Indian Leather Technologists' Association

[A Member Society of International Union of Leather Technologists' and Chemists Societies (IULTCS)]

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- An Association with over 600 members from India and abroad working since last 64 years for the growth and development of Leather and its allied industries.
- Organize seminars, symposiums, workshops in order to share information, knowledge & latest development and interactions for the benefit of all concerned.
- Organize Human Resource Development programmes on regular basis.
- Publish for over 60 years, a technical monthly journal namely "Journal of Indian Leather Technologists' Association" (JILTA), widely circulated through out the World.
- Publish books for the benefit of the students at various levels of study, for the Research Scholar and the Industry.
- Work as interface between Industry and the Government.
- Assist Planning Commission, various Government Institutions, Ministry and autonomous bodies to formulate appropriate policies for the growth of the Industry.
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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION [JILTA]

Indian Leather Technologists' Association is a premier organisation of its kind in India was established in 1950 by Late Prof. B.M.Das. It is a Member Society of International Union of Leather Technologists & Chemists Societies (IULTCS).

The Journal of Indian Leather Technologists' Association (JILTA) is a monthly publication which encapsulates latest state of the art in processing technology of leather and its products, commerce and economics, research & development, news & views of the industry etc. It reaches to the Leather / Footwear Technologists and the decision makers all over the country and overseas.

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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION [JILTA]

Indo-Iranian Tie – Though belated but need of the time

India's low passion, very cautious, relationship with Iran of the last 36 years awaits transformation, Prime Minister Modi's visit cannot be a negotiating event; it is a symbolic one to strengthen the politico-diplomatic relationship.

Prime Minister Modi's visit cannot be a negotiating event; it is a symbolic one to strengthen the politico-diplomatic relationship. However, it will be the culmination of some processes which have been going on in the background. Everyone's eyes are on Chah Bahar port which lies in the Sistan Baluchistan area of southern Iran; we should know the geo-strategic and geo-economic reasons for this. Yet, as a starter it is good to be aware that this area has had a running low key insurgency for many years and the Islamic Republican Guard is deployed to counter it.

The prime minister's visit is being seen as a big ticket event on Chah Bahar because once embedded here the Indian commercial set-up can finally start looking towards Central Asia, 24 years after the first opportunities arose. Denied access to both Afghanistan and Central Asia by Pakistan these developments are also being closely watched by Islamabad. A Transport and Transit Corridors (Chabahar) Agreement was finalised during the second meeting of experts in Delhi on April 11, 2016 and includes Afghanistan within its ambit. This will be a major strategic breakthrough and is to be inked during the visit. Once materialised it is bound to enhance the Iran-India-Afghanistan relationship and help the latter in its fledgling trade ventures.

However, the fact that the infrastructure connecting Chah Bahar inwards and onto the intended areas is either nonexistent or in a poor state will mean that the real worth of the Agreement will take time to materialize. There is a need for refurbishment and fresh construction of railway infrastructure and provision of rolling stock which is already underway. This will need stamina, staying power and much convincing for Iran's continued involvement even in the face of other viable and functional ports at Bandar Abbas and Bandar Khomeini. Energy will compete with connectivity as the next big issue. With funds in its hands after the de-freezing of its $100 billion in the US Iran should be looking towards participating in big ticket projects which will enhance the quantum of supply of natural gas to India. The Iran Pakistan India $7.5 billion pipeline is as good as dead due to Pakistan's obstinacy. However, there are other projects on the drawing board such as an Iran Oman India undersea pipeline. The Farzad 2 gas fields are likely to be taken up by some Indian companies with a $5 billion to $10 billion investment. Here again it is a question of competing technology from the US and other developed countries to exploit Iran's known reserves. Indian companies will have to give robust competition.

How will Pakistan and China see these developments in the light of the $46 billion investment that China is making in the China Pakistan Economic Corridor? The idea of isolating India and having an exclusive connect in the region for China is likely to fly in the face if the projects being contemplated fully fructify. Perhaps more public sector support to India's private players may be needed. China will attempt to do everything to prevent this happening and through the proxy of Pakistan which has restive borders in the Chah Bahar region. Lastly,

an issue for the sidelines of the PM's visit which must be something India should constantly seek for its viability is the Iran-Israel relationship. There really are no potential mediators. Animosity and antagonism do not last forever. They too are contextual. Perhaps, with contexts changing and the common adversary of all being ISIS (Daesh), Iran and Israel have no reason to be adversaries. The Hezbollah question will remain. However, even Israel should be happy to rid itself of the burden of constantly defending itself.

Perhaps the time for the idea has come and India can play the most positive role in this regard.

Significance of the visit in a nutshell :

1. India and Iran signed a deal to develop the Chabahar port, situated less than 100 km from Pakistan's Gwadar Port.

2. According to an estimate, India will be spending $500 million for the development of Chabahar Port. The move is aimed at cutting down the importance of Pakistan's Gwadar Port, built with China's help.

3. Once operational, the Chabahar Port will help India bypass Pakistan and transport goods directly to Afghanistan and Central Asia.

4. Located in south-east Iran, the Chabahar Port will enable India to bypass Pakistan and open up a route to land-locked Afghanistan with which New Delhi has close security ties and economic interests. It will also open India's trade route to West Asia.

5. From Chabahar, the existing Iranian road network can link up to Zaranj in Afghanistan, about 883 km from the port.

6. The Zaranj-Delaram Road constructed by India in 2009 can give access to Afghanistan's Garland Highway, setting up road access to four major cities in Afghanistan – Heart, Kandahar, Kabul and Mazar – e – Sharif.

7. India has already spent $100 million building a 220-kilometre road in the Nimroz province of Afghanistan. The road will be extended to Chabahar.

8. India will no longer be dependent on Pakistan's permission to allow Indian trucks to Afghanistan through Wagah border. Chabahar will help New Delhi's efforts to engage with Kabul directly both strategically and economically.

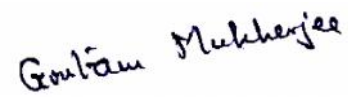
9. India and Iran had in 2003 agreed to develop Chabahar on the Gulf of Oman outside the Strait of Hormuz, near Iran's border with Pakistan.

10. However, the project moved slowly mainly because of sanction by the West, primarily the US, against Iran. The sanctions were lifted in January, 2016.

11. Chabahar Port is of a strategic importance to India. The port will help counter Chinese presence in the Arabian Sea. Chabahar is India's answer to China's Gwadar.

12. Can provide the diplomatic edge to India's ambition of developing a blue-water navy, India's partnership with Iran in Chabahar completes its strategic goal of encircling Pakistan as the port's development aims to bypass her in Afghanistan.

13. Counter the Chinese : The Chinese presence at Gwadar in Pakistan and threats posed by Kashghar-Gwadar corridor would be checked.



Goutam Mukherjee

Formation of various Sub-Committees

LEXPO Siliguri – XXII having been successfully over, this Committee has been dissolved.

In the 487th E.C. Meeting held on 28.04.2016 & 488th E.C. Meeting held on 26.05.2016, formation of the following Sub-Committees were recommended. Kind consents of most of the recommended Members have already been received, the same is awaited from a few.

1) Sub-Committee for Library & Archieve :

Dr. Goutam Mukherjee (Co-Ordinator)
Mr. Jiban Dasgupta
Mr. Shiladitya Deb Choudhury
Mr. Tarak Chandra Saha
Mr. Aloke Kumar Dey

The primary function of this sub-committee will be proper maintenance of the library, purchase of new books useful for leather industry etc.

2) Sub-Committee for Foundation Day Celebration :

Mr. Kaushik Bhuiyan (Co-Ordinator)
Mr. Prabir Kumar Dasgupta
Mr. Kunal Naskar
Mr. Debashish Chakraborty
Mr. Jiban Dasgupta
Mr. Bibhas Chandra Jana
Mr. Amit Kumar Mondal
Mr. Aniruddha De

The primary function of this sub-committee will be to draw up a plan and obtain E.C.'s concurrence for the same and be actively associated with the implementation of the approved plan which will be a whole day program with national seminar, lunch, tea, dinner and a cultural program.

3) Sub-Committee for reshaping LEXPOs :

Mr. Aloke Kumar Dey (Co-Ordinator)
Mr. Pradipta Konar
Mr. Jiban Dasgupta
Mr. Prabir Kumar Dasgupta
Mr. Sudhansu Kumar Biswas
Mr. Bibhas Chandra Jana
Mr. Kaushik Bhuiyan
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Mr. Mrinal Kanti Chakraborty
Mr. Kanak Kumar Mitra
Mr. Paresh Chandra Mukherjee
Mr. Bani Prasad Gorai
Mr. Debashish Chakraborty
Mr. Shiladitya Deb Choudhury
Mr. Udayaditya Paul

The primary function of this sub-committee will be to plan venue & schedule of Lexpos to be organized well in advance during financial year 2016-2017 and obtain E.C.'s concurrence for the same and be actively associated with the implementation of the approved plan.

The area of activities will be primarily to give a different shape to our Lexpo Fair which will meet the aspiration of common people, the exhibitors and will meet our objectives more effectively.

4) Membership Sub-Committee :

Mr. Sudhansu Kumar Biswas (Co-Ordinator)
Mr. Shiladitya Deb Choudhury
Mr. Bibhas Chandra Jana

The primary function of this sub-committee will be to review the applications for new membership, to take steps to increase the number of prospective members, to help office to update the record of the members and to find out the members interested to join in any of our activities.

5) Sub-Committee for updation of Members' Information Database :

Mr. Kaushik Bhuiyan
Mr. Jiban Dasgupta
Mr. Shiladitya Deb Choudhury
Mr. Bibhas Chandra Jana

The primary function of this sub-committee will be to provide Email Ids / Mobile No.s of Members known to the sub-committee members

6) Sub-Committee for Marketing of Books published by ILTA :

Dr. Goutam Mukherjee
Dr. Sanjay Chakraborty

The primary function of this sub-committee will be to find & plan ways & means to publish the contents and availability of these books throughout the world which will increase the possibility of sale of these books and the readers will be benefited.

7) Sub-Committee to look after the commercial aspect of JILTA :

Mr. Asit Baran Kanungo
Dr. Goutam Mukherjee
Mr. Shiladitya Deb Choudhury

The primary function of this sub-committee will be to explore the possibility of making "JILTA" commercially viable by making proper plan to avail the opportunities presently being used by other publishers or any other arenas.

8) Sub-Committee for Seminar, Workshop, Training with Govt. Support :

Dr. Goutam Mukherjee (Co-Ordinator)
Mr. Arijit Chakraborty
Mr. Udayaditya Pal
Mr. Sudipta Sen
Mr. Swapan Kr. Basu

The primary function of this sub-committee will be to plan Seminar, Workshop, Lectures, Training, Project etc. with Govt. support and after the plan is approved by the E. C., be actively associated with the implementation of such approved plan with financial support from the Govt.

9) Regional Sub-Committees :

Presidents and the Secretaries of the two Regional Committees have been requested to recommend Sub-Committee with 3/4 Members including the co-ordination the regional activities. Such as organizing a National Seminar, assisting in organizing IULTCS -2017.

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c) **Kindly obtain an Acknowledgement Slip (available at ILTA Office) for any document handed over to ILTA Office.**

Susanta Mallick
General Secretary

Executive Committee Members meet every Thursday at 18-30 hrs. at ILTA Office.
Members willing to participate are most welcome.


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Since 1950

Article

Economic Development in India: The Role of Leather Industries

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Abstract

The Indian leather industry holds a very prominent place in the Indian economy in view of its massive potential for employment, growth and exports. With a vast captive source of raw materials, a national network of tanneries, skilled manpower for leather goods manufacture and a well-established presence in export markets, India's leather industry is poised to grow even further. There has been an increasing emphasis on its planned development, aimed at optimum utilization of available raw materials for maximizing the returns, particularly from exports. The industry comprises of firms in all capacities starting from small artisans to prominent global players. India ranks first among major livestock holding countries in the world and thus has a rich endowment of raw materials in terms of the cattle population. It has the capacity to fulfill 10% of the global leather requirement. Export of leather and leather products during 2014-2015 registered an impressive growth at US$ 6494.41 million against the performance of US$ 5937.97 million in the corresponding period of last year, recording a positive growth of 9.37%. The article tries to evaluate performance of Indian leather industry in terms of productivity growth and estimating the industry's future growth performance of by means of SWOT analysis.

Keywords: Leather industry, economic growth, export, leather goods, productivity.

Introduction

Leather has had a universal appeal from time immemorial. The leather industry plays significant part in the development of Indian economy and is one of the most widely traded commodities globally. Leather and leather manufacturers constitute an indispensable and dependable source for export trade and foreign exchange earnings. This sector is known for its consistency in high export earnings and is the ninth largest global exporter of leather goods and accessories in the world. The growth in demand for leather is driven by the fashion industry, especially footwear and the sector is also the second largest producer of footwear and leather garments. Apart from this, furniture and interior design industries, as well as the automotive industry also demand leather. For India, leather industry is a high priority industrial sector and an extreme focus area owing to its prominence in the Indian economy in view of its massive potential for employment, growth and exports. There has been an increasing emphasis on its planned development, aimed at optimum utilization of available raw materials

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for maximizing the returns, particularly from exports. The exports of leather and leather products gained momentum during the past two decades.
Indian leather industry today has attained well merited recognition in international markets besides occupying a prominent place among the top seven foreign exchange earners of the country. The leather industry has undergone a dramatic transformation from a mere exporter of raw materials in the sixties to that of value added finished products in the nineties and onwards. The share of value added finished items in the total exports from the leather sector have presently reached 80 % against 20 % in the 1970s. The Policy initiatives taken by the Government since 1973 for the development of the sector through optimal utilization of available raw materials have been instrumental in the phenomenal transformation of the leather industry. One important policy initiative taken by the Government includes liberalization of the leather sector. Government has de-reserved the manufacture of various types of leather viz. semi-finished leather, harness leather, leather shoes etc., which are produced by small-scale sector (Ray, 2011). In the wake of globalization of Indian economy supported with liberalized economic and trade policies since 1991, the industry is poised for further growth to achieve greater share in the global trade. Apart from a significant foreign exchange earner, leather industry has tremendous potential for employment generation. Direct and indirect employment of the industry is around 25 lakhs people. The skilled and semi-skilled workers constitute nearly 50% of the total work force (Naidu, 2000).

Precipitated by a balance of payments crisis, India has adopted several waves of far-reaching trade reforms since 1991. The reforms have included sharp reductions in the number of goods subject to licensing and other non-tariff barriers, reductions in export restrictions, and tariff cuts across all industries. Trade liberalization has resulted in higher levels of competition within the Indian economy. There has been ongoing debate regarding impact of liberalization on productivity growth in Indian manufacturing industries. The 90's reforms were taken up to make Indian industries efficient, technologically up to date and competitive. The enhancement of efficiency, upgradation of technology and enhancement of competition were expected to make Indian industries rapidly growing. In the wake of globalization of Indian economy supported with liberalized economic and trade policies since 1991, the industry is poised for further growth to achieve greater share in the global trade (Topalova, 2011).

Literature Review

An attempt has been made to critically review the literature of the past research work in relevance to present study objective, so that theoretical views and empirical evidences of the reviews enables better understanding of the subject. Shetty (1963) pointed out that the technological base in the industry was extremely primitive and a unit was rarely interested to adopt technological modification in the process. Usha (1985) focused attention on some selected issues related to the structure of work force, Mechanization and the prospect of the traditional skilled and unskilled workforce in the industry. Her Major findings were that the leather tanning sector in Tamil Nadu, about 90.0 % of the total entrepreneurs belonged to the Muslim Community and rest belong to the Hindu Community. As regards the Mechanization of Industry, most of the tanning and manufacturing units were using Labor-intensive

technique, in which the skilled hand workers formed a majority of the workforce. Qureshi (1990) discussed some issues of leather making artisans of Mewat region in the district of Gurgaon, Haryana A large Majority of Leather Products makers were facing problems of inferior quality of goods, time consuming, less profitability, low prices for products, non availability of credit and payment delays. Sahasranaman (1993) pointed out some basic problems of the leather product industry. According to this study, in the Leather product Industry, the dominance of traditional production system, confinement of production to a particular community, absence of modernization of technology, were the basic problems of the producers. Jagathnath Krishna *et al*.(1999) stated that the production of leather and leather products involves various socio-economic activities. The economic activities were largely in the form of generation of income, creation of employment, etc. On the other hand, the production of leather and leather goods led to the social development in the form of understanding, awareness, social equity, better health, education and nutrition. Thanikaivelan *et al*.(2005) summarizes the current leather processing methods with their rationale and environmental problems and to revamp leather processing methods anew for the sustainability of leather industry. Some of the novel concepts in leather processing are briefly mentioned and discussed. Bhavani (2010) highlights the issue of quality employment generation by the Small Scale Industries and negates the short term attitude of increasing the volume of employment generation compromising with quality. The author argues that such employment generation may be high in quantitative term but very low in quality. Technological upgradation would enable the small firms to create quality employment improving, duration and skill. This structural shift may reduce the rate of employment generation in the short run but would ensure high-income employment generation in the long run. Neeraj, (2016) emphasize the continuous export growth in the various segments of leather industries and its role in the economical development.

Objectives of the Study

The objective of the study is aimed at comprehending the status of India's trade of leather and leather products in the global market by analyzing India's position and country-wise growth rate of exports of leather articles and to examine the stability in the exports of leather articles at the global level.

Research Methodology

This research paper is descriptive and analytical in nature. Data are collected from various research papers, journals, books, internet, published documents and reports of Government agencies. Further, the secondary data has been compiled to understand the importance and contribution of leather industry to the economical growth and development.

Structure of the Industry

The Indian leather industry comprises both organized and unorganized segments from small artisans to global companies which produce a wide range of products from raw hides to fashionable shoes. The organized manufacturing sector broadly consists of tanning and dressing of leather, manufacture of luggage, handbags, saddlery, harness and footwear. The unorganized sector plays a dominant role in the entire production of leather & leather products. The sector is dominated by micro and small units with bigger units accounting for just around 5 % of the total manufacturing units. The distribution of units in terms of broad classification of micro, small, medium enterprises and others is indicated in Table 1.

Table 1: Structure of the industry

(in numbers)

Category	Large Units	Medium Units	Small Units	Micro Units	Merchant Units	Total
Finished leather	30	49	309	68	151	607
Leather footwear	38	46	228	49	81	442
Non leather footwear	4	2	34	13	17	70
Footwear component	29	32	182	28	22	293
Leather goods	14	13	242	259	210	738
Leather garments	8	8	132	49	72	269
Leather gloves	4	3	38	36	24	105
Harness and saddlery	3	9	74	69	26	181
Total	**130**	**162**	**1239**	**571**	**603**	**2705**

Source: DIPP/MOCI/Working Group Report/12th Five Year Plan /Leather Industry.

The small scale, cottage and artisan sectors account for a significant 75-80 % of the total production in the categories of footwear, leather goods and leather apparel. On the other hand, the tanneries segment operates more in the organized space. The medium and large scale sectors account for about 55 % of finished leather production.

Apart from the quality of the raw material, the process of its conversion into leather and later processes like design, product development and product manufacture play a key role in the value-addition. The domestic leather & footwear industry comprises both integrated as well as standalone companies. The integrated companies operate across the entire value chain spectrum spanning collection of hides & skins, tanning & finishing of leather and manufacturing of leather goods. The standalone companies operate in any one of the three activities. The various products of the industry can be broadly classified into different segments, namely, tanning & finishing, footwear & footwear components, leather garments, leather goods including saddlery & harness, etc. The estimated production capacity in different segments is given in Table 2.

Table 2: Production capacity in different segments

Product	Capacity
Hides	65 million pieces
Skins	170 million pieces
Finished Leather	2 billion sq. ft.
Footwear & footwear components	909 million pairs
Leather shoe uppers	100 million pairs

Product	Capacity
Non-leather footwear	1056 million pairs
Leather garments	16 million pieces
Leather Goods	63 million pieces
Industrial gloves	52 million pairs
Saddlery and harness	12.50 million pieces

The production of leather & leather products is by and large cluster centric. Table 3 gives details of major production centres in the country. Firms in the sector are concentrated in clusters in Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, New Delhi, Punjab, Tamil Nadu, Telangana, Uttar Pradesh, West Bengal. Besides this, there are some minor clusters in the States of Andhra Pradesh, Assam, Bihar and Rajasthan. These clusters have distinct features. Agra is, for instance, a leather product cluster, while Kanpur is a leather as well as product cluster. In terms of geographical coverage of value activities, while tanning is broadly distributed among Tamil Nadu (55-60 %), Kanpur (12-15 %), Kolkata (18-20 %), and Jalandhar (5-7 %), the footwear industry is concentrated in the clusters of Agra and Kanpur. Tamil Nadu, Uttar Pradesh and West Bengal account for bulk of the output.

Table 3: Leather and leather product production centres/clusters in India

Zone	State	District/Region	Major products
East	West Bengal	Kolkata	Leather hand bags, pouches fashion gloves, wallets, purses industrial gloves, travel an luggage bags, chappals, sandal and all other small leather goods.
West	Maharashtra	Andheri (East), Bhiwandi and Kolhapur	Leather footwear, ladies sandals and leather goods. Kolhapur is famous for Kolhapuri chappals.
North	New Delhi	New Delhi	Leather garments, leather footwear, leather accessories, leather goods
	Uttar Pradesh	Kanpur, Agra, Noida and Saharanpur	Finished leather, safety boots, leather footwear, footwear uppers, leather goods and harness and saddlery items.
	Punjab	Jalandhar and Ludhiana	Leather footwear, non-leather footwear
	Haryana	Ambala, Gurgaon, Panchkula, Karnal, Faridabad, Bahadurgarh and Manesar	Finished leather, leather footwear, footwear components,

Zone	State	District/Region	Major products
South	Karnataka	Bangalore	Men's and ladies' leather garments and accessories
	Kerala	Calicut, Cochin	Finished leather, leather garments leather footwear, footwea components, leather accessories
	Tamil Nadu	Chennai, Vaniyambadi, Trichy, Erode, Ranipet, Vellore, Ambur, Pallavaran, Pernambut, Dindigul, Chromepet, Vandalur and Madhavaram	Finished leather, leather footwear, footwear components, leather garments, leather goods and leather gloves
	Telangana	Hyderabad	Leather footwear, leather foot wear components, leather garments, harness & saddlery, leather gloves, finished leather
Central	Madhya Pradesh	Dewas	Men's and ladies' leather garments and accessories, men's shoes ladies' shoes, children's shoes sandals and upholstery leathers

Source: Council for Leather Exports

The skewed structure of the industry in India, viz., towards a largely unorganized and small enterprise segment is by virtue of the erstwhile policy of reservation of bulk of this industrial sector for the small-scale sector. Smaller size of operations and also various limitations on Foreign Direct Investment (FDI) policy in terms of equity and repatriation norms had (in the past) limited FDI and Joint Ventures. This was even while South-East Asian countries including China facilitated rapid relocation of industry from developed countries. This stunted growth trends vis-à-vis potential. Subsequently, however, in India, export based incentives were provided to industry and investment norms liberalised, catalysing growth.

Raw Material Supplies

The industry uses primarily indigenous natural resources with little dependence on imported resources. The primary sources of raw material for the leather industry all over the world are cattle, buffalo, sheep and goat. However, the skins of camel, equine, kangaroo and deer are also tanned but these do not account for a notable share of the world's leather output. Trade in the skins of exotic or wild animals was banned globally under the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), of which India is a signatory. The leather industry is bestowed with an affluence of raw materials as India is endowed with 21% of world cattle and buffalo and 11% of world goat & sheep population.

This is on account of population of 190.90 million cattle, 108.70 million buffaloes, 135.17 million goats and 65.06 million sheep. These four species provide basic raw material for the leather industry. According to the latest census, India ranks first in respect of buffalo, second in cattle & goats, third in sheep among the major livestock holding countries in the world.

Table 4: Animal population and livestock availability for leather industry

(million numbers)

Species	Population	Share of global population	Global Rank	Percentage culled each year for the leather industry	Livestock available annually for skinning and tanning
Buffalo	108.70	67.39 %	I	22 %	23.91
Cattle	190.90	14.32 %	II	12 %	22.90
Goat	135.17	17.97 %	II	77 %	104.08
Sheep	65.06	5.33 %	III	62 %	40.33

Source: Livestock Census, 2012

The annual availability of 2 billion square feet of leather accounts for 10% of world leather requirement is the main strength of the industry, accounts for a share of 21.02% of India's total export. Some of the goat / calf / sheep skins available in India are regarded as speciality products commanding a good market.

The system of collecting hides and skins in India is quite unlike practices followed in other industrialized countries of the world. A report of the Council for Leather Research in India (CLRI) stated that, annually, about nine million hides and an equal number of skins were lost due to non recovery from carcasses in far flung villages. A well-established network of butchers, animal breeders, small and big traders, agents, weekly markets and major markets exists across the country. Large traders in major markets have their agents in small feeder towns and villages. They receive hides and skins from villages either through their sub-agents or directly from butchers. Often villagers transport the hides and skins directly to weekly markets from where agents of large traders procure them. A system of advance payment to butchers also prevails. Generally, it takes 7 to 21 days for hides to reach the tannery after the animal has been skinned (CLRI, 1990).

Tanning and Finishing Capacity

With tanning and finishing capacity for processing 235 million pieces of hides and skins per annum spread over different parts of the country, most of which is organized along modern lives, the capability of India to sustain a much larger industry with its raw material resource is evident. Tanneries are spread all over the country. According to a CLRI report, there are 2091 tanneries functioning across the country (Table 5). This number does not include the unregistered cottage-scale tanneries. Of late, tanning activities in the states of Maharashtra (particularly Mumbai), Karnataka (mainly Bengaluru) and Rajasthan have reduced considerably due to economic and environmental reasons.

Table 5 : Number of tanneries spread across India

State	Number of Tanneries	Salient Features
Tamil Nadu	939	– Out of the total number of tanneries in India, about 45% are in Tamil Nadu alone. – Tamil Nadu, West Bengal and Uttar Pradesh account for 88.50% of the total tanneries in the country. – The states of Tamil Nadu, Uttar Pradesh and Maharashtra contribute to 85% of the total production each with a share of 37.44%, 21.74% and 14.96% respectively.
West Bengal	538	
Uttar Pradesh	392	
Punjab	79	
Maharashtra	33	
Andhra Pradesh	24	
Haryana	18	
Bihar	17	
Karnataka	16	
Rajasthan	15	
Others	20	
Total	**2091**	

Source: Central Pollution Control Board

As the manufacture of semi-processed leather or chrome tanning was reserved for the small-scale sector until recently, there is a preponderance of small-tanneries across the country. Table 6 compares the tanning capacities of India's small scale and large/medium tanneries through the different stages of leather processing. Limited resources, small scale of operations, lack of technical expertise and a hand-to- mouth situation prevent a majority of small-scale tanneries from opting for modernization or improved process technologies.

Table 6: Comparison of capacities of Indian small-scale and large/medium tanneries

(million pieces)

Stage of processing	Item	Installed capacity (per annum)		
		SSI	Medium/Large	Total
Raw to semi-finished hides and skins	Hides	23.16 (97.47)	0.60 (2.53)	23.76 (100)
	Ovine skins	57.58 (96.58)	2.04 (3.42)	59.62 (100)
Raw to finished leather	Hides	27.94 (72.97)	10.35 (27.03)	38.29 (100)
	Ovine skins	70.56(69.37)	31.16 (30.63)	101.72 (100)
Semi-finished to finished leather	Hides	9.38 (68.67)	4.28 (31.33)	13.66 (100)
	Ovine skins	32.31(68.83)	18.31 (36.17)	50.67 (100)

Note : Figures in brackets indicate percentage shares to total hides including calfskins

Source : Council for Leather Research in India

In order to augment the domestic raw material availability, the Government of India has allowed duty free import of hides and skins from anywhere in the world. It is an attraction for any foreign manufacturer who intends to shift his production base from a high cost location to low cost base.

Product-wise Classification

Indian Leather Footwear Industry

India is the second largest global producer of footwear after China, accounting for 14% of global footwear production. It is the engine of growth for the entire Indian leather industry with an all total annual production 2065 million pairs. Huge domestic retail market 1950 million pairs (95%) are sold in domestic market. Footwear export accounts for 42.83% share in India's total leather & leather products export. The Footwear product mix Gents 54%, Ladies 37% and Children 9%. Major category of footwear exported from India include dress shoes, casuals, moccasins, sports shoes, horacchis, sandals, ballerinas, and booties. Most of the modern footwear manufacturers in India are already supplying to well established brands in Europe and USA. Nearly 75% of India's export of footwear is exported to European countries and USA. The footwear Sector is now de-licensed and de-reserved, paving the way for expansion of capacities on modern lines with state-of-the-art machinery. To further assist this process, the Government has permitted 100% FDI through the automatic route for the footwear sector.

Indian Leather Goods Industry

The leather garment industry is the Fifth largest global exporter with an Annual production capacity – 63 million pieces of leather articles, 52 million pairs of Industrial gloves. Items produced by this sector include, in addition to bags, handbags, hand gloves and industrial gloves, wallets, ruck-sacks, folios, brief cases, travelware, belts, sports goods, upholstery and saddlery goods. A surfeit of modern units in Chennai, Kanpur and Calcutta employing skilled human resources and equipped with modern and sophisticated machinery account for a diversified range of superlative small leather goods including bags, purses, wallets, industrial gloves etc. made of quality leathers of cows, sheep, goats and buffaloes. The products meet the requirement of bulk buyers and consumers in Europe, USA and Australia. The major market for Indian leather goods is Germany, USA, UK, France and Italy. With products ranging from designer collections to personal leather accessories, this sector has a share of 25.34 % in the leather industry, while maintaining an average growth rate of 11 % recorded in the last five years.

Indian Saddlery Industry

India is one of the largest producers of saddlery and harness goods in the world. The saddlery industry was established in the 19th century primarily to cater to the needs of military and police. From then on initiatives were taken to develop, the industry and today there are over 150 units in the organized sector, out of which approximately 105 are 100% export oriented

units. The estimated annual production capacity for the production of Saddlery & Harness is 12.50 million pieces. Kanpur, in the state of Uttar Pradesh, is a major production centre for saddlery goods in India accounting for more than 95% of the total exports of saddlery items from India. Kanpur, because of its specialization in tanning and finishing of buffalo hides is the only centre in the country where harness leather, which is major input for saddlery industry, is manufactured. The major importers of Indian saddlery are Germany, USA, UK, France, Scandinavia, Netherlands, Japan, Australia and New Zealand.

Indian Leather Garments Industry

The leather garment industry occupies a place of prominence in the Indian leather sector and is the second largest producer with annual production capacity of 16 million pieces. The sector is also the third largest global exporter accounting for 10.09% share of India's total leather export. The product classification of leather garments comprise of jackets, long coats, waist coats, shirts, pant/short, children garments, motorbike jackets, aprons and industrial leather garments. The major export destination of leather garments from India is Germany. Among the three major exporting nations of leather garments (India, China and Turkey), India maintains a similar level of market share of about 20%, in both German and EU markets. Other markets for India include Italy, U.K., U.S.A. France, Spain and Netherlands.

Export Potential

India's leather industry has grown drastically, transforming from a mere raw material supplier to a value-added product exporter. The leather industry, one of the major foreign exchange earners of the country recorded significant growth since the beginning of the decade. Today the share of the value added finished products in the total exports from leather sector are 80% as against 20% in 1970s. Commanding over 10 % of the global raw material requirement, a liberal import policy re upporting infrastruc India has considera

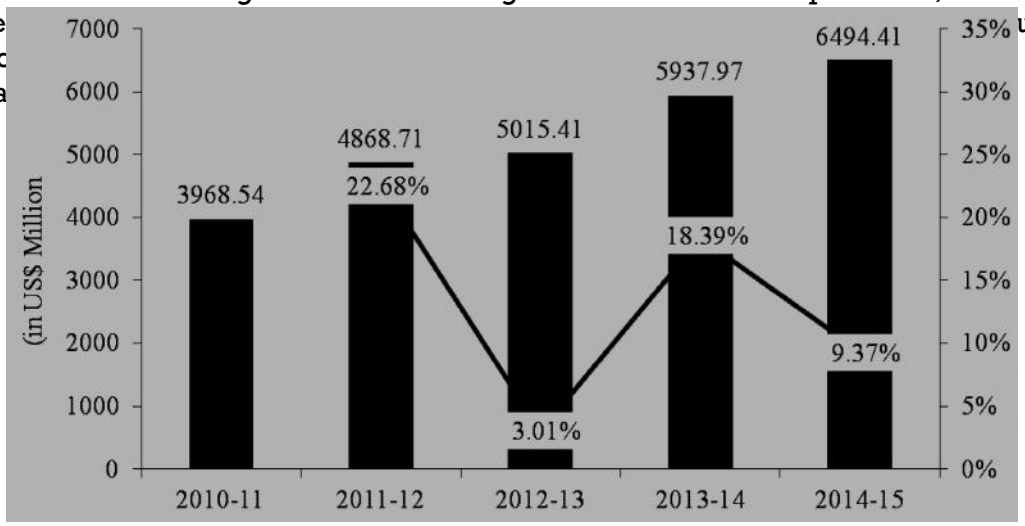

Figure 1: India's export of leather and leather products for five years

Source: Council for Leather Exports

The export of leather and leather products for the Financial Year (FY) April-March 2014-15 touched US$ 6494.41 million as against the performance of US$ 5937.97 million in the corresponding period of last year, recording a positive growth of 9.37%. In Rupee terms, the export touched Rs. 397091.55 million in April-March 2014-15 as against the previous year's performance of Rs. 359246.15 million registering a positive growth of 10.53%. The product-wise export performance during FY 2015 vis-à-vis FY 2014 is given in Table 7.

Product-wise Export performance during April-March 2014 – 15 vis-à-vis April-March 2013 – 14 is given below:

(Value in Million US$)

CATEGORY	APRIL-MAR 2013 – 14	APRIL-MAR 2014 – 15	% VARIATION	% Share
FINISHED LEATHER	1284.71	1329.05	3.45%	20.46%
LEATHER FOOTWEAR	2035.45	2277.52	11.89%	35.07%
FOOTWEAR COMPONENTS	320.15	361.21	12.82%	5.56%
LEATHER GARMENTS	596.15	604.25	1.36%	9.30%
LEATHER GOODS	1353.91	1453.26	7.34%	22.38%
SADDLERY AND HARNESS	145.54	162.70	11.80%	2.51%
NON-LEATHER FOOTWEAR	202.06	306.42	51.65%	4.72%
TOTAL	**5937.97**	**6494.41**	**9.37%**	**100.00%**

(Value in Million Rs.)

CATEGORY	APRIL-MAR 2013-14	APRIL-MAR 2014-15	% VARIATION
FINISHED LEATHER	77724.70	81262.67	4.55%
LEATHER FOOTWEAR	123144.36	139255.74	13.08%
FOOTWEAR COMPONENTS	19369.28	22085.68	14.02%
LEATHER GARMENTS	36067.17	36945.77	2.44%
LEATHER GOODS	81911.00	88857.54	8.48%
SADDLERY AND HARNESS	8804.99	9948.29	12.98%
NON-LEATHER FOOTWEAR	12224.65	18735.86	53.26%
TOTAL	**359246.15**	**397091.55**	**10.53%**

Source: DGCI&S

Export of different categories of footwear holds a major share of about 45% in India's total leather and leather products exports with an export value of US$ 2945.15 million. this is followed by leather goods and accessories with a share of 22%, finished leather, 21%, leather garments 9% and saddlery & harness 3%.

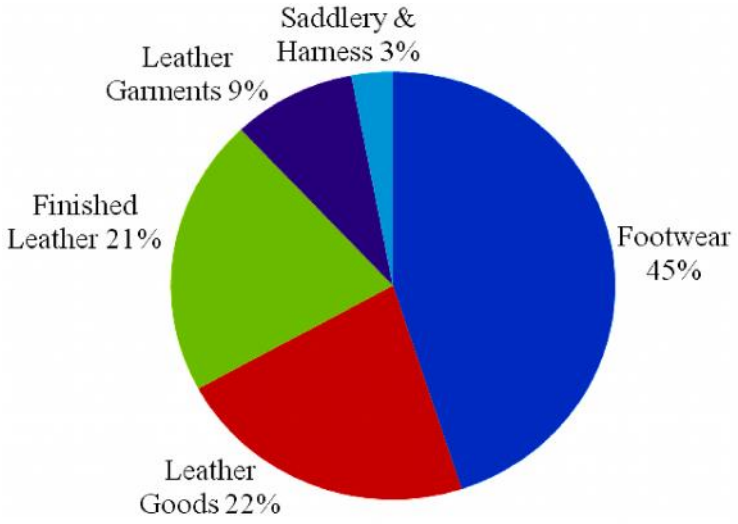

Figure 2: Product-wise percentage share in total exports

Global Scenario

Export of leather & leather products have shown positive growth in all the product segments during the period April-March 2014-15 both in Rupee and Dollar terms. The major markets for Indian leather & leather products during 2014–15, are Germany (12.32%), USA (11.83%), UK (11.57%), Italy (7.76%), France (5.72%), Hong Kong (6.50%), Spain (5.41%), Netherlands (3.46%), China (2.99%), Denmark (1.29%), UAE (4.3%), Belgium (1.68%). These 12 countries together accounts for nearly 75% of India's total leather & leather products export and European Union accounts for 57% of India's total export of leather and leather products (Table 8).

Table 8: Trend of leather & leather products export to different countries during April-March 2014-15 vis-à-vis April-March 2013-14

Country	April-Mar 2013-14	April-Mar 2014-15	% Change	Total Export 2014-15
	(Value in Million US$)			
Germany	765.56	800.20	4.52%	12.32%
USA	680.22	768.06	12.91%	11.83%
UK	664.92	751.33	13.00%	11.57%
Italy	518.04	504.26	-2.66%	7.76%
Hong Kong	471.61	422.11	-10.50%	6.50%

Country	April-Mar 2013-14	April-Mar 2014-15	% Change	Total Export 2014-15
	(Value in Million US$)			
France	354.72	371.75	4.80%	5.72%
Spain	308.07	351.27	14.02%	5.41%
Netherlands	218.55	224.92	2.92%	3.46%
U.A.E.	180.54	281.07	55.68%	4.33%
China	153.63	194.26	26.45%	2.99%
Belgium	95.73	108.88	13.74%	1.68%
Denmark	89.38	83.90	-6.12%	1.29%
Vietnam	86.34	115.57	33.86%	1.78%
Australia	78.73	84.66	7.53%	1.30%
Korea Rep.	58.30	68.47	17.46%	1.05%
Portugal	51.84	68.39	31.93%	1.05%
Canada	51.66	59.24	14.69%	0.91%
Russia	51.58	49.96	-3.14%	0.77%
Sweden	50.62	46.48	-8.18%	0.72%
Japan	48.76	56.21	15.28%	0.87%
South Africa	48.16	55.04	14.28%	0.85%
Austria	40.06	35.48	-11.44%	0.55%
Saudi Arabia	38.67	47.42	19.11%	0.73%
Switzerland	32.82	37.05	12.89%	0.57%
Indonesia	27.22	28.95	6.37%	0.45%
Singapore	19.77	22.14	11.97%	0.34%
Greece	12.01	14.22	18.40%	0.22%
New Zealand	9.66	12.11	25.38%	0.19%
Others	730.82	831.01	13.71%	12.79%
Total	5937.97	6494.41	9.37%	100.00%

Source : DGCI&S

Although the exports of Indian leather and leather products have grown manifold during the past decades, our country's share in global trade is around 3% among world imports of leather products. Whereas India's share in world imports of leather footwear is 1%. Major exporting countries of leather footwear are China (14% share), Portugal (6% share), Brazil (5% share) and Indonesia (4% share).

India's share in world imports of leather garments is 6%. Major exporting countries of leather garments are China (36% share), Germany (9% share), Italy (7% share), Turkey (5% share) and Pakistan (4% share)

India's share in world imports of leather goods is 7%. Major exporting countries are China (22% share), Italy (22 % share), France (7% share) and Greece (5% share). India's share in world imports of harness and saddlery is 8%. Major exporting countries of harness & saddlery are Germany (14 % share), U.K. (14 % share), China (12% share). Overall, India is facing fierce competition in international market from countries like China, Vietnam, Thailand, Indonesia, etc., which are emerging as major manufacturing countries.

East European countries like Poland, Romania, Czech and Slovak Republics have re-emerged as major production centres particularly for footwear sector. These countries pose major challenge to Indian exporters as they enjoy geographical advantage.

India is a sourcing point for global brands. With regard to footwear, some of the global brands are Acme, Ann Taylor, Bally, Clarks, Diechmann, DKNY, Florsheim, Gabor, Guess, Harrods, Hush Puppies, Kenneth cole, Marks & Spencers, Nike, Pierre cardin, Reebok, Salamander, Tommy Hilfiger, Diesel, Lacoste, Kickers, Calvin Klein, Bata, H&M, Mercedez and many more. In the garments sector some such brands are Armani, Marco Polo, Guess, Pierre Cardin, Tommy Hilfiger, etc. with regards to leather goods and accessories, some of the value chain leaders and marketers are Liz Claiborne, Harrods, Yves St, Laurent, Tommy Hilfiger, Marks & Spencer's, guess, Next, Pierre Cardin, Wal-Mart etc.

In the leather garments sector India is a sourcing point to Abercrombie & Fitch, Andre Maarc, Ann Taylor, Armani, Charter Club, Colehaan, Daniel Hector, DKNY, Guess, Pierre Cardin, Kenneth Cole, Liz Claiborne, Mango, Marco Polo, Nautica, Tommy Hilfiger, Versace, Zegna

In the Leather Goods / Accessories category sourcing is done by : American Eagle Outfitters, Banana Republic, Bracciliani, British Home Stores, Coach, Etienne Aigner, Furla, GAP, Geoffrey Beene, Guess, H & M, Harrods, Laurent, Levis, Liz Claiborne, Marks & Spencer, Next, Pierre Cardin, Prada, Tommy Hilfiger, Walmart, Yves St.

Besides, major brands are sourced from India, MNC brands are sold in India like Aldo, Bally, Clarks, Ecco, Ferragammo, Florshiem, Geox, Hush Puppies, Lee cooper, Lloyd, Louis Vuitton, Marks & Spencer, New Balance, Nike, Nine West, Reebok, Rockport, Stacy Adams, Tod's.

Employment in Leather Industry

Leather and allied industries in India play an important role in terms of providing employment to a 25 lakh people, mostly from the socially and economically backward communities with 30% women predominance. Skilled and semiskilled workers constitute nearly 50% of the total work force. Indian leather sector includes a complex grid of artisans, tiny, cottage, small and medium enterprises (NSDC, 2011). Abundance of traditional skills in tanning, finishing and manufacturing downstream products and relatively low wage rates are the factors of comparative advantage for India. Indian leather sector includes a complex grid of artisans, tiny, cottage, small and medium enterprises. ~~The segment-wise and state-wise workforce position are mentioned in Table 9 and Figure~~ 3 respectively.

Table 9: Employment in various segments in leather industry

Industry Segment		**Workforce** *(in lakh)*
Flaying, curing, handling & transport etc. of raw material	(Self-Employment)	10 (40%)
Tanning and finishing	(Organized Sector)	1 (4%)
Footwear & Footwear components	(Organized Sector)	2 (8%)
	(Unorganized Sector) (cottage, household & rural artisans)	9 (36%)
Leather Garments, Goods etc.	(Organized Sector)	3 (12%)
Total		**25 (100%)**

Source : National Skill Development Corporation

The employment in the self-employed/unorganized sector comprising raw material collection, flaying, curing, trading, household footwear production units etc. Is around 19 lakh (76%). The remaining 6 lakh (24%) are employed in the organized sector. Among the sub-segments, footwear and footwear components is the largest, providing employment opportunity to approximately 11 lakh people, mostly from the weaker sections of the society. Out of this, about 2 lakh are employed in the organized sector, comprising 30% women. Remaining 9 lakh people are engaged in the unorganized footwear sector such as rural artisans, cottage and household units etc. Leather garments and other goods (including gloves, saddles, harnesses, etc.) is another major sub-segment employing approximately 3 lakh people and mostly in the organized sector. Tanning and finishing is the third major sub-segment employing approximately 1 lakh people currently. The influx of trained manpower across all verticals is extremely important for the development of this sector. It is a fact that having a relatively well trained and educated work force is a critical element for the rapid export & domestic growth of this sector. In one of the studies carried out by Office of The Economic Adviser to Department of Industrial Policy & Promotion (DIPP), it has been estimated that 46 lakh incremental human resource will be required till year 2022 and the leather & leather product sector has been identified as one of the ten most important sectors of the economy which need greater thrust and special emphasis in terms of skill development initiative.

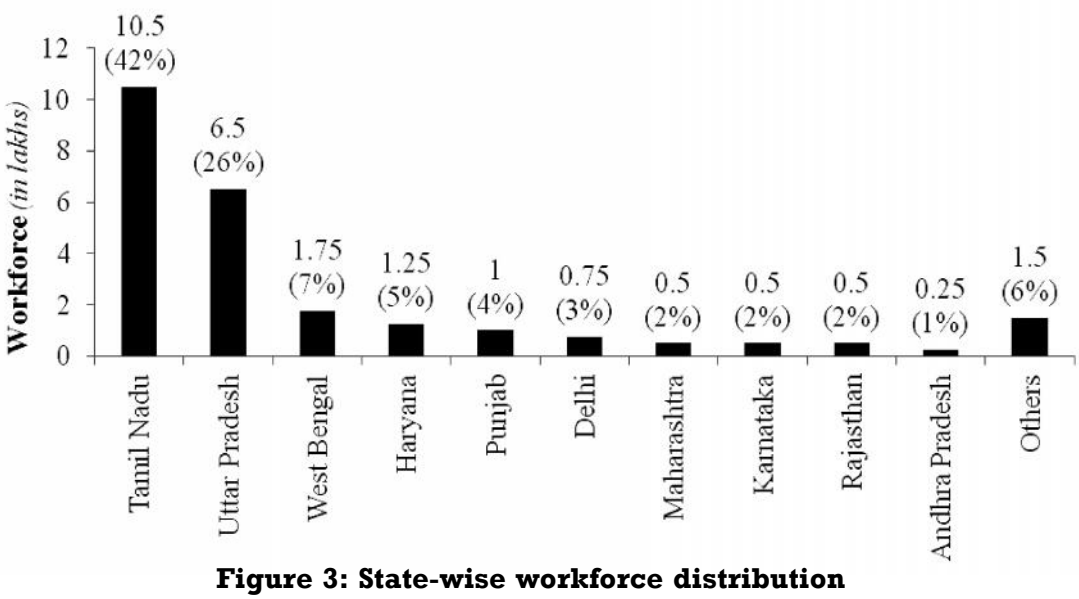

Figure 3: State-wise workforce distribution

Future Outlook

The Government of India had identified the leather sector as a focus sector in the Indian foreign trade policy in view of its immense potential for export growth prospects and employment generation. Accordingly, the Government is also implementing various special focus initiatives under the foreign trade policy for the growth of leather sector. With the implementation of various industrial developmental programmes as well as export promotional activities; and keeping in view the past performance, and industry's inherent strengths of skilled manpower, innovative technology, increasing industry compliance to international environmental standards, and dedicated support of the allied industries, the Indian leather industry aims to augment the production, thereby enhance export, and resultantly create additional employment opportunities.

Indian Leather Development Programme (ILDP) is being implemented for development of leather sector in 12th FYP with an outlay of Rs.990.36 crore in the country. The major objective of ILDP is to augment raw material base, enhance capacity, modernization and up-gradation of leather units, address environmental concerns, human resource development, support to traditional leather artisans, address infrastructure constraints and establish institutional facilities. The ILDP comprises the following six sub-schemes:

(i) ***Integrated Development of Leather Sector (IDLS)*** :Under this sub-scheme, assistance is provided for technology up-gradation/modernization and/or expansion and setting up of a new unit in the leather sector. The Sub-scheme provides assistance in form of investment grant to the extent of 30% of cost of new plant and machinery for micro and small enterprises and 20% of cost of new plant

and machinery for other units subject to a ceiling of Rs. 2 crore for each product line.

(ii) Human Resource Development (HRD) **:** HRD mission targets potential work force for leather sector and lays stress on skill development and technical development. This project is intended to train and prepare individuals to be fit to work in medium to large industrial units. Up gradation of skills of persons already employed in the sector, besides training for trainers/supervisors, is also undertaken. Under Placement Linked Skill Development Training, at least 75% of trained persons are placed in the industry as per the guidelines.

(iii) Support to Artisan **:** There are various clusters in India making traditional footwear and other leather goods. The aim of this scheme is to promote the clusters at various forums as they are an integral part of rural Indian economy and have potential for generating local employment and export. The artisan clusters all over India would be supported for enhancing their design and product development, capacity building, providing marketing support, establishing common facility center and marketing support/linkage. The broad objective of this component is to ensure better and higher returns to the artisans resulting into socio-economic upliftment.

(iv) Establishment of Institutional Facilities **:** The sub-scheme of ILDP aims at providing institutional facilities by way of establishing new campuses of FDDI to meet the growing demand of the leather industry for footwear technologies, designers, supervisors and mechanics. Two new branches of FDDI in Punjab and Gujarat are being set up.

(v) Leather Technology, Innovation & Environmental Issues **:** This sub-scheme provides financial support to Leather Cluster to meet the prescribed pollution control discharge norms and environmental issues. This covers establishment/ expansion/ up gradation of Common Effluent Treatment Plant (CETP), Technology benchmarking for implementing cleaner technologies for environment management, utilization of solid waste from tanneries and conducting workshops to educate and train the tanners and tannery workers.

(vi) Mega Leather Cluster (MLC) - The major objective of developing MLCs is to create state of the art infrastructure and to integrate the production chain in a manner that caters to the business needs of the leather industry so as to cater to the domestic market and exports. These mega clusters will assist the entrepreneurs to set up units with modern infrastructure, latest technology, and adequate training and Human Resource Development (HRD) inputs. The development of MLCs would help in creating additional employment opportunity, particularly for the weaker sections of society. MLCs for the development of leather industry will have common facilities. The project cost would cover various infrastructure development components like Core Infrastructure, Special Infrastructure, Production Infrastructure, HRD & Social Infrastructure, R&D Infrastructure and Export services related infrastructure.

Being a Central Sector Scheme, funds are not allocated/released to State/UT. It is released to concerned implementing agencies. For the last three FY 2012-13, 2013-14, 2014-15 fund released and utilized under ILDP is Rs. 90 crore, Rs. 150.01 crore and Rs. 270 crore respectively.

Besides support under ILDP, assistance has been provided for installation of one Common Hazardous Waste Disposal Facility and one Common Effluent Treatment Plant in Unnao (Kanpur), Uttar Pradesh and for three Common Effluent Treatment Plants with Zero Liquid Discharge (ZLD) at Thuthipet (Ambur), Maligaithope (Ambur) and Valayampet (Vaniyambadi) in Tamil Nadu under Industrial Infrastructure Upgradation Scheme (IIUS) being implemented by Department of Industrial Policy and Promotion.

Further, assistance to leather industry has also been provided through the following projects by Department of Commerce:

a) Establishment of two CETPs/Leather Industrial park at Industrial park at Industrial Growth Centre, Lassipora, Pulwama and Industrial Growth Centre, Samba, Jammu & Kashmir,

b) Proposal of the Council for Leather Exports (CLE) for undertaking Animal Welfare Projects in West Bengal and Karnataka,

c) Development of additional infrastructure in the Ambur Trade Centre like fire fighting work, car parking and internal road work at Ambur (Tamil Nadu),

d) Establishment of Testing Laboratory at Ranipet (Tamil Nadu),

e) Infrastructure upgradation of Design Studio in Kolkata (West Bengal),

f) Establishment of Common Facility Centre in the leather cluster of Jalandhar (Punjab),

g) Establishment of Trade Centre at Agra (Uttar Pradesh),

h) Common Facility Centre in Melvisharam, Tamil Nadu,

i) Upgradation of Ranitec CETP, District Vellore, Tamil Nadu,

j) Upgradation of CETP in Madhavaram Leather Cluster, District Chennai, Tamil Nadu.

Environmental Aspects for Leather Products

Manufacturers who produce environmentally sound products will enjoy a competitive advantage in all business relations with EU in general and Germany in particular. The pitch has to be to successfully emphasize the environmental soundness of the product in the information to the buyers since major attention is being paid to the increasing role of the environmental regulations. Therefore, the manufacturers have to view their products and

production processes not just by looking at traditional aspects like price, quality, customer demands, etc. but also at the environment. Environmentally sound production, consequently, opens new market opportunities.

The regulations concerning the ban on the use of Azo Dyes and Pentachlorophenol (PCP) need to be specially taken care of. Use of both these inputs has been banned due to their carcinogenic nature. Likewise, for compliance with the German packing regulations, Indian suppliers have to stick to the basic principle that packaging material be reusable and recyclable. Consumers may have a tendency to choose products, which are easily recognizable as such and are labeled according to legal stipulations. The hallmark for these environment-friendly products is normally referred to as **'ECO-LABEL'**. This indicates that the product is manufactured in consonance with the environmental regulations.

SWOT Analysis of the Indian Leather Industry

Strengths

- Ready availability of trained / skilled manpower at competitive wage levels
- Large raw material source – 3 billion sq ft of leather produced annually
- Some varieties of goat / calf / sheep skins command premium position
- Strong and eco-sustainable tanning base
- Modernized manufacturing units
- World-class institutional support for design and product development, HRD and R&D.
- Policy initiatives taken by the Government
- Capability to assimilate new technologies and handle large projects
- Continuous emphasis on product development and design upgradation
- Presence of support industries like leather chemicals and finishing auxiliaries
- Presence in major markets – Long Europe experience
- Strategic location in the Asian landmass

Weaknesses

- Lack of warehousing support from the government
- International price fluctuation
- Huge labour force resulting in high labour charges
- Lack of strong presence in the global fashion market
- Unawareness of international standards by many players

Opportunities

- Rising potential in the domestic market
- Abundant scope to supply finished leather to multinationals setting up shop in India.
- Growing fashion consciousness globally

- Lot of scope for product diversification into other products, namely, leather garments, goods etc.
- Use of information technology and decision support software to help eliminate the length of the production cycle for different products
- Use of e-commerce in direct marketing

Threats

- Major part of the industry is unorganized
- Entry of multinationals in domestic market.
- Stiff competition from other countries. (The performance of global competitors in leather and leather products indicates that there are at least 5 countries viz., China, Indonesia, Thailand, Vietnam and Brazil, which are more competitive than India.)
- Limited scope for mobilizing funds through private placements and public issues (many businesses are family-owned)
- Difficulty in obtaining bank loans resulting in high cost of private borrowing
- Improving quality to adapt the stricter international standards.
- High competition from East European countries and other Asian countries
- Non- tariff barriers - Developing countries are resorting to more and more non – tariff barriers indirectly.
- Lack of communication facilities and skills
- Fast changing fashion trends are difficult to adapt for the Indian leather industries.

Conclusion

Continuous export growth in the various segments of leather industries shows that the leather industries play a vital role in the development of our economy. There exists enormous scope and potential to produce more leather products through planned production and systematic marketing efforts. Introduction of scientific management methods to improve the productivity and to reduce the unit cost, eco-labeling, good house keeping, occupational safety and health, developing own ethnic designs, brand image, etc. are some of the urgent measures needed. The traditional strengths of having sizeable raw materials, technical skills and comparatively cheaper labour may not safeguard the Indian leather industry unless appropriate measures are initiated.

To support the sector the Government of India has taken several initiatives from de-licensing the sector, allowing 100% FDI and duty free imports, providing funding assistance to the manufacturing units, assisting in promotion of the industry through industrial parks to implementation of various industrial development programmes. With the implementation of various export promotional activities, the Indian leather industry aims to augment production, enhance exports and create additional employment opportunities. Keeping in view the historical performance, strength of the sector and support from the government, the Indian leather industry is poised to grow manyfolds.

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KOLKATA LEATHER UNITS GLOBAL REACH

On a trip to Rome, Tridib, an MBA graduate from Kolkata, bought a branded leather belt. The sales personnel at the shop asked Tridib if he was from the eastern part of India. "You have chosen the best belt in the medium price range, and it is from Kolkata," the sales person said, much to Tridib's surprise. He went on to tell Tridib how a number of leather goods manufacturers from Kolkata supply to several popular Italian brands.

For decades now, leather items from the city – ranging from bags to fashion accessories – have established a good reputation in the global market for consistent quality and competitive prices. Statistics suggest that half of the Indian finished leather item exports are from the units in and around the city.

Ramesh Juneja, Regional Chairman (East) of Council for Leather Exports, told Business Line that more than 600-odd firms from the city have earned a place in the hard currency export markets. "Apart from leather bags, purse and accessories, gloves for industrial use and leather garments are also substantially exported from Kolkata," said Juneja.

In the April-January period of the current financial year, the share of the Eastern Region, primarily from the Kolkata units, in export of leather goods was 50 per cent of the country's total. According to the Directorate General of Commercial Intelligence and Statistics, in the 10-month period until January-end these leather goods units recorded exports worth Rs. 3,606 crore.

"Though there has been an overall decline of 10.71 per cent in export of leather goods from the country, the eastern region has kept the fall in exports (from the previous fiscal) at the minimal level of 4.85 per cent.," Juneja, who runs an leather goods export unit, explained.

A large number of the leather goods units in and around Kolkata are associated with global brands. Industry sources say that many of them supply to Gucci, Pierre Cardin, Guy Lorche, La Martina, Le Tanneur, Radley, Prada, Delsy, Armani, Samsonite, Marks & Spencer.

The units not only have modern processing and manufacturing facilities, they have honed their skill in craftsmanship and designing to suit the style in vogue, mood and the need. A few of the independent units employ market analysts and designers to translate market-driven concept into practices of their own.

An independent unit (without specific supply contract) said it develops products after conducting a detailed market research with the help of cues from the forecasting made by the Leather Council. The designs are often developed through CAD followed by the patterns that are prepared digitally.

Torero Corporation Pvt. Ltd. a Kolkata based company, has taken the global brand association model of business to a new height.

It obtained global licence from AT Cross Company, an iconic writing instrument maker of the US, for leather goods. This global marketing licence holder for cross branded leather

items, manufacturers leather items such as wallets, bags, belts and cases for mobiles, laptops and iPads for Cross. The items are produced from finished Spanish Leather, imported from a Cross approved unit in Spain. Bagging overseas deals with affordable tag.

(Businessline – 30/03/2016)

US FOOTWEAR IMPORTS UP BY 6%

2015 Import numbers have just been released by the US authorities. According to the FDRA (Footwear Distributors and Retailers of America), the impressive close of the year is clear with the highest December dollar and volume totals on record.

The FDRA confirmed that 2015 US annual imports rose by 5.8% in value terms and by 5.7% in volume terms from 2014, achieving new records, and growing at the fastest paces in the last four and five years, respectively.

According to the same source, Vietnam expanded its share of the US import market the most, up by 21.9% for the year to an unprecedented 4.3 billion US dollars in total value (at border). Despite that, China remains-by far-the largest supplier to US consumers, but the country saw its annual share of the US footwear import market slide again to just 65.6%, a fifteen-year low. Athletic footwear imports went up by 11.6% (a record level) and children's footwear imports grew by 8.6% (also a record level).

"Our analysis of 2015 footwear import data shows the Trans Pacific Partnership (TPP) has grown substantially in importance to the footwear industry", commenced FDRA President Matt Priest, adding : "Based on these numbers, TPP would save our industry half a billion dollars in duties the first year of implementation. The data also shows growth in both athletic as well as leather footwear from Vietnam. This confirms what we have been hearing from on the ground-that more and more companies from all product categories are starting to manufacturing there, meaning TPP would provide real relief to our industry's 2.9 billion US dollars annual duty bill as well as lower the cost of footwear for millions of middle class American families."

The FDRA analyzed the numbers and has highlighted the fact that the US footwear industry paid 2.9 billion US dollars in duties in 2015 an increase of 200 million US dollars over 2014.
With the growing importance of the TPP to the footwear industry and to American footwear consumers, the FDRA calculates TPP would now save the footwear industry half a billion dollars in duties on year one of implementation.

BIODEGRADABLE CLOTHING, SHOES MADE FROM TEA BYPRODUCT

Scientist have developed a new leather-like, biodegradable material using tea byproducts to make clothing, shoes or handbags, an advance that could help cut down the waste generated by the fashion industry.

Researchers at lowa State University developed a gel-like film consisting of cellulose fibres-a byproduct of kombucha tea-that feeds off a mixture of vinegar and sugar. The film is grown by using a symbiotic colony of bacteria and yeast (SCOBY).

According to Young-A Lee, an associate professor at lowa State University, the properties of this SCOBY film are similar to leather once it is harvested and dried, and can be used to make clothing, shoes or handbags. The material has been tested for other application, such as cosmetics, foods and biomedical tissue for wound dressing, but it is relatively new to the apparel industry. The fact that the fibre is 100 per cent biodegradable is a significant benefit for the fashion industry, which by its very nature generates a lot of waste, Lee said.

"Fashion companies keep producing new materials and clothing, from season to season, year to year, to fulfill consumers desire and needs," Lee said. "Think about where these items eventually go. They will take tremendous underground spaces of the Earth like other trash," she said. The cellulose fibre reduces waste by creating continuous cycle of reuse or regeneration, what is known as cradle-to-cradle design, Lee said.

Even if clothing is recycled or repurposed, it still eventually ends up in trash. Lee envisions a truly sustainable fabric or material that is biodegradable and goes back into the soil as a nutrient rather than taking up space in a landfill. Using the SCOBY gives new purpose to the tea byproduct, lessening the fashion industry's dependence on non-renewable materials. Working with a novel fibre is not without its challenges. Researchers conducted several tests to determine if the SCOBY-based cellulosic fibre is a viable alternative to leather for the fashion industry.

The tests showed that one of the biggest problems is moisture absorption from the air and the person wearing the vest or shoes. The moisture softens the material and makes it less durable. Researchers also discovered that cold conditions make it brittle. Mass production is another issue to confront. Lee says it takes around three to four weeks, depending on temperature and room conditions, to grow the material in the lab.

The researchers are working on how, and if it is possible, to reduce the growth cycle for mass production. Researchers surveyed college students to gauge their response to a vest prototype made from the cellulose fibre. The majority thought it was made of leather, rawhide, paper or plastic.

(PTI – 11/05/2016)

COMPAT SETS ASIDE CCI ORDER AGAINST 11 SHOWMAKERS

The Competition Appellate Tribunal (Compat) has set aside a CCI order against 11 shoe manufacturers who were fined Rs. 6.25 crore by the regulator for alleged collusive bidding in a government tender.

In 2013, the Competition Commission of India (CCI) imposed a penalty on each of the contravening company at the rate of 5% of the average turnover of the company after a DG level investigation. Following the ruling, the companies-AR Polymers, MB Rubber, Tirupati Footwear, HB Rubber, Rajkumar Dyeing & Printing Works, Preet Footwear, SS Rubber, Shiva Rubber Industries, Derpa Industrial Polymers, RS Industries and Puja Enterprises-approached the tribunal and appealed against the matter.

(Financial Express. 15/05/2016)

LEATHER EXPORTS FALL BELOW $6 BILLION MARK

India missed its export target of $6.25 billion in leather and leather goods for the financial year 2015-16. From April 2015 to March 2016, India exported leather and leather goods worth $5.92 billion against $6.58 billion for the year-ago period, marking a negative growth of 10.11 per cent. The deceleration was mainly seen in finished leather at 21 per cent and footwear components at 20.88 per cent.

On the domestic side, the sales of leather and leather goods were to the tune of nearly $6 billion. M. Rafeeque Ahmed, Council for Leather Exports Chairman said the exports volume was hit by several factors such as slowdown in China, weakening demand in euro zone, currency fluctuations, hike in duty tariff and recession.

"In the case of China there is a slowdown in manufacturing activities. Hence, our share of exports of finished leather has come down drastically. Exports of leather products are down by seven per cent. But, that is not a worrying factor. Due to the weakening euro, the prices of raw materials have gone up, which is being resisted by the European Union. However, we are facing competition from Portugal, Slovakia and Romania on the cost and logistics factors," he said.

India exports nearly 60 per cent of its goods to the U.S., Germany, the U.K., Italy, France, Hong Kong and Spain. While India's export to U.S. was up by 11 per cent till January 2016, it was in the negative zone for other countries. He also opined the sector would post at least 15 per cent growth over the previous year.

LEND US A HELPING HAND LEATHER INDUSTRY URGES GOVT.

The leather industry in Vellore district is one of the largest in the country, and it is looking to the State Government for help with resources and give a boost to the infrastructure.

Areas in Vellore district, particularly Ranipet, Melvisharam, Ambur and Vaniyambadi, are home to hundreds of leather manufacturing units. Nationally, if the whole state accounts for 45 per cent of leather exports, Vellore's share stands at 30 per cent, according to M. Rafeeque Ahmed, Chairman of Council for Leather Exports. "When it comes to leather exports, Vellore is the largest contributing district. One of the biggest problems faced by the sector here is environment related. In many states, the Government contributes to enable leather industries to adopt and implement a zero liquid discharge system," he says.

While industries get funding from the Centre for the implementation of the system, the Tamilnadu Government, Mr. Ahmed says, should contribute funds for bringing in a permanent solution. Another crucial requirement for the leather sector is continuous power supply. To boost exports, the State government should intervene and get the Chennai Port-Maduravoyal elevated expressway built fast, he adds.

"The works have been stalled for nearly five years. If this is completed, there will be 24-hour movement of container lorries. Presently, lorries are allowed into the port after 10 p.m. and this is leading to queuing of vehicles. The project will breathe life into the port."

Water shortage

S. Faiz Ahmed, Honorary Secretary of Ambur Tanners Association, also insists that the government should invest in the sector. "We are facing a water shortage in Vellore. We recycle processed water and reuse it. Currently, we are able to recycle 70 per cent water, and want to take this to 90 per cent. This required a lot of investment, and we need the State Government's investment to take this forward."

Of the total exports, Vellore alone accounts for Rs.5,000-Rs.6,000 crore worth of products. "Many foreigners visit places such as Ranipet, Ambur and Vaniyambadi. The municipalities do not have sewage treatment plants and sewage overflows onto the roads in many areas, and this does not give a good impression," he says. The government, Mr. Faiyaz Ahmed adds, should provide special attention for towns that generate employment and foreign exchange and establish proper infrastructure such as STPs and roads.

According to him, the town of Ambur contributes Rs.14 crore annually to the Employees' State Insurance Scheme. But, the people here do not get to enjoy the benefits.

(The Hindu – 03/05/2016)

KOLKATA CO. TO MAKE POLICE LEATHER ITEMS

Kolkata-based Torero Corporation has obtained rights for the global manufacture, marketing and distribution of Italian brand Police's leather accessories range.

The exclusive licensing agreement will see Torero launch the fashion major's entire bouquet of bags and leather accessories in India, including wallets, sling bags, belts and shoes. Two years ago, De Rigo Group-owned Police, a $457-million brand, forayed into leather accessories.
According to Yashovardhan Gupta, Director and CEO, Torero, the company has been in talks with De Rigo for two years for the partnership. "We were suppliers and manufacturers to Police's leather accessory range during its launch. Now, Police's range will be manufactured, marketed and distributed by us," he told reporters at a press conference. At present, the focus will be on the US, UK, France, Spain, Belgium and India markets.

According to Gupta, Police's leather accessories will be available in stores at a 30-35 per cent discount over international prices. "We have obtained the De Rigo board's approval for this. In India, the prices will be lower that what they are globally," he said.

For example, the wallets will be priced upwards of Rs.2,500 and bags will be Rs.5,000 onwards. Torero is targeting sales of $10 million from Police by the end of this fiscal and $20 million by the end of FY 18. "We are looking at sales of $50 million in four years. The target customer will be value and fashion conscious youth who are aware of global brands," Gupta said.

Torero will initially partner with Shoppers Stop (all 75 stores). It is also in talks with online platforms like Amazon, Jabong and Flipkart.

(Businessline – 07/05/2016)

BEEF SCARE HITS LEATHER INDUSTRY HARD, MANY LOSE JOBS

The beef scare is hitting the leather industry hard. Importers from Germany, France, Italy and US, unsure about supplies from India, are looking to players such as Pakistan.
"There's a raw-material scarcity," says M Rafeeque Ahmed, Chairman, Council for Leather Exports (CLE), adding the industry is experiencing a 15% slowdown because of a shortage of hides. Puran Dawar, President, Agra Footwear Manufacturers and Exporters Chamber, concurs saying current conditions are far from conductive. This shows in the numbers. Export of finished leather from the eastern region (2015-16 first quarters) is down 18.5% against the same period last year. Fall in footwear export has been steep at 73%.

Buyers are no longer confident about placing orders. One of the largest foreign exchange earners, the leather industry is under threat because of a man-made crisis," says Ranesh Juneja, Regional Chairman (East), CLE. The commerce ministry's target of doubling export from $6.5 billion in 2014-15 to $13 billion in 2019-20, made under PM Modi's Make in India project, he says, "may now get jeopardized".

(Times of India – 17/05/2016)

TRAINING PROGRAMME HELD AT REGIONAL CENTRE FOR EXTENSION & DEVELOPMENT (CSIR-CLRI), KOLKATA FOR LEATHER GOODS SECTOR

A skill development training programme for Leather Goods sector in the eastern part of India was conducted at the Regional Centre for Extension & Development (Kolkata) of CLRI. A total of 150 boys and girls belonging to SC community underwent this programme. It was a part of 'Skill India Mission' of the Honourable Prime Minister, Shri Narendra Modi. National Scheduled Caste Finance & Development Corporation (NSFDC), a Govt. of India organization, supported this programme.

The period of the training programme was 35 days. In order to train 150 candidates utilizing the limited capacity available with RCED, Kolkata, the programme was held in four batches during the period from 8th Dec, 2015 to 3rd May, 2016. The training was conducted for developing skill in two operations – a) Cutting and clicking, and b) Assembling and stitching as these are the two main operations where skilled manpower is in great demand. While boys were preferably selected for cutting and clicking, the girls, who have an inherent sense of beauty and aesthetics, were chosen for skill development in stitching and assembling jobs.

It was noted that the background of the selected trainees was very diverse in nature. Therefore, along with the practical based lessons, 8 – 10 lectures covering general properties of leather as a material and its selection, grading, storage, care and maintenance were arranged for each batch of trainees to supplement their skill. This additional arrangement will enable the trainees to utilize their newly acquired skill more intelligently and enhance the employbility potential of the trainees considerably. It is hoped that this programme will support the leather goods industry in this part of the country in building its capacity further. RCED, Kolkata (under the direction of CSIR- CLRI) has elaborate plan to organize such skill development programme in the financial year 2016-17 too.

Figure1: Dr. Dipankar Chaudhuri, Head, RCED-CLRI, Kolkata addressing the trainees in the inaugural programme

Figure 2. Shri Chinmay Das from West Bengal SC & ST Development and Finance Corporation, Govt. of West Bengal in an interactive session with the trainees. Shri Das provided information on various schemes of financial assistance available for the trainees

FOREIGN DIRECT INVESTMENT (FDI) INTO THE COUNTRY INCREASED BY 37 PER CENT TO USD 39.32 BILLION DURING 2015

The foreign investment inflows stood at USD 28.78 billion in 2014, according to data by the Department of Industrial Policy and Promotion (DIPP). Computer hardware and software section to attract the highest FDI, followed by services, trading business, automobile industry and chemicals.

Singapore emerged as the biggest FDI source, followed by Mauritius, US, Netherland and Japan. The government has taken several steps to promote investments through a liberal FDI policy. It has relaxed norms in several sectors, including single brand retail, e-commerce and construction. (Also read : India gets USD 42 billion FDI during Apr-Feb : RBI)

"The focus on improving ease of doing business in the country and relaxation of norm would help in attracting more and more FDI," and official said. The Economic Survey 2015-16 had said that a favourable policy regime and sound business environment have facilitated increase in FDI flows into the country.

(The Hindu – 18/04/2016)

GLOBAL ECONOMIC SITUATION GRIM, WORRISOME : JAITLEY

The global economic situation is "grim" and "worrisome" that has prompted the nation to put up "firewalls" around their own systems to save themselves from the slowdown and grow within the limitations, finance minister Arun Jaitley has said.

"If you were to ask me how's the global situation, I think anybody has been able for sure to hazard even a significant guess," Jaitley said at the Asia Society here when asked what his programme id for the global economy for the next couple of years.

(Business Standard – 10/05/2016)

PHONE BILL, EATING OUT AND BANKING TRANSACTIONS BECOME COSTLIER FROM 1ST JUNE

From Wednesday, the 1st June' 2016 eating out, internet and travel becomes costly with the new Krishi Kalyan Cess kicking in.

Finance minister Arun Jaitley had proposed the Krishi Kalyan Cess in this Budget, which is at 0.5% on all taxable services. The new effective service tax could henceforth be 15%.

Jaitley, in his last Budget, had increased the Service Tax rate from 12.36% to 14%. This new rate of Service Tax at 14% was applicable from 1st June 2015. Moreover from 15th November 2015, Swachh Bharat Cess at 0.5% also got applicable. Therefore the effective rate of Service Tax is currently at 14.5% with effect from 15th Nov 2015. It seems, the rate is slowly being

increased to bring service tax closer to the expected goods and services tax (GST) rate of 17-18%.

The move impacts your phone bills, dining plan, movies, healthcare, banking transactions. The proceeds of Krishi Kalyan Cess would be exclusively used for financing initiatives relating to improvement of agriculture and welfare of farmers. The Cess will come into force with effect from 1st June 2016.

The Krishi Kalyan Cess shall be in addition to any cess or service tax leviable on such taxable services under Chapter V of the Finance Act, 1994, or under any other law for the time being in force.

Service tax collection has grown by a compounded annual rate of 25 per cent over the past four years to an estimate Rs 2.1 lakh crore collected in FY16. That's higher than the tax collected from excise and customs on items like gold, cars, mobile phones, etc. The government raised the service tax from 12.3 per cent in April 2015 to 14 per cent in May 2015. It's further set to rise to 15 per cent from June onwards.

Also, the service tax base has gone up over the years as more services were included in service tax fold. Restaurants, petrol pumps and multiplexes are some of the common examples which have been included in the service tax fold over the past few years.

(Economic Times – 29/05/2016)

MODI GOVERNMENT'S NEW WAY TO TAX GOOGLE, FACEBOOK KICKS IS FROM 1ST JUNE

The Central Government on Monday, 30th May announced rules for equalization levy — or 'Google tax' for taxation of payments for international digital services by India. Businesses — that was introduced in the Budget.

The specified services covered by the levy include online advertising, provision for digital advertising space and any other service to be notified by government. The rules come into effect from June 1.

Finance minister Arun Jaitley had announced the equalisation levy, emanating out of OECD's Base Erosion and Profit Sharing project, on payments made by businesses for specific digital services to a non-resident entity not having permanent establishment in India.

The idea is to indirectly tax internet giants for money they make from Indian advertisers, by imposing a levy on the payments these advertisers make.

The levy was structured based on recommendations of a panel set up the Central Board of Direct Taxes and included industry representatives.

Tax experts say businesses will have to start preparing now that the rules have been announced.

"Equalisation levy made various players sit up and take notice, especially since this is India's first step to tax digital economy , and one of the first few internationally," said Rakesh Nangia, managing partner at Nangia & Co.

"Now with rules in place, people need to start taking action, since the statement of specified services procured starting June 1, 2016 has to be reported in the statement to be furnished by June 30, 2017," he said. He aslo said rules provide clarity as to how an assessee can appeal against the order of the assessing officer.

What is Google tax ??

From June 1, an equalization levy of 6% will have to be deducted by a business entity in India which makes payments exceeding Rs 1 lakh in the aggregate in a financial year to a non-resident service provider for specified services.

What are the services that fall under this rule?

For now, specified services cover online advertisements, provision for digital advertising space or any other facility or service for the purpose of online advertisements. This list will expand soon.

Why this tax?

The move is aimed at technology firms that gain on online ads. This will bring them under India's tax net. A similar tax structure is already in place Organization for Economic Cooperation and Development (OECD) nations and European countries.

How does it impact me?

The move impacts anyone and everyone with an online setup and who use Facebook or Google for marketing.

What if a firm fails to deduct this tax?

Then the firm or the business owner won't be allowed to consider the expenses in calculating taxable profits, which will increase their taxable income and liability.

(Economic Times – 30/05/2016)

INDIA'S GDP GROWS 7.9% IN MARCH QUARTER THAN; 7.6% IN 2015-16

India's GDP growth accelerated to 7.9 per cent in the three months through March from a revised 7.2 per cent in the previous quarter, Government data showed on Tuesday, 31st May.

Analysts polled by Reuters had forecast annual growth of 7.5 per cent in the quarter.

For the 2015/16 fiscal year ending in March, growth came in at 7.6 per cent, in line with the official estimate. Growth was 7.2 per cent in 2014/15.

"Momentum is building up faster than anticipated, and there is demand pick-up in the horizon. This definitely spells out a positive story that there will soon be a recovery in private sector capex," said Shubhada Rao, Chief economist, Yes bank.

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LEATHER SCIENCE ABSTRACTS

VOLUME 49 **NUMBER 05** **MAY, 2016**

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All enquiries for further details should be addressed to: THE DIRECTOR, **(ATTN.: EDITOR, LESA)** CENTRAL LEATHER RESEARCH INSTITUTE, ADYAR, CHENNAI-600 020, INDIA.

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LEATHER SCIENCE AND TECHNOLOGY

LEATHER INDUSTRY. HISTORY. MANAGEMENT. ECONOMICS. EDUCATION

49.14627

Economic reforms in India since independence. PAUL (B), (Indian Leather Technologists' Association,'Sanjoy Bhavan', No. : 44, Shanti Pally, 3rd Floor, Kolkata-700 107, India). (J. Indian Leather Technol. Assoc.; 63, 12; 2013, Dec.; 1937-47).

The Economic development in India followed socialist-inspired policies for most of its independent history, including state-ownership of many sectors; India's per capita income increased at only around 1% annualized role in the three decades after Independence. Since the mid-1980s, India has slowly opened up its markets through economic liberalization. India has progressed towards a free market economy after more fundamental reforms since 1991 and their renewal in the 2000s. In the late 2000s, India's growth reached 7.5%, which will double the average income in a decade. Analysts say that if India pushed more fundamental market reforms, it could sustain the rate and even reach the Government's 2011 target of 10%. States have large responsibilities over their economies. The annualized 1998-2008 growth rates for Tamil Nadu(9.8%), Gujarat(9.6%), Haryana(9.1%) or Delhi(8.9%) were significantly higher than for Bihar(5.1%), Uttar Pradesh(4.4%) or Madhya Pradesh(6.5%). India is the tenth-largest economy in the world and the third largest by purchasing power purity (PPP) adjusted exchanged rates. On per capita basis, it ranks 140th in the world 129th by PPP. (39 Ref.; 2 Tab.; 2 Fig.; 1 Photo).

49.14628

Chemicals industry : emerging trends and challenges. M/s. COMPETITIVE CAPABILITIES INTERNATIONAL. (No. : 24 South Boulevard, Block F Eastgate Park, Bruma, Johannesburg, South Africa). (Chem. Wkly.; 59, 21; 2013, Dec., 31; 187-91).

Discusses the factor such as complexity which very much affect but cannot be avoidable and also necessary as well as the various challenges that face the chemical industry. Describes an Integrative Improvement System (ITC) that delivers sustainable performance improvement in the chemical industry. (1 Tab.; 4 Photos).

49.14629

India's oleochemical industry and its global prospects. NABAR (N), (Chemicals Division, M/s. Godrej Industries Limited, Pirojshanagar, Eastern Express Highway, Vikhroli, Mumbai-400 079, India). (Chem. Wkly.; 59, 19; 2013, Dec., 17; 183-6).

Describes the Indian oleochemical industry which is poised to contribute towards developing high quality products that enrich the daily lives of people globally, together with promoting sustainability. Value creation will be in partnership involving oleochemical manufacturer,

specially derivative producer and fast moving consumer goods(FMCG) formulator. The increase in local consumption in India will ensure that the existing and upcoming capacities are fully utilized. India can become a net exporter of oleo-based products and derivatives with the right policies in place and its rich natural, human, scientific and technological resources. India should capitalize on its core strengths such as locally available resources like rapeseed/mustard and castor, as well as increase average of the all-important palm by going forward. India should also be geared up for photosynthesis of oils from specific strains of algae as the next level of sustainable raw materials for biofuels and other chemicals as the year 2025 is approaching. (3 Fig.; 2 Photos).

49.14630

Prospects of specialty chemicals in India : an overview. (Chem. Wkly.; 59, 20; 2013, Dec., 24; 187-8).

Specialty chemicals are performance-enhancing chemicals used for specific applications. Some of the key user segments for specialty chemicals include fine chemicals, paint & coating additives, advanced polymers, adhesives and sealants etc. Overviews the global and the Indian markets for the specialty chemicals. (1 Tab.; 1 Fig.; 1 Photo).

49.14631

Are the emerging alternatives to phthalates better? What does the science tell us? KINGSBURY (T), (Sustainability Division, M/s. Cardno ChemRisk, Headquarters, No. : 101, 2nd Street, Suite 700, San Francisco, California 94105, USA). (Chem. Ind. Dig.; 26, 12; 2013, Dec.; 87-90).

Phthalates have commonly been used as plasticizers for flexible poly vinyl chloride(PVC) for more than 50 years. Over the past few decades, however, momentum has been growing internationally from government bodies, non-governmental organizations(NGOs) and companies to remove these substances from commerce. Explores the questions, such as what has led to all this attention? What bans exist? What do we really know about the hazards and risks posed by using these chemicals in consumer products? What does one know about them, besides that they are not phthalates as the use of alternative plasticizers grow and also other questions about a wide array of phthalates and their emerging alternatives. (3 Fig.).

49.14632

Nanotechnology : prospects and potential. GHARPURE (YH), (M/s. Gharpure Consulting Engineers Private Limited, No. : 9/10, General Assurance Building, Crawford Market, No. : 232 Dadabhai Naoroji Road, Fort, Mumbai-400 001, India). (Chem. Wkly.; 59, 19; 2013, Dec., 17; 195-9). Nanotechnology or nanotech involves manipulation of the matter at atomic and molecular level. Discusses in detail about the prospects and potential for nanotechnology. (6 Ref.; 2 Tab.; 3 Fig.; 3 Photos).

49.14633

Chemical lists in retail and regulation-An international perspective. HOFHERR (W), (M/s. ETAD, Stadthausgasse 18, 4051 Basel, Switzerland). (Chem. Ind. Dig.; 26, 12; 2013, Dec.; 78-80).

Among the most prominent are the Candidate List and Authorization List of REACH, Restricted Substances Lists provided by retailers, positive lists as in printing ink ordinances and Food Contact material laws and a variety of product lists. A light is thrown on major watch lists as per international regulations.

49.14634

Driving process engineering through optimized design and operations. GHOSH (A), (M/s. AspenTech, South Asia Region, Bhekarai Nagar Road, SP Infacity, Phursungi, Pune-412 308, Maharashtra State, India). (Chem. Wkly.; 59, 20; 2013, Dec., 24; 209-12).

Process engineering has witnessed significant transformation in recent years, driven by engineering best practices, technology innovation and more recently, by global economic market changes. The trend towards more effective energy management to minimize operating costs and the need to reduce emissions are two of the key issues process industry companies face on a daily basis. The services, that should have to be delivered faster to maintain quality and ensure that margins are increased, should be focused. The role of software technology in the process industry is to help companies on this journey and the best software providers in this space are able to provide solutions throughout the entire process. Discusses the scope to meet the challenges, evaluation of the obstacles across the project lifecycle, optimization of the engineering support to manufacturing and planning as well as an evaluation, also of the benefits. (3 Photos).

49.14635

Plasmonic solar cells. VERMA (SS), (Department of Physics, Sant Longowal Institute of Engineering & Technology, Campus Road, Longowal-148 106, Sangrur District, Punjab State, India). (Renew. Energy; 7, 2&3; 2013, Dec.; 22-6).

Plasmonic solar cells(SCs) have great potential to drive down the cost of solar power. The trapping of light is crucial for thin film SCs to make SC a viable energy source. So, plasmonic nanoparticles could be used to increase the efficiency of thin film SCs. (3 Photos).

49.14636

Promoting quality and trade amongst SAARC countries through standardization and conformity assessment. GAMBHIR (PK), GUPTA (S), (M/s. Bureau of Indian Standards, Manak Bhavan, No. : 9, Bahadur Shah Zafar Marg, New Delhi-110 002, India). (Stand. India; 27, 9 & 10; 2013-l4, Dec.-Jan.; 31-4).

The South Asian Association of Regional Cooperation(SAARC) has taken several measures over a period of time to minimize the technical barriers to trade within the region, which are not only in compliance to the provisions of the technical barrier to trade(TBT) compliance to the provisions of the technical barrier to trade(TBT) Agreement, but will also facilitate access to regional producers to the global markets. But more need to be done collectively by the SAARC Member States and at a much faster pace. (5 Ref.).

RAW HIDES AND SKINS

49.14637

Quercetin and â–sitosterol prevent high fat diet induced dyslipidemia and hepatotoxicity in Swiss albino mice. SIKDER (K), DAS (N), KESH (SB), DEY (S), (Department of Physiology, University of Calcutta, No. : 92, Acharya Prafulla Chandra Road, Kolkata-700 009, India). (Indian J. Exp. Biol.; 52, 1; 2014, Jan.; 60-6).

High fat diet group showed a significant rise in serum and hepatic total cholesterol, triglyceride and athrogenic index which are major biomarkers of dyslipidemia and cardiovascular risk. The liver function markers, lipid perioxidation and proinflammatory cytokine levels were elevated in high fat diet group whereas antioxidant levels significantly reduced. These findings manifest hepatic damage which was further confirmed by histological findings. Quercetin and â–sitosterol through structurally different yet both ameliorate the sickening changes in different mechanism. The current investigation is perhaps the first report of the mechanistic role of two polyphenols over dyslipidemia and subsequent hepatotoxicity. (38 Ref.; 3 Tab.; 9 Fig.).

ENZYMOLOGY

49.14638

Hepatoprotective activity of *Oxalis corniculata L.* ethanolic extract against paracetomol induced hepatotoxicity in Wistar rats and its in vitro antioxidant effects. SREEJITH (G), JAYASREE (M), LATHA (PG), SUJA (SR), SHYAMAL (S), SHINE (VJ), ANUJA (GI), SINI (S), SHIKA (P), KRISHNAKUMAR (NM), VILASH (V), SHOUMYA (S), RAJASEKHARAN (S), (Jawaharlal Nehru Tropical Botanic Garden and Research Institute(JNTBGRI), Palode, Thiruvananthapuram 695 562, Kerala State, India). (Indian J. Exp. Biol.; 52, 2; 2014, Feb.; 147-52).

Oxalis corniculata is well known for its medicinal properties like anti-inflammatory, digestive, diuretic, antibacterial, antiseptic etc. Focused the ability of *Oxalis corniculata* to alleviate liver damage caused by over dose of paracetamol. Evaluated the antioxidant activity of *Oxalis corniculata* using the free radical scavenging activity of 1,1-diphenyl-2-picrylhydrazyl radicals, total anti oxidant capacity by phosphomolybdenum method and also the total phenolic content. The ethanolic extract of whole plant of Oxalis corniculata(OC, 500 ìg/mL, po) ~~significantly reduced 1, 1-diphenyl-2-picrylhydrazyl radicals. The dose also caused significant~~

reduction(62.67%) in malondialdehyde levels of murine hepatic tissues. The antioxidant capacity of OC was comparable to that of standard ascorbic acid and showed 53.5 ìg of phenol/ mg OC. Rats pre-treated with OC for 4 days showed significant reduction in the serum enzymes such as glutamate oxaloacetate transaminase, glutamate pyruvate transaminase, alkaline phosphatase, serum bilirubin and showed almost normal histological liver architecture of the treated groups compared to paracetamol induced damage group, indicating its hepatoprotective and antioxidant potential. (35 Ref.; 3 Tab.; 4 Fig.).

49.14639

The role of fungi isolated from historical vegetable-tanned leather on the degradation of peptides and amino acids. ABDEL-MAKSOUD (G), THARWAT (NA), GAD (H), (Conservation Department, Faculty of Archaeology, Cairo University, Giza, Egypt). (J. Soc. Leather Technol. Chem.; 98, 1; 2014, Jan.-Feb.; 1-9).

Discusses the large numbers of leather artefacts that are found in many places in Egypt such as libraries, museums, storehouses, mosques and churches. Many aspects of deterioration especially fungal stains are found on the surface of items such as bookbindings due to unfavourable environmental conditions(such as increased temperature, relative humidity, light, air pollutants etc.). Aims to isolate and identify fungi from vegetable-tanned leather bookbindings, study the effect of highly proteolytic fungi in the hydrolysis of leather into peptides and amino acids and determination of amino acid content of accelerated aged leather produced using fungi. Isolated and identified fungi from three historical bookbindings for achieving it. Estimated the peptide nitrogen and free amino acids for up to 90 days of incubation. Studied also the effect of microbial ageing of the leather on the amino acid content. The results revealed that the most frequently found fungi were *Aspergillus niger, Penicillium spp.* and *Alternaria spp.* The enzymatic activity of these fungi towards the degradation of gelatin was much higher when a phosphate buffer was used in the media than when a citrate buffer was used. Expressed the results as clear zone(mm). Peptide and free amino acids increased during incubation times of up to 90 days. Hydrolysis plays an important role in the deterioration after infection with the studied fungi. (44 Ref.; 3 Tab.; 18 Fig.).

49.14640

Associated use of enzymes and hydrogen peroxide for cowhide hair removal. ANDRIOLI(E), GUTTERRES(M), (Federal University of Rio Grande do Sul, Chemical Engineering Department, Laboratory of Leather and Environmental Studies(LACOURO), Luiz Englert Str. s/n, 90040-040, Porto Alegre, RS, Brazil). (J. Am. Leather Chem. Assoc.; 109, 2; 2014, Feb.; 41-8).

Evaluates the enzymatic extract produced by a strain of *Bacillus subtilis* in combination with hydrogen peroxide for hair removal of cowhides. Tested two concentrations of enzymatic extract(100 and 300 U g^{-1} of hide) and two concentrations of hydrogen peroxide(4% and 8%). Evaluated the hides visually and also the wastewater through analysis of total nitrogen, total fixed and volatile dissolved solids, glycosaminoglycans, proteoglycans and hydroxyl proline.

The oxidative enzymatic unhairing didn't cause destruction of hair and reduced the process time, compared to the conventional and the enzymatic unhairing. The results showed that the oxidative-enzymatic unhairing could be a visible alternative to the use of lime and sodium sulfide on hair removal. (13 Ref.; 3 Tab.; 22 Fig.).

49.14641

Screening and characterization of nitroglycerin degrading microorganisms. PADMAVATHY(S), ANANTHI(V), PRAVEEN RAJA(P), ASHA DEVI(NK), (Department of Zoology, Thiagarajar College (Autonomous), Nos. : 139-140, Munichalai Road, Madurai-625 009, Tamil Nadu State, India). (Scitech J.; 1, 2; 2014, Feb.; 19-24).
Biodegradation process is a novel and economically feasible one for the degradation of many toxic compounds present in the environment in a sustainable manner. Nitroglycerin degrading organisms were isolated from soil samples using environment technique. The nitroglycerin biodegradation assay was carried out using all the bacterial species capable of growing in minimal medium containing nitroglycerin. Three among the five isolates were found to be potent in nitroglycerin degradation. Their efficacy in substrate utilization and spectrophotometric analysis formed the basis for the selection of the assay. The crude enzyme was extracted isolates by cell lysis method. Nitroglycerin biodegradation assay was also carried out using the enzyme extracts and subjected to ultraviolet spectrophotometric analysis. The selected isolates were tentatively identified as *Arthrobacter sp., Agrobacterium sp.* and *Pseudomonas sp.* as per the standard methods. One potent isolate N5(*Pseudomonas sp.*) was selected and utilized for chemical characterization studies, based on the above obtained results. Chemical characterization of the degraded samples was done by fourier transform infrared(FTIR) analysis, which showed potential degradation of nitroglycerin carried out by *Pseudomonas sp.* (25 Ref.; 4 Tab.; 5 Fig.).

LEATHER CHEMICALS AND AUXILIARIES

49.14642

Direct synthesis of â–*N*-glycosides by the reductive glycosylation of azides with protected and native carbohydrate donors. ZHENG (J), URKALAN (KB), HERZON (SB), (Department of Chemistry, Yale University, No. : 225 Prospect Street, New Haven, Connecticut 06520-8107, USA). (Angew. Chem.; 52, 23; 2013, Jun., 3; 6068-71).

Describes a simple and straightforward method, for the stereocontrolled synthesis of â-linked *N*-glycocerrides, that uses alkyl and aryl azides, as the nitrogen source. The *N*-glycosides are formed in high yields and with â selectivities(typically=70% yield, >15:1 â:á selectivity). This approach is also amenable to the synthesis of *N*-glycosylated amino acids and peptides. (34 Ref.; 3 Tab.; 2 Schemes).

49.14643

Rational design of anapoptosis – inducing photo reactive DNA intercalator. UEBERSCHHAR (N), DAHSE (H), BRETSCHNEIDER (T), HERTWECK (C), (Leibniz Institute for Natural Product

Research and Infection Biology, HKI, Buetenbergstr. 11a, 07745 Jena, Germany). (Angew. Chem.; 52, 24; 2013, Jan., 10; 6185-9).

Describes the molecular modeling and mutasynthesis that were employed to rationally tailor the antitumoral agent charteusin into a vinyl-substituted derivative. Discusses the exposure with visible light dramatically improved antiproliferative activities owing to covalent building with deoxyribonucleoroacid(DNA) and induction of apoptosis. The results hold promise for a more efficient chemotherapy, in particular for selectively treating tumors with light probes. (38 Ref.; 23 Fig.).

49.14644

Acidic *p*H-responsive siRNAs conjugate for reversible carrier stability and accelerated endosomal escape with reduced IFNá-associated immune response. TAKEMOTO (H), MIYATA (K), HATTORI (S), ISHII (T), SUMA (T), UCHIDA (S), NISHIYAMA (N), KATAOKA (K), (Division of Clinical Biotechnology, Center for Disease Biology and Integrative Medicine, The University of Tokyo, Hongo 7-3-1, Bunkyo-ku, Tokyo 113-0033, Japan). (Angew. Chem.; 52, 24; 2013, Jun., 10; 6218-21).

Describes an siRNA(small interfering ribonucleoroacid) which is based on an acid-labile maleic acid amide linkage for programmed transfer of siRNA from the endosome to the cytosol and siRNA release in the cell interior. The procedure relies on reversible stability in response to endosomal acidic *p*H value. The complexed polyionic conjugate achieved gene silencing in cultured cancerous cells with negligible side effects. (27 Ref.; 10 Fig.).

49.14645

Iridium catalyzed enantioselective hydrogenation of unsaturated heterocyclic acids. SONG (S), ZHU (S), PU (L), ZHOU (Q), (State Key Laboratory and Institute of Elemento-Organic Chemistry, Nankai University, NO. : 94 Weijin Road, Tianjin 300071, China). (Angew. Chem.; 52, 23; 2013, Jun., 3; 6072-5).

Describes the development of a highly enantioselective hydrogenation of unsaturated heterocyclic acids using chiral ridium/spirophosphino oxazoline catalysts. This reaction provided an efficient method for the preparation of optically active heterocyclic acids with excellent enantioselectivties. (33 Ref.; 3 Tab.; 3 Schemes).

49.14646

Self-adjuvanting synthetic antitumor vaccines from MUC1 glycopeptides conjugated to T-cell epitopes from tetanus toxoid. CAI (H), CHEN (M), SUN (Z), ZHAO (Y), KUNZ (H), LI (Y), (Institut fur Organische Chemie, Johannes Gutenberg-Universitat Mainz, Duesberweg 10-14, D55128 Mainz, Germany). (Angew. Chem.; 52, 23; 2013, Jun., 3; 6106-10).

Describes the T-helper epitope peptide P30 from tetanus toxoid that was used as the immunostimulant in MUC1 glycopeptide antitumor vaccines and apparently also acts as a built-in adjuvant. P30 conjugated glycopeptides vaccines containing three glycans in the

immunodominant motifs PDTRP(Partially dynamic travelling repairman problem) and GSTAP(Protein G and streptavidin-binding protein) induced much stronger immune responses and complement dependent cytotoxicity mediated killing of tumor cells when applied in plain PBS(phosphate buffered saline) solution without complete Freund's adjuvant. (38 Ref.; 11 Fig.; 2 Schemes).

49.14647

Exploring the mechanism of IR-UV double-resonance for quantitative spectroscopy of protonated polypeptides and proteins. NAGORNOVA (NS), RIZZO (TR), BOYARKIN (OV), (Laboratoire de Chimie Physique Moléculaire, École Polytechnique Fédérale de Lausanne, Route Cantonale, CH-1015 Lausanne, Switzerland). (Angew. Chem.; 52, 23; 2013, Jun., 3; 6002-5).

Describes the infrared-ultraviolet(IR-UV) double resonance photodissociation which is used for conformational assignment of the electronic spectra of a cold protonated decapeptide. Proposes a mechanism of the IR-UV depletion spectroscopy(IR-UV DS) and elaborates a procedure of using it for measurements of absolute absorption cross-sections of vibrational transition. (24 Ref.; 4 Fig.).

49.14648

A supramolecular peptide synthesizer. BERTRAN-VICENTE (J), HACKENBERGER (C), (Leibniz Institut für Molekular Pharmakologie(FMP), Robert-Roessle-Strsse 10, 13125 Berlin, Germany). (Angew. Chem.; 52, 24; 2013, Jun., 10; 6140-2).

Described earlier a rotaxene-based set up for the sequence-specific synthesis of small peptides by the Leigh group which runs automatically once started. Discussed this molecular machine that combines elements from both chemical and biochemical peptide(bio-) syntheses. (10 Ref.; 2 Schemes).

49.14649

General entry to aspidosperma alkaloids : enantioselective total synthesis of (-)-aspidophytine. YANG (R), QIU (FG), (Laboratory of Molecular Engineering and Laboratory of Natural Product Synthesis, Guanzhou Institutes of Biomedicine and Health, Chinese Academy of Sciences, 190 Kaiyuan Boulevard, The Science Park of Guanzhou, Guangdong 510530, China). (Angew. Chem.; 52, 23; 2013, Jun., 3; 6015-8).
Discusses a general approach towards the asymmetric total synthesis of various aspidosperma alkaloids that includes the combination of a C=H(Carbon=Hydrogen) bond activation with a Heck-type coupling and the stereo-controlled formation of piperidine and pyrrolidine rings as key steps. Demonstrated the feasibility of this approach with the total synthesis of aspidophytine in 18 steps from 4,4'-disubstituted cyclohexanedione and 2,3-dimethoxyaniline. (64 Ref.; 6 Schemes).

49.14650

Manganese-catalyzed oxidative benzylic C-H fluorination by fluoride ions. LIU (W), GROVES (JT), (Department of Chemistry, Princeton University, Princeton, New Jersey 08544, USA). (Angew. Chem.; 52, 23; 2013, Jun., 3; 6024-7).

Describes an efficient protocol for the selective fluorination of benzylic C-H(Carbon-Hydrogen) bonds. The process is catalyzed by manganese salen complexes and uses of nucleophilic fluorine sources such as triethylamine trihydrofluoride and KF(Kaal Fischer). Reaction rates are sufficiently high (30 minutes) to allow adoption for the incorporation of ^{18}F fluoride sources for PET(Position emission tomography) imaging applications. (59 Ref.; 1 Tab.; 5 Fig.).

49.14651

Catalyst-free direct growth of a single to a few layers of grapheme on a germanium nanowire for the anode material of a lithium battery. KIM (H), SON (Y), PARK (C), CHO (J), CHOI (HC). (Interdisciplinary School of Green Energy, Ulsan National Institute of Science and Technology(UNIST), 50 UNIST-gil, Emyang-eup, Ulju-gun, Ulsan, 689-798, South Korea). (Angew. Chem.; 52, 25; 2013, Jun., 3; 5997-6001).

Describes the direct growth of a single to a few layers of graphene on a germanium nanowire that was achieved by a metal-catalyst-free chemical vapor deposition(CVD) process. The Gr/Ge NW was used as anode in a lilthium ion battery. The material has a specific capacity of 1059 mA h g^{-1} at 4.0C, a long cycle life over 200 cycles and a high capacity retention of 90%. (32 Ref.; 13 Fig.).

49.14652

Different photochemical events of a genetically encoded phenyl azide define and modulate GFP fluorescence. REDDINGTON (SC), RIZKALLAH (PJ), WATSON (PD), PEARSON (R), TIPPMAN (EM), JONES (DD), (School of Chemistry, Cardiff University, Cardiff University Main Building, Park Place, Cardiff CF10 3AT, Wales, UK). (Angew. Chem.; 52, 23; 2013, Jun., 3; 5974-7).

Discusses the expansion of the genetic code that opens new avenues to modulate protein function in real time. The fluorescent properties of green fluorescent protein(GFP) can be modulated by light by genetically incorporating photoreactive phenyl azide. Different effects on function and photochemical pathways are observed by depending on the residue in GFP programmed to incorporate the phenyl azide. (26 Ref.; 16 Fig.).

49.14653

Improving hydrothermal carbonization by using poly(ionic liquid)s. ZHANG (P), YUAN (J), FELLINGER (T), ANTONIETTI (M), LI (H), WANG (Y), (Abteilung Kolloidchemie, Max-Planck

Institut fur Kolloid-und Genzflackenforschung, Gohm, Postdam 14424, Germany). (Angew. Chem.; 52, 23; 2013, Jun., 3; 6028-32).

Describes the synthesis of porous nitrogen-doped carbon materials(HTC(Heat transfer coefficient)) Carbon with PILS(poly ionic liquids) composed of spherical nanoparticles and also those with Au-Pd(Gold-Palladium) core-shell nanoparticles embedded(Au-Pd@N-Carbon). These materials can be prepared from sugars by hydrothermal carbonization (160-200° Centigrade) in the presence of PILs, which act as a stabilizer, pore-generating agent and nitrogen source. (51 Ref.; 2 Tab.; 15 Fig.).

49.14654

The case of the worrisome valves. RAGHAVA CHARI (S), (Chem. Ind. Dig.; 26, 5; 2013, May; 78-81).

Provides the solutions, to the mystifying problems of a 3"1500#ball valve on anti-surge control of 250-bar, 20,000 HP centrifugal compressor; a 4' 1500#taper plug valve on 250-bar ammonia lines and a 6" 300# Teflon lined taper plug valve on condensate line. This article has been written in a humorous vein. (4 Fig.).

49.14655

Helical oligomers of thiazole-based ã–amino acids : Synthesis and structural studies. MATHIEU (L), LEGRAND (B), DENG (C), VEZENKOV (L), WENGER (E), DIDIERJEAN (C), AMBLARD (M), AVERLANT-PETIT (M), MASURIER (N), LISOWSKI (V), MARTINEZ (J), MAILLARD (LT), (Institut des Biomolecules Max Mousseron, UMR 5247, Central National de la Recherche Scientifique(CNRS), Universites Montpellier 1 et II, UFR des Sciences Pharmaceutiques et Biologiques, 15 Avenue Charles Flahault, 34093 Montpellier Cedex 5, France). (Angew. Chem.; 52, 23; 2013, Jun., 3; 6006-10).

Discusses the synthesis of 4-Amino(methyl)-1,3-triazole-5-carboxylic acids(ATCs) as new ã-amino acid building blocks. Analyses the structures of various ATC oligomers in solution by CD(circular dichroism) and NMRS(nuclear magnetic resonance spectroscopy) and in the solid state by X-ray crystallography(XRC). The ATC sequences adopted a well-defined 9-helix structure in the solid state and in aprotic and protic organic solvents as well as in aqueous solution. (39 Ref.; 1 Tab.; 9 Fig.; 2 Schemes).

49.14656

Development of a new fast ionic system based on antimony iodide and silver phosphate. SUNTHANTHIRARAJ (SA), SARUMATHI (R), (Department of Energy, University of Madras, Guindy Campus, Sardar Vallabhai Patel Road, Guindy, Chennai-600 025, India). (Indian J. Pure Appl. Phys.; 51, 5; 2013, May; 336-42).

Describes a series of compositions of the mixed system$(SbI_3)_{100-x}$-$(Ag(PO_4)_x$, that has been prepared by melt quench technique and characterized by means of X-ray diffraction(XRD),Differential scanning calorimetry(DSC), Fourier transform infrared(FTIR), X-ray photoelectron spectroscopy(XPS), ion transference number measurements and electrical conductivity studies involving complex impedance analysis. The room temperature electrical conductivity($ó_{298}$) data have suggested an increase value of conductivity with increasing concentration of the depant namely, SbI_3(Antimony trioxide) attaining a maximum value of $4.2X10^{-3}$ Scm^{-1} in the case of the typical composition having 40 mol% SbI_3. It has also been noticed that the insertion of iodide ions would expand the network resulting in the opened up structure for the favourable migration of Ag^+ ions within AgI(Silverioxide), which may be formed due to an ion exchange reaction between SbI_3 and AgPO4(silver phosphate) in accordance with hard and soft acids and bases(HSAB) principle. (19 Ref.; 3 Tab.; 8 Fig.).

49.14657

Light-induced click reactions. TASDELLEM (MA), YAGCI (Y), (Department of Polymer Engineering, Faculty of Engineering, Yalona University, Merkez Merleskesi. Cinavoik Yolu Üzeki 77200 Merkez/Yalova, Turkey). (Angew. Chem.; 52, 23; 2013, Jun., 3; 5930-8).

Discusses the spatial and temporal control over chemical and biological processes, both in terms of "tuning" products and providing site-specific control as one of the most exciting and rapidly developing areas of modern science. The challenge, for synthetic chemicals, is to discover and develop selective and efficient reactions which are capable of generating useful molecules in a variety of matrices. Light has been recognized as a valuable method for determining where, when and to what extent a process is started in recent studies. Accordingly, it reviews the fundamental aspects of light-induced click reactions, highlights the applications of these reactions to diverse fields of study and discusses also the potential for this methodology to be applied to the study of biomolecular systems. (93 Ref.; 1 Tab.; 13 Schemes).

49.14658

Heterostructural calcium carbonate microspheres with calcite equatorial loops and veterite spherical cores. WANG (S), PICKER (A), CÖLFEN (H), XU (A), (Helmut Cölfen, Physical Chemistry, University of Konstanz, Universitasstrasse 10, Box 714, 78457 Konstanz, Germany). (Angew. Chem.; 52, 24; 2013, Jun., 10; 6317-21).

Describes two different functional additives that have been taken for producing the title structures. The proposed mechanism based on the nonclassical particle-mediated crystallization of calcium carbonate demonstrates the individual and cooperative effects of the polymer poly(sodium 4-styrenesulfonate) and small folic acid molecules on the formation of heterostructures at different reaction stages. (48 Ref.; 12 Fig.).

49.14659

The fatty acid composition of diacylglycerols determines local signaling patterns. NADIER (A), REITHER (G), FENG (F), STEIN (F), REITHER (S), MULLER (R), SCHULZ (C), (Cell Biology & Biophysics Unit, European Molecular Biology(EMSL), Meyerhofstrasse 1, 69117, Heidelberg, Germany). (Angew. Chem.; 52, 24; 2013, Jun., 10; 6330-4).

Designed the caged compounds for releasing biologically active signaling molecules with temporal, spatial and even subcellular resolution. The example of diacylglycerol, some signal responses PKC(Protein Kinase C) is used to show for remaining spatially distinct while other signals([Ca2])(calcium ions) spread across the entire cell as an answer to the question viz : how localized does the signal stay. Surprisingly, this distribution patterns depend on the

of Chemistry, Stanford University, Room No. : 121, No. : 333 Campus Drive Mudd Building, Stanford, California 94305-5080, USA). (Angew. Chem.; 52, 24; 2013, Jun., 10; 6202-4).

Describes the title reaction of methylene-trimethylenemethane(TMM) with á,â-unsaturated *N*-acyl pyrroles as an efficient method for the construction of vinylidenecyclopentanes. An asymmetric protocol using this unique donor forms cycloadducts in excellent yield and enantioselectivity, making use of a bisdiamidophosphite ligand derived from trans-1,2-stilbenediamine. (26 Ref.; 2 Tab.; 2 Schemes).

49.14661

Cathode materials for intermediate temperature solid oxide fuel cells. BHOGA (SS), KHANDALE (AP), (Department of Physics, RTM(Rashtrasant Tukadoji Maharaj) Nagpur University, Mahatma Jyotiba Fuley Educational Campus, Amravati Road, Nagpur-440 033, Maharashtra State, India). (Indian J. Pure Appl. Phys.; 51, 5; 2013, May; 305-9).

The superfine crystallites of $Nd_{1.8}Ce_{0.2}$ CuO_{4+8} are obtained when prepared by mechanochemical reaction using different process control agents. The crystallite size, C_s=34 nm is the smallest for $Nd_{1.8}$ $Ce_{0.2}$ CuO_{4+8} prepared using salicyclic acid process control agent viz. : National Commission for the Certification of Crane Operators(Air Sanitizer)(NCCO(Sa)) as compared to others. The direct current(dc) conductivity(1.64 S cm^{-1}) is the highest for NCCO(Sa) amongst all, which is attributed to the smallest crystallite size and high sintered density. The agglomeration of superfine grain leads to optimal distribution of nano-pores results in low area specific resistance(1.1 ohm cm^2) for the NCCO(Sa). The electrochemical performance suggests adsorption of oxygen by cathode as rate-limiting step. The proposed mechanochemical reaction is useful as a technique for the synthesis of materials with the submicron-sized crystallites. (33 Ref.; 1 Tab.; 8 Fig.).

49.14662

A multilayered supramolecular self-assembled structure from soybean oil by *in situ* polymerization and its applications. KAVITHA (V), GNANAMANI (A), (Microbiology Division, Council of Scientific and Industrial Research-Central Leather Research Institute (CSIR-CLRI), Adyar, Chennai-600 020, India). (Indian J. Exp. Biol.; 51, 5; 2013, May; 400-5).

Emphasizes the *in situ* transformation of soybean oil to self-assembled supramolecular multilayered biopolymer material. Studied the said polymer material which was characterized and the entrapment efficacy of both hydrophilic and hydrophobic moieties. In brief, soybean oil at varying concentration was mixed with mineral medium and incubated under agitation(200 rpm) at 37°Centigrade for 240 hours. Physical observations were made till 240 hours and the transformed biopolymer was separated and subjected to physical, chemical and functional characterization. The maximum size of the polymer material was measured at 2 cm in diameter and the cross sectional view displayed the multilayered onion rings like structures. The scanning electron microscopy(SEM) analysis illustrated the presence of multilayer

honeycomb channeled structures. Thermal analysis demonstrated the thermal stability(200°Centigrade) and high heat enthalpy(1999 J/g). Further, this multilayered assembly was able to entrap both hydrophilic and hydrophobic components simultaneously suggesting the potential industrial application of this material. (19 Ref.; 16 Fig.; 1 Scheme).

49.14663

Structural and electrical conductivity studies of nanocrystalline Li_2NiFiO_4 material. CHERUKU (R), VIJAYAN (L), GOVINDARAJ (G), (Department of Physics, School of Physical, Chemical and Applied Sciences, Pondicherry University, R. Venkataraman Nagar, Kalapet, Pondicherry-605 014, Puduchery State, India). (Indian J. Pure Appl. Phys.; 51, 5; 2013, May; 343-5).

Describes the synthesis of a phase pure nanocrystalline Li_2NiFiO_4(Lithium Nickel sulfate) material by sol-gel technique. Citric acid is used as fuel and the experiment is done in nitrogen atmosphere. The material is crystallized in a cubic rock-salt structure of space group $Fm\bar{3}m$. Accomplished the structural characterization through X-ray diffraction(XRD), thermogravimetry/differential thermal analysis (TG/DTA), scanning electron microscopy (SEM). The electrical characterization of the material is done through impedance spectroscopy. (11 Ref.; 1 Tab.; 8 Fig.).

FINISHING MATERIALS

49.14664

Color preference and light sensitivity in trilobite larvae of mangrove horseshoe crab, *Carcinoscopius rotundicauda*(Latreille, 1802). SRIJAYA (TC), PRADEEP (PJ), HASSAN (A), CHATTERJI (A), SHAHROM (F), JEFFS (A), (Institute of Tropical Aquaculture, University Malaysia Terengganu Mengabang Telipot, 21030, Kaula Terengganu, Malaysia). (Indian J. Exp. Biol.; 52, 3; 2014, Mar.; 281-90).

Describes the trilobite larvae of *Carcinoscopicus rotundicauda* that were tested to determine their color preference and light sensitivity until their first moulting(25 days post hatching) under laboratory conditions. Maximum congregation size of the trilobite larvae was found in the white zone respectively where(n=12) followed by yellow(n=8) and orange(n=8), which showed the larval preference for lighter zones. Morisita's index calculation showed a clumped/ aggregated distribution(yellow, blue, orange and white) and uniform/hyper dispersed distribution(green, red and black) for various tested colors. Trilobite larvae showed least preference for brighter regions while tested in the experiment[black;(n=4) and red;(n=5)]. Experiments done to determine the light sensitivity of trilobite larvae showed that the larvae had more preference towards ultraviolet lights. The maximum congregation size of 38.8 and 40.7% of the larvae was encountered under ultraviolet light, when the light sources were kept horizontal and vertical, respectively. Overall, results suggested that the trilobite larvae of *Carcinoscopius rotundicauda,* preferred light source of shorter wavelengths(UV light) and colors of lighter zone(white, yellow, orange), which might be due to their adaptation to their

natural habitat for predator avoidance, prey selection and water quality. (86 Ref.; 2 Tab.; 2 Fig.).

49.14665

Melamine glyoxal resin as a retanning agent-Preparation and application. SUN (Q), LIAO (X), SHI (B), (National Engineering Laboratory for Clean Technology of Leather Manufacture, Sichuan University, Wangjiang Campus, Section of Chengdu No. : 24 of Southern Yichuan, Chengdu-610065, Sichuan Province, People's Republic of China). (J. Soc. Leather Technol. Chem.; 98, 1; 2014, Jan.-Feb.; 17-22).

Describes amino resins that have played an important role in the manufacture of leather due to their outstanding filling and dyeing properties. However, a traditionally prepared amino resin usually contains free formaldehyde, which is strictly restricted in leather products. There is a growing demand for formaldehyde-free leathers in the global leather market. Discusses the synthesis of a formaldehyde-free amino resin by using glyoxal as condensing agent and investigated its retanning properties. It was found that the glyoxal can be used to replace formaldehyde to synthesize amino resin and the optimal reaction conditions were that the molar ratio of melamine to glyoxal was 1:6, reaction temperature was 333K and reaction time was 3 hours. Retanning experiments with the prepared amino resin indicated that its retanning properties, including fullness, softness, general appearance of the leather and mechanical strength are better or equal to those of a traditionally prepared amino resin. (22 Ref.; 8 Tab.; 2 Fig.).

49.14666

The effect of various pesticides *Carbofuran, Cardendezine, lindane, Fenvalarate, Nuvacron, Neembicidine* on the Ostracod *Oncocyprispustulosa*. THOMAS (J), TESSY (KL), (Sacred Heart College, Railway Station Road, Chalakudy-680 307, Thrissur District, Kerala State, India). (Scitech J.; 1, 2; 2014, Feb.; 15-8).

Conducted the effect of pesticides like *Carbofuran, Carbendazine, Lindane BHC(Benzene Hexachloride), Fenvalarate, Nuvacron, Neembicidine.* The pesticides used were biocides which were categorized as insecticides, fungicides and herbicides. The insecticides include *BHC, Nuvacron and Fenvalarate*. The fungicides include *Carbendiczine* and *Carbofuran* and *Neembizidine*. The ostracod was exposed to various pesticides in different concentration and conducted short time bio-assay. LC 50 revealed that *Fenvalarate* is more toxic. Initially a wide range of pesticide concentration were used to determine the effect on the ostracod by using the method-range finding the test. The pesticide concentrations, of the narrow range, that were prepared as its effect on Ostracod was determined by using the results of range finding test. (7 Ref.; 3 Tab.; 1 Fig.).

49.14667

*p*H as a parameter for the exponential stability of fatliquor emulsions. KOWALSKA (M), BIKOWSKA (A), (Faculty of Materials Science, Technology and Design, Kazimierz Pulaski

University of Technology and Humanities in Random, Poland, No. : 27 Chrobrego Street, 26-600 Radom, Poland). (J. Soc. Leather Technol. Chem.; 98, 1; 2014, Jan.-Feb.; 23-9).

Presents the characteristics of emulsions used in a tannery for leather greasing. Prepared the emulsions from fine commercial greasing[fatliquor] products as 10% emulsions which were tested in the *p*H range from 4 to 8. Presented also the mean particle size, fraction number and dispersions coefficients of tested systems. It was found that samples with emulsions containing lanolin and samples with emulsions containing mixtures of synthetic and natural oils showed the best stability based on the obtained results. (14 Ref.; 2 Tab.; 5 Fig.).

49.14668

Banned fatliquors by REACH Regulation and alternative uses. ARIF HOSSAIN (Sk.), (Leather Technology Department, Government College of Engineering and Leather Technology, Block-LB, Salt Lake City, Kolkata-700 098, India). (J. Indian Leather Technol. Assoc.; 64, 2; 2014, Feb.; 196-8).
Chemicals are typically intermediate products calling for a greater element of innovations. Four factors which would challenge the leather chemical sector of the future are sociological, technological, environmental and political. Leather today is more of smart material than an ordinary covering of body and feet. Consumer demands are expected to be a more material oriented and such challenges can only be met through chemicals. Perhaps this calls for a greater synergy amongst leather technologist, polymer science, nano technologist. The stability of leather would depend strongly on how alternatives based more on biological products are developed. Movement of leather processing from chemical to bio processing has to be seen as an opportunity towards developing bio based specialty chemicals, which can be employed for integrated processing. Meeting the REACH regulation from time to time would ensure that the industry is constantly challenged towards upgrading their products to remain safe.

49.14669

Summoning chemistry : Using materials revolution to create coatings with advanced functionalities. KOZARSKY (R), RANADE (A), (Advanced Materials Team, M/s. Lux Research, Incorporation, No. : 100 Franklin Street, 8th Floor, Boston, Massachusetts 02110, USA). (Chem. Ind. Dig.; 27, 2; 2014, Feb.; 65-71).

Advances in nanotechnology and materials science have enabled functionalities in coatings beyond the basic protective and decorative attributes. However, the variety of functionalities and mechanisms to achieve them has created mismatched perceptions among coating developers and would-be industry customers. Analysed four coating functionalities namely (a) hydrophobic, (b) antimicrobial, (c) photocatalytic and (d) self-healing for their applicability and disruptive potential across various target segments. Assessed 53 innovative small to-medium sized developers to predict the winners, losers, hidden gems and long shots. (3 Ref.; 4 Tab.; 4 Fig.).

LEATHER PROPERTIES. QUALITY CONTROL

49.14670

The stability of metal-tanned and semi-metal tanned collagen. DUKI (A), ANTUNES (APM), COVINGTON(AD), GUTHRIE-STRACHAN (J), (Institute for Creative Leather Technologies(ICLT), School of Science and Technology, University of Northampton, Boughton Green Road, Northampton NN2 7AL, Northamptonshire, England). (Leather Age; 36, 4; 2014, Mar.; 15-20).

Studied the metal tanning and semi-metal tanning potency of the first row transition metals using high powder. Transition metal show different levels of synergistic hydrothermal stabilization in semi-metal tanning. Measurement of hydro thermal stability was carried out regularly in order to monitor the stability and permanence of tanning interactions in metal tanned and semi-metal tanned leathers. The results indicate that the physic-chemical properties of leather can be altered as a result of redox interactions, in which certain transition metals play the role of a catalyst. The extent of metal catalysed oxidative degradation of leather can proceed to the extent of complete destruction of the tanning matrix as well as the collagen itself. Discussed a proposed mechanism of metal catalysed autodegradation in semi-vanadium**(IV)** leather with regard to experimental results and a review of earlier research on the interaction of vanadium salts with phenolic compounds. (18 Ref.; 2 Tab.; 6 Fig.).

49.14671

Effect of neutral salt on pickling and tanning-A study based on assembly behavior of collagen. WEI (X), ZHANG (W), SHI (B), (The Key Laboratory of Leather Chemistry and Engineering of Ministry of Education, Sichuan University, Chengdu 610065 and National Engineering Laboratory for Clean Technology of Leather Manufacture, Sichuan University, Wangjiang Campus, Section of Chengdu No. : 24 of Southern Yichuan, Chengdu-610065, Sichuan Province, People's Republic of China). (J. Soc. Leather Technol. Chem.; 98, 1; 2014, Jan.-Feb.; 30-4).

Investigates the role of neutral salt in pickling and tanning processes by observing the assembly behaviours of collagen in the presence of NaCl(sodium chloride) and tanning agents. The results indicated that NaCl dehydrated collagen molecules and thus induced collagen to assemble into fibres. This fibre assembly led to the close approach of collagens into fibres and generated wide spaces between collagen fibres. Accordingly, the presence of NaCl could promote the penetration of tanning agents and favor the tanning reaction. Importantly, the dehydration and fibre-forming functions of NaCl resulted in a porous and orderly fibrous microstructure of collagens, which might contribute to the satisfactory mechanical and aesthetic properties of leathers. This underlying action of mechanism of NaCl revealed in this research might be useful for the researchers to optimize traditional pickling and tanning techniques and develop practical salt free or low-salt pickling and tanning techniques. (10 Ref.; 12 Fig.).

49.14672

Effects of thickness and gain on the amplitude of airborne ultrasonics. LIU (C), LATONA (NP), (United States Department of Agriculture(USDA), Agricultural Research Service(ARS), Eastern Regional Research Center(ERRC), No. : 600 East Mermaid Lane, Wyndmoor, Pennsylvania 19038, USA). (J. Am. Leather Chem. Assoc.; 109, 3; 2014, Mar.; 70-5).

Currently, hides and leather are virtually inspected and graded for quality, usable area and sale price. However, visual inspection is not reliable for detecting defects that are hidden inside the material. Development of a non-contact nondestructive method to accurately evaluate the quality of hides and leather is very urgently needed. The research results for airborne ultrasonic(AU) testing using non-contact transducers to evaluate the quality of hides and leather were earlier reported. Demonstrated the ability of AU testing for revealing defects in hides and leather that were difficult to be found during visual inspection. Reported also the AU inspection using a statistical data/cluster analysis technique, in which leather and hide defects were depicted as color-coded amplitude or "C-scans. Recently, new research was carried out to study the effects of transducer frequency, thickness of leather and AU gain on the resultant AU amplitude received, which was shown in a C-scan imagine. Observations showed that a lower frequency of 100 KHz yielded better transmission of AU waves through samples and the AU gain should be less than -5dB. In addition, the amplitude of the C-scan decreased with the thickness of the samples. It is a significant guidance for successful AU testing. (11 Ref.; 3 Tab.; 7 Fig.).

BY-PRODUCTS

49.14673

The impact of water pollution with chromium and nickel to the food chain. STASINOS (S), ZABETAKIS (), (Agricultural University of Athens, Food Chemical Laboratory, Department of Food Science and Technology, Iera Odos 75, Athens 118 55, Greece). (Spectros. Europe; 25, 6; 2013; 17-21).

Discusses the previously concerning anthropogenic heavy metal combination of plants and the levels of Ni(Nickel) and Cr(Chromium) in onions and carrots. It is warned that the farmers using irrigation water containing chromium and nickel should be supplied with clean water. Suggests that the EFSA(European Food Safety Authority) eventually uses such evidence to set levels for heavy metals in food crops. This evidence is put into use as another stick with which to beat the leather industry, however; the chrome used in the artificial irrigation and also present in ground water, which is expressed as total chromium, was Cr**(VI)**-dichromate. (9 Ref.; 5 Fig.).

49.14674

Extraction of keratin from unhairing wastes of goatskin and creating new emulsion formulation

containing keratin and Calendula flower(*Calendula officinalis L.*). BAYRAMOGLU (EE), YORGANCIOGLU (A), YELDIYAR (G), ONEM (E), (Ege University, Faculty of Engineering, Department of Leather Engineering, Muhendisligi Bolumu, 35100 Bormova/Izmir, Turkey). (J. Am. Leather Chem. Assoc.; 109, 2; 2014, Feb.; 49-55).

Demonstrated the use, of keratin extracted from unhairing wastes of goatskin for cosmetics. Keratin has been purified from unhairing wastes of goatskin according to the oxidation method for producing emulsions. The experimental process to prepare the emulsions includes Oil/Water(C/W) emulsion method with keratin and *Calendula officinalis* flower extract(*Calendula officinalis L.*). Formulated four emulsion ingredients. Fourier transform infrared spectroscopy(FTIR) analysis of the keratin purified and *p*H, viscosity and average particle size analyses of the emulsions prepared have been carried out. The results of the study have shown that keratin obtained from unhairing wastes of leather industry could be smoothly used in producing emulsion formulations with calendula flower ingredient. (27 Ref.; 2 Tab.; 7 Fig.).

49.14675

Effect of co-combination of tannery sludge and coal on the migration of Cr in the bottom ash. ZHOU (J), WANG (N), LIAO (X), ZHANG (W), SHI (B), (Key Laboratory of Leather Chemistry and Engineering of Ministry of Education, Sichuan University, Chengdu 610065, People's Republic of China). (J. Soc. Leather Technol. Chem.; 98, 1; 2014, Jan.-Feb.; 35-41).

Analyses the feasibility of co-combustion of tannery sludge and coal as well as nano-combustion of the sludge by breaking the migration of chromium in the sludge and its bottom ash. Most of the chromium was found to be fixed in the bottom ash during combustion when the temperature was not over 600°Centigrade. Determines the speciation of chromium in bottom ash by BCR(Community Bureau of Reference) method for further analysis of the migration behavior of chromium after combustion. It was found that a great deal of chromium was converted from oxidable fraction in sludge to exchangeable fraction in bottom ash. Moreover, acid leaching test indicated chromium stabilized in the original sludge became easier to leach from the bottom ash. These facts suggest that the environmental risk of chromium in the ash is much higher than in the original sludge. Therefore, co-combustion of sludge and coal without any further treatment is not a feasible way to disperse chromium enriched tannery sludge. (18 Ref.; 4 Tab.; 10 Fig.).

49.14676

Flocculation behaviours of collagen protein-Al**(III)** composite flocculant. LI (R), ZHAO (J), LIAO (X), ZHANG (W), SHI (B), (National Engineering Laboratory of Clean Technology for Leather Manufacture, Sichuan University, Wangjiang Campus, Section of Chengdu No. : 24, Southern Yichuan, Chengdu 610065, People's Republic of China). (J. Am. Leather Chem. Assoc.; 109, 2; 2014, Feb.; 56-62).

Describes the hydrolyzed collagen protein(HCP), which had been prepared by the hydrolysis of solid skin wastes and then cross-linked with glycerol triglyceridyl ether(GTE) to produce

cross-linked collagen protein(CCP). Describes also the successful synthesis of a series of CCP-Al(Aluminium)(**III**) composite flocculants(CCP-Al) by the combination of CCP with different amounts of $Al_2(SO_4)_3$(Aluminium Sulfate). A kaolin suspension(5 g/**I**) was utilized as a model system to investigate the flocculation behaviours of the as-prepared flocculants. The flocculation extent reached 95% in 20 minutes with the sludge volume ratio lower than 15% when the dosage of the CCP-Al was 50 mg/L. The CCP-Al exhibited better flocculation performance than the $Al_2(SO_4)_3$ under the same revealed that the size of flocs formed by CCP-Al was larger than that of $Al_2(SO4)_3$, suggesting a better aggregation of flocs. **(**23 Ref.; 1 Tab.; 10 Fig.).

49.14677

Responsible waste management for responsible growth. (Chem. Wkly.; 59, 27; 2014, Feb., 11; 191-8).

Discusses that no single technology can address all issues related to treatment of waste generated by chemical industries. Efforts must be made to minimize and control the waste generation at source and thereafter plan should be made for waste treatment. Research and development teams should endeavour for improvement of existing processes and development of new eco-friendly processes for sustainable and balanced growth. Conventional technology for wastewater treatment should be operated in an efficient and optimum manner and chemical industries should keep on upgrading their waste management processes as per new technologies being developed. (1 Fig.; 6 Photos).

49.14678

Application of multiful BGL gasification for the production of sustainable natural gas. WILLIAMS (A), (Chem. Ind. Dig.; 26, 5; 2013, May; 58-63).

The BGL gasifier, is a large scale(150-300MWth) oxygen blown slagging gasifier. British Gas has originally developed as the first stage in a high efficiency route for production of substitute natural gas from coal. The first application of the technology at SVG in Germany where a commercial scale plant operated for 7 years co-gasifying mixtures of coal and wastes to produce syngas for power and methanol production. The BGL gasifier is currently being deployed in China where the first plant, designed to produce fertilizer from lignite, is currently being commissioned and several others are in the design and construction stage. Discussed the waste and coal gasification schemes, based around the BGL gasifier and their potential as a means of supplementing gas supplies and converting problematic wastes to high value substitute natural gas. (14 Ref.; 3 Tab.; 5 Fig.).

TANNERY. ENVIRONMENTAL ASPECTS

49.14679

EU proposes chromium **VI** to be restricted under REACH Annex **XVII** in leather articles. VENKATESAN (P), (Business Development Division, CTS(Footwear Leather Goods, PPE), C.P.T. Road, Tharamani, Chennai-600 113, India). (Leather News India; 5, 1; 2014, Jan.; 41).

A draft commission regulation that has amended REACH Annex **XVII** of European Commission(EC) No. : 1907/2006 which has been notified to the World Trade Organization(WTO) by the European Commission regarding chromium**VI** compounds in leather articles and articles containing leather parts. The proposed date of application is expected in the first quarter of 2015. The draft regulation prohibits any leather article or articles containing leather parts that come into contact with skin which contain 3 or more mg/kg(0.0003%) of chromium**VI** from being placed in the market. (1 Tab.).

49.14680

Overview of EU labelling of leather products. VENKATESAN (P), (Business Development Division, CTS(Footwear Leather Goods, PPE), C.P.T. Road, Tharamani, Chennai-600 113, India). (Leather News India; 5, 1; 2014, Jan.; 42-3).

The results of a study on the feasibility of a leather labeling system at the European level have been published recently by the European Commission. This study helps to identify the key issues relating to labeling of leather products. Consumer labeling is focused which is limited to final leather products liable to carry a label. The proposed EU legislation on the labeling of leather products is based on the model of the Footwear labeling Directive(94/11/EC). The proposed specific types of labeling covered by the study include (a) country of origin labeling; (b) Traceability labeling; (c) Environmental labeling; (d) Social labeling; (e) Authenticity ('real leather') labeling and (f) animal species labeling. The European Commission(EC) has intended to launch a final impact assessment before proceeding with the actual legislative procedure. (1 Tab.).

49.14681

Behind the bureaucracy. USMAN KHAN, (M/s. Modus Europe, No. : 37 Lisburne Road, London NW3 2NS, England). (Leather Intl; 218, 4838; 2014, Mar.; 46, 48&50).

Discusses public consultation, impact assessments and how the leather industry can have the voice heard with European Union(EU) membership meaning many European leather-makers are bound by regulations that have been brought so far. (3 Photos).

49.14682

Recent environmental regulations and technical developments in world leather sector. RAJAMANI (S), CANDAR (V), (International Union of Environment Commission of IULTCS, Old No. : 18, New No. : 45, First Street, South Beach Avenue, M.R.C. Nagar, Chennai-600 028, India). (Leather Age; 36, 2; 2014, Jan.; 21&23-8).

The recent environmental regulations and systems developed in world leather sector with specific reference to Asian Countries including India, China etc. are dealt. Annual world leather process is estimated at 15 million tons of hides and skins. Wastewater discharge

from tanneries is more than 600 million m^3/annum and solid waste generation is about 6 million tons/year. The safe disposal of sludge which is about 5 million tons/year from effluent treatment plants is one of the major unresolved issues in many countries. The leather production activities, especially raw to semi finishing processes are being shifted from United States, West European countries etc. to Asian and South American countries. Environmental regulations are standards are similar in developing and developed countries. Certain parameters are more stringent in developing countries when compared to the developed countries. Major investments are being made for the environmental systems and resettlement of tanneries from the urban areas to the industrial parks. New regulations such as restriction on the use of chemicals, control on salinity and water recovery under Zero Discharge Concept(ZDC), Management of chromium containing sludge etc. envisage continued Research & Development(R&D) activity. (7 Ref.; 6 Tab.; 9 Fig.).

49.14683

Impact of electroplating industrial effluents on plants, potable water and generotoxicity to Meristamatic cells of onion root tips. NAGARAJAN (N), GUNASEKARAN (P), RAJENDRAN (P), (Department of Zoology, Vivekananda College, Tiruvedagam, Madurai-625 234, Tamil Nadu State, India). (Scitech J.; 1, 2; 2014, Feb.; 25-31).

Irrigation with electroplating industrial effluent contaminated water poses threat to plant growth and consumers since it contained deleterious heavy metals such as nickel, chromium, cadmium, zinc, iron and copper. Everyday more than 36,000L of effluents generated by approximately 80 electroplating industries in Madurai City are mixed with waste water that is used for growing leafy vegetables in Avanipuram. Physico-chemical analysis of the effluent sample revealed the contents are beyond threshold limits and nickel is predominant(2172 ppm). Analysis of heavy metals in leafy vegetables such as *Sesbania grandiflora*(Agathi keerai), *Amaranthus sp*(Thandu keerai), *Spinacea oleracea linn*(Pala keerai) and *Moriya oleffera*(Murungai keerai) grown in effluent contaminated area showed they are higher than the critical levels. Water samples indicated the presence of heavy metals(Ni, Cu, Fe, Mn and Pb)(Nickel, Copper, Iron, Manganese and Lead) higher than the prescribed limits. Increase in vigour and tolerance index at 0.1% of the effluent in rice revealed the positive role of the effluent. However reduction in vigour index and tolerance index(effluent concentration 0.1%>) compared to control indicates the severity of toxic elements in the effluent. Proportional increase in phototoxicity percentage with increase in effluent concentrations confirmed effluent toxicity. Histological abnormalities like bridge formation, fragmentation, multipolarity and stickiness during mitotic cell division in root tip meristamatic cells of onions, *Allium cepha* confirmed the genotoxic impacts of the effluent. Results of the study necessitate effluent treatment before releasing into the environment for irrigation purposes. (48 Ref.; 1 Tab.; 13 Fig.).

49.14684

A study on water quality of selected water bodies of District Raigarh, Chhatisgarh. KUSHWAHA (R), RAI (OP), KUSHWAHA (BP), (Mahatma Gandhi Chitrakoot Gramodhya

Viswavidhyalay, Faculty of Science and Environment, Near Ram Mandhir, Chitrakoot-485 780, Satna District, Chattisgarh State, India). (Indian J. Environ. Protect.; 34, 1; 2014, Jan.; 71-3).

Dealt the physical and chemical parameter of water like *p*H, total dissolved solids(TDS), toxic shock syndrome(TSS), conductivity, turbidity, color, alkalinity, total hardness, ammonia, sulphate, chloride, fluoride, sodium, potassium, calcium, iron, boron manganese, copper, mercury, hexavalent chromium etc., in 12 selected ponds, namely Kirodimal Pond and Dipakhole Pond of district Raigarh, Chattisgarh. Analyzed the physic-chemical characteristics of selected ponds for period of monsoon, winter and summer seasons in year 2006-07, respectively according to international standard(IS) of drinking water. There is increasing order found in all the parameter in monsoon, winter and summer months, respectively. (5 Ref.; 1 Tab.).

49.14685

Study of ground water quality of some areas of Imphal West District, Manipur-A physico-chemical approach. LAISHRAM (NS), (D.M. College of Science, Department of Chemistry, Imphal-795 001, Tripura State, India). (Indian J. Environ. Protect.; 34, 1; 2014, Jan.; 74-80).

Analyzed the ground water samples, collected from 10 different locations of Imphal West District of Manipur during pre-monsoon period for physic-chemical parameters, such as temperature, *p*H, total dissolved solids(TDS), electrical conductivity(EC), total hardness(TH), Calcium(Ca), magnesium(Mg), sodium(Na), potassium(K) and chloride(Cl). Also percent sodium(% Na) and calculated the sodium adsorption ration(SAR). The ground water samples represented by S-1 to S-5 are fit for drinking purposes. However, further investigations are necessary to examine whether some heavy metals are present beyond desirable limits or not. In case of samples S-6 to S-10, some suitable treatments are required so as to keep some of the parameters of them within desirable limits of Bureau of Indian Standards(BIU) for drinking water. Except S-10, the ground water samples represented by S-1 to S-9 are fit for other domestic purposes but all of them are found to be fit for irrigation(or agriculture) purpose. (26 Ref.; 4 Tab.).

49.14686

The ground water assessment of an industrial town near South Chennai City. PARVATHAVARTHINI (VK), SENTHILNATHAN (T), (Vellammal Engineering College, Department of Physics, Vellammal Nagar, Ambattur-Red Hills Road, Chennai-600 066, India). (Indian J. Environ. Protect.; 34, 1; 2014, Jan.; 68-70).

Aims an examination, of the pollution threat, especially to the ground water resources around the places of Maraimalai Nagar town which is in the south of Chennai and suggests remedial measures that may also be relevant to other industrial areas. Twelve representative samples were collected from various sources, such as bore wells and open wells for the analysis of physico-chemical and bacteriology parameters. It is found that continuous disposal of industrial effluents on land, which has limited capacity to assimilate the pollution load, has led to groundwater pollution. Groundwater quality surrounding the industrial areas has

deteriorated and the application of polluted groundwater for potability has resulted in increased salt content of soils. Drinking water wells(deep bore wells) also have high concentration of salts in some locations. (13 Ref.; 3 Tab.).

49.14687

Experimental study on leachate characteristics and its effect on groundwater quality. RAGHAVI (P), RAJAGOPALAN (V), (Department of Civil Engineering, University College of Engineering, Anna University, No. : 12, Sardar Vallabhai Patel Road, Guindy, Chennai-600 025, India and Bharathidasan Institute of Technology(BIT), Tiruchy-Pudukkottai National Highway No. : 47 Road, Duriyur Village, Tiruchirappalli-620 024, Tamil Nadu State, India). (Indian J. Environ. Protect.; 34, 1; 2014, Jan.; 55-60).

Tiruchirappalli is facing more adverse solid waste disposal problems due to random increase in population and urbanization. Unscientific disposal of solid waste in Ariyamangalam produce more adverse effects on environment. The groundwater quality in adjacent to the landfill site are changed in their physical and chemical characters. Continuous dumping of solid waste on landfill site has rapidly changed the landuse pattern. Focused the leachate characteristics, solid waste physic-chemical composition and the effect of leachate on ground water contamination. Investigated the chemical characteristics and the contamination of groundwater in relation to landuse. Most of the water samples were not conforming to the standards for the drinking water quality. The groundwater near the landfill site of Tiruchirappalli city was found to be not suitable either for domestic or irrigation purposes. Observed the leachate, that had adversely affected the ground water, which is monitored for *p*H, alkalinity, hardness, ions, total dissolved solids and electrical conductivity, etc. These parameters pose health effects to humans and surroundings. Higher chemical oxygen demand(COD), biological oxygen demand(BOD) values of leachate contaminate groundwater more adversely whose effects must be reduced by adopting suitable leachate management techniques. (12 Ref.; 4 Tab.; 4 Fig.).

49.14688

Assessment of fluoride pollution in some ponds of Singrauli area. CHAURASIA (S), GUPTA (AD), (Mahatma Gandhi Chitrakoot Gramodya Viswavidhyalaya, Department of Energy and Environment, Faculty of Science and Environment, Near Ram Mandhir, Chitrakoot-485 780, Satna District, Chhatisgarh State, India). (Indian J. Environ. Protect.; 34, 1; 2014, Jan.; 61-4).

Fluoride is very much essential for healthy growth of teeth and bones if present between 0.6-1.5 mg/L in drinking water but if the level is higher than 1.5 mg/L than it is harmful for health and may cause dental and skeletal fluorosis, decalcification, digestive and nervous disorders may occurs but less than 0.6 mg/L fluoride in drinking water makes bones and teeth fragile. Fluoride concentrations in 10 pond water were determined of Singrauli area covered the district Singrauli of Madhya Pradesh and Sonbhadra district of Uttar Pradesh. Fluoride is released in large quantities in this area by aluminium plant, thermal power plant, Kanoria Chemicals etc., the problem of high fluoride concentration in ground and surface water resources has now become important toxicological and environmental issue.

Preliminary investigation indicates that several health disorders have been identified in Singrauli area due to excess intake of fluoride through drinking water. Most of people in this area suffer from dental and skeletal fluorosis, such as mottling of teeth, deformation of ligaments, bending of spinal column and ageing problem. Fluoride concentration varied from 1.62-5.82 mg/L. Maximum concentration of fluoride was found at Majhauli village ponds indicates that the possible major source of fluoride is nearest aluminium plant which contribute fluoride pollution in village ponds of the north-eastern direction of the region. A plan, for giving a comprehensive picture of fluoride pollution in the ponds of Singrauli region and drawing urgent attention of local community and government on the problem and threat of fluoride pollution, through this study, was made. (9 Ref.; 1 Tab.; 1 Fig.).

49.14689

Monitoring process safety performance. JAYARAMAN (G), SHAH (R), JAYARAMAN (K), (M/s. Essar Oil Limited, No. : 77, C.P. Ramasamy Road, Abhiramapuram, Chennai-600 018, India). (Chem. Wkly.; 59, 28; 2014, Feb., 18; 205-13).

Warning signs are indicators that something is wrong or about to go wrong. A loss may be prevented if these indicators are recognized and acted. Prevention is better than cure. Of course, this will only happen if one comes to know about what are to be looked for and are willing to take the initiative to do something about it. A review of significant incidents in the Process Industries suggests that most, if not all, of the incidents were preceded by warning signs. Some of these signs were clearly visible, but not acted upon because their significance was not understood. Other warning signs were less obvious, but may have been easily detected by observant personnel for correction. Discussed the warning signs, that have preceded or contributed to put incidents and highlighted some important measurement criteria, in accordance with American Petroleum Institute(API)'s Refining and Petroleum(RP)-754. These indicators, as such, are physical, tangible and related to the management practices of the organization. Warning signs, that are detected may themselves be problems or symptoms of potential problems or incidents. Every sign provides a clue that may be an indication of a catastrophe. These clues gives everyone an opportunity to do things differently to reduce the risk building-up. (5 Ref.; 1 Tab.; 14 Fig.).

49.14690

The chemistry of managing waste. SHAH (V), (M/s. Dow Chemical lnternational Private Limited, Functional Materials Department, Sp Plot No. : 16-19&20a Tamarai Tech Park(Near Olympia Towers, Jawaharlal Nehru Road), Guindy, Chennai-600 032, India). (Chem. Wkly.; 59, 28; 2014, Feb., 18; 217-8).

Describes the institution of the Responsible Care Program(RCP), that has been formulated in 1985 for the modernization of the industry which has been progressive improvement in manufacturing and handling processes, as much as to contain waste and ensure safe disposal as to improve efficiencies. This program guidelines mandatory for any company wanting to do business with it and its members. (3 Ref.; 2 Photos).

49.14691

Development of nanocomposites with antibacterial effect for leather and textile. BACARDIT (A), BOU (J), ROCAS (J), OLLÉ (L), (A^3 Chair in Leather Innovation, Igualada Engineering School(EEI), UPC Placa del Rei, 15.08700-Igualada, Spain). (Leather Age; 36, 5; 2014, Feb.; 13,15-20&25).

Aims for the development, of new systems of nanocomposites to confer new functions to materials used for seats of public vehicles and public spaces. Focused, specifically, an antibacterial effect, for leather and technical textile substrates. Studied the first stage of the research consists of a selection of micro/nano-materials and active principles : selection of encapsulation of nanoparticles, antibacterial and antifungal substances. In the second stage, the process of encapsulation of active principles. The research includes optimization of the encapsulation process by improving the size and stability of the capsules. In addition, the synthesis of a hybrid organic-inorganic polymer acting as a nanomaterial was developed. Described the uses, of the characterization techniques like scanning electron microscopy(SEM) and optical microscopy(OM), analysis and distribution of particle size(DLS) zetasizer), for understanding the mechanisms of synthesis and action of micro/nanomaterials. Standard ASTM 2180-07 "Test methods for determining the activity or incorporated antimicrobial agent(s) in polymeric or hydrophobic materials" has been adopted with regard to the antibacterial and antifungal ability of the nanocomposites. The developments of the different products and the results that have been obtained till date have allowed the conclusion that the synthesized products showed inhibition to the growth of bacteria and fungi in the contact surface. (12 Ref.; 6 Tab.; 16 Fig.).

49.14692

Sustainable environmental protection system for tanning industry with viable sludge and saline stream management. RAJAMANI (S), (Asian International Union of Environment(AIUE) Commission, Old No. : 18, New No. : 45, First Street, South Beach Avenue, MRC Nagar, Chennai-600 028, India). (Leather News India; 5, 1; 2014, Jan.; 38-40).

Proposed the Centralized pretreatment system for upgradation of common effluent treatment plant(CETP). It is novel, appropriate first of its kind, addresses the directions of Pollution Control Authorities in a sustainable way in Uttar Pradesh and in other states. Listed the salient aspects of the integrated environment protection system for tannery industries. (15 Ref.; 2 Fig.; 2 Photos).

49.14693

The right material for every application. LEONHARD (H), GROTSCH (G), (Materials Engineering and Testing at TÜD SÜD Chemie Service, Kaiser-Wilhelm-Allee, 51373 Leverkusen, Germany). (Chem. Wkly.; 59, 40; 2014, May, 13; 199-201).

Discusses that the plant materials such as duplex stainless steel must meet higher demands as process engineering grows increasingly complex and production efficiency rises. Demonstrated this fact in a case study of stress corrosion cracking in a continuously operated distillation column. (6 Photos).

49.16494

Application of *Elaeis guineensis* leaves in palm oil mill effluent treatment. LATIF (A), SUHAINI (AA), ROMZAY (RA), (Department of Occupational Safety and Health, Faculty of Technology, Universiti Malaysia Pehang, Lebuhraya Tun Razak, 26300, Kuantan, Pehang Darul Maknur, Malaysia). (Indian J. Sci Technol.; 7, 3; 2014, Mar.; 254-61).

Palm Oil Mill Effluent(POME) is a highly polluting wastewater that pollutes the environment if discharged directly owing to its high Chemical Oxygen Demand(COD), Biological Oxygen Demand(BOD) concentration. *Elaeis guineensis* leaves in POME treatment are utilized to reduce the COD. BOD and to remove color and comply with the Department of Environment(DOE) discharge standard limit. Batch biosorption experiments were carried out for the removal of Azo Dye(AO52) using *Elaeis guineensis* leaves as a potential biosorbent. The effects of various parameters, such as *p*H, mass of bio-sorbent, initial concentration and contact time were studied to evaluate and optimize the biosorption process condition. The optimum conditions were found at *p*H 2, 90 minutes of contact time, 80 ppm of initial concentration and 1.0g amount of biosorbent. This optimum condition was then applied for COD, BOD and color removal in POME. Maximum percentage reduction of COD and BOD was found to be 802% and 44% respectively and percentage of color removed stood at 91.6% under the optimum condition. The result shows that the final concentration of BOD does not comply with the standard discharge limit, specified by Environment Quality(Prescribed Premises)(Crude Palm Oil) regulations, 1977 while no standard discharge limit in stipulated for COD. Langmuir and Freundlich models were applied to describe the experimental data. Experimental data fitted very well with the Langmuir isotherm model. It indicates that the biosorption mechanism of *Elaeis guineensis* occurs on a homogeneous surface through monolayer biosorption. Further, revealed the effective use, of *Elaeis guineensis* as a biosorbent as the alternative treatment of COD, BOD and color removal in POME. (27 Ref.; 6 Tab.; 7 Fig.).

49.14695

Studies on development of odor control and abatement system for leather tanning industry. PANDA (RC), SIVAKUMAR (V), MANDAL (AB), (Chemical Engineering Division, Council of Scientific and Industrial Research-Central Leather Research Institute(CSIR-CLRI), Adyar, Chennai-600 020, India). (J. Indian Leather Technol. Assoc.; 64, 3; 2014, Mar.; 281-90).

Release of various gases released in the form of unpleasant odor in tanneries is a matter of concern for every long time since leather processing involves both biological as well as chemical materials. Release of toxic gaseous odor is also considered as pollution to environment. Removal of odor from wet processing sections of leather tanneries is important to preserve safety and occupational health. Such odor causing gases are toxic in nature and are identified mostly as ammonia, hydrogen sulfide and volatile organic compounds. These

gases were sampled, analyzed and experimentally quantified. Techniques for the abatement of odorous gases are designed using mechanical and bio-technological methods. Vent and ducting systems are designed to such odorous gases and is fed to biofilter. Micro-organisms in the biofilter assimilate these toxic gases are thereby reduce air pollution. Results are helpful to conclude that the ducting and biofilter techniques presented here, to reduce these toxic emission loads, seems to be simpler and economically cheaper. % odor removal efficiency of about 95% for NH_3(Ammonia) and 96% for H_2S(Hydrogen Sulfide) is available less than 2ppm of odor causing cases would be obtained. Therefore, present methodology would help in abatement of odor in a tannery not only for compliance related to air-pollution norms but make environment in and around tannery, safe and hygienic. (10 Ref.; 3 Tab.; 2 Fig.; 4 Photos).

LEATHER PRODUCTS

FOOTWEAR

49.14696

Ensuring efficient leather grading. LYTHGOE (L), (Leather News India; 5, 1; 2014, Jan.; 36-7).

Discusses the use, of the SATRA Five Point Leather Grading System for training the quality inspection personnel. Various benefits, that can be achieved, if both supplier and shoe factory using the same method, are many and listed every of them.

49.14697

PU sole manufacturing processes and methods. SARASWATHY (G), MOHAN (R), DAS (BN), (Shoe Design and Development Center (SDDC), Council of Scientific and Industrial Research-Central Leather Research Institute (CSIR-CLRI), Adyar, Chennai-600 020, India). (Leather Age; 36, 2; 2014, Jan.; 33-6).

Describes the Direct injection and Pouring(DIP), that are suitable to manufacture direct molded polyurethane soles. Good cell structure, optimum mechanical properties and aesthetics are achieved by both the processes. DIP offers high productivity, cleaner working conditions but high on investment. Pouring technology is less productive as compared to DIP; use of solvents is not ecofriendly but low on investment. (5 Tab.; 4 Fig.).

49.14698

Effect of global economic meltdown on Indian leather & leather product industry. MAHATA (S), (Leather Technology Department, Government College of Engineering and Leather Technology, Block-LB, Salt Lake City, Kolkata-700 098, India). (J. Indian Leather Technol. Assoc.; 64, 2; 2014, Feb.; 199-209).

Discusses the gross domestic product(GDP) growth rate of Indian economy was also met a slow down during the period of financial crisis. The contagion effects of the financial crisis spread from the advanced economies to the Indian market in three distinct channels namely

the financial, the real or trade and the confidence channels. India's central bank-the Reserve Bank of India(RBI) took a number of monetary casing and liquidity enhancing measures to facilitate flow of funds from the financial system to meet the needs of productive sectors. A number of steps like cutting down the cash reserve ratio(CRR), relaxing statutory liquidity ratio(SLR) by one percent, have been taken to address this problem. RBI also announced a 100 basis points cut in the repo rate, which is the rate at which banks can borrow against surplus SLR securities. All these timely and strong steps taken by the monetary authorities helped Indian economy show a rapid recovery from the financial crisis. The economy remained on the path of rapid resurgence which began in 2009-10 and has virtually returned to the high growth path that it had achieved during 2005-08, before the Global financial crisis and economic meltdown. Care ratings released its projections of various economic variables for 2012 and 2013 in January 2012. The report projects that India's GDP growth in the financial year(fy) 2012 will be 7%, which is likely to rise to around 7.5 in fy2013 under certain assumptions made relating to the global economy and domestic policy responses. The fiscal deficit for fy 12 will not meet the budgets target of 4.6% of gdp and would be higher on account of slippages and excess expenditure. Monetary indicators look to weaker with growth in credit being and deposits 18%. Therefore, it is contingent on the policy actions of the government while a gradual recovery is expected in the economy in fy 2013. (6 Ref.; 1 Photo).

49.14699

Child labor in footwear sectors in India. SAHASRANAM (A), (M/s. CEMCOT, No. : F-2, "Shreyas", No. : 87, Greenways Lane, Greenways Road, Raja Annamalaipuram, Chennai–600 028, India). (Leather Age; 36, 3; 2014, Feb.; 54-6).

Furnishes the main findings of the reports on the interactive session with various stakeholders to consider the issue of child labor in the footwear industry, especially focusing on the export sector.

49.14700

Segments of technical textiles-present scenario of market-Part 3. NAIR (GP), PANDIAN (SP), (No. : B2/12, Technocrat Society, Off. : V.S. Marg, Prabhadevi, Mumbai-400 025, India). (Colourage; 61, 1; 2014, Jan.; 86-94).

Describes the market segments for the machineries which are being manufactured for apparels and shoes and covered the items on Interlinings which form the major component of the apparel group. (20 Ref.; 15 Fig.).

LEATHER GOODS

49.14701

Indian leather garments industry. SAMBASIVA RAO (N), (Leather Age; 36, 3; 2014, Feb.; 26-32).

Describes the Indian manufacturers of leather garments who have a strong competitive position on the foreign markets. Indian exporters can capitalize and capture the new markets in cold countries which are not focused. Even in developing countries also, spending on leather garments is high since the leather jacket would protect the human body. Listed the methods, of competition that appear to be most promising for exporters. The Indian leather garments industry may explore more opportunities by adopting innovative marketing methods for their export markets in the coming years. (12 Tab.; 1 Fig.).

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