



ILTA
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Our Activities

- An Association with over 600 members from India and abroad working since last 68 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.
- Assist small and tiny leather goods manufacturers in marketing their products by organizing LEXPOs in Kolkata and different parts of India.

Indian Leather Technologists' Association

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

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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

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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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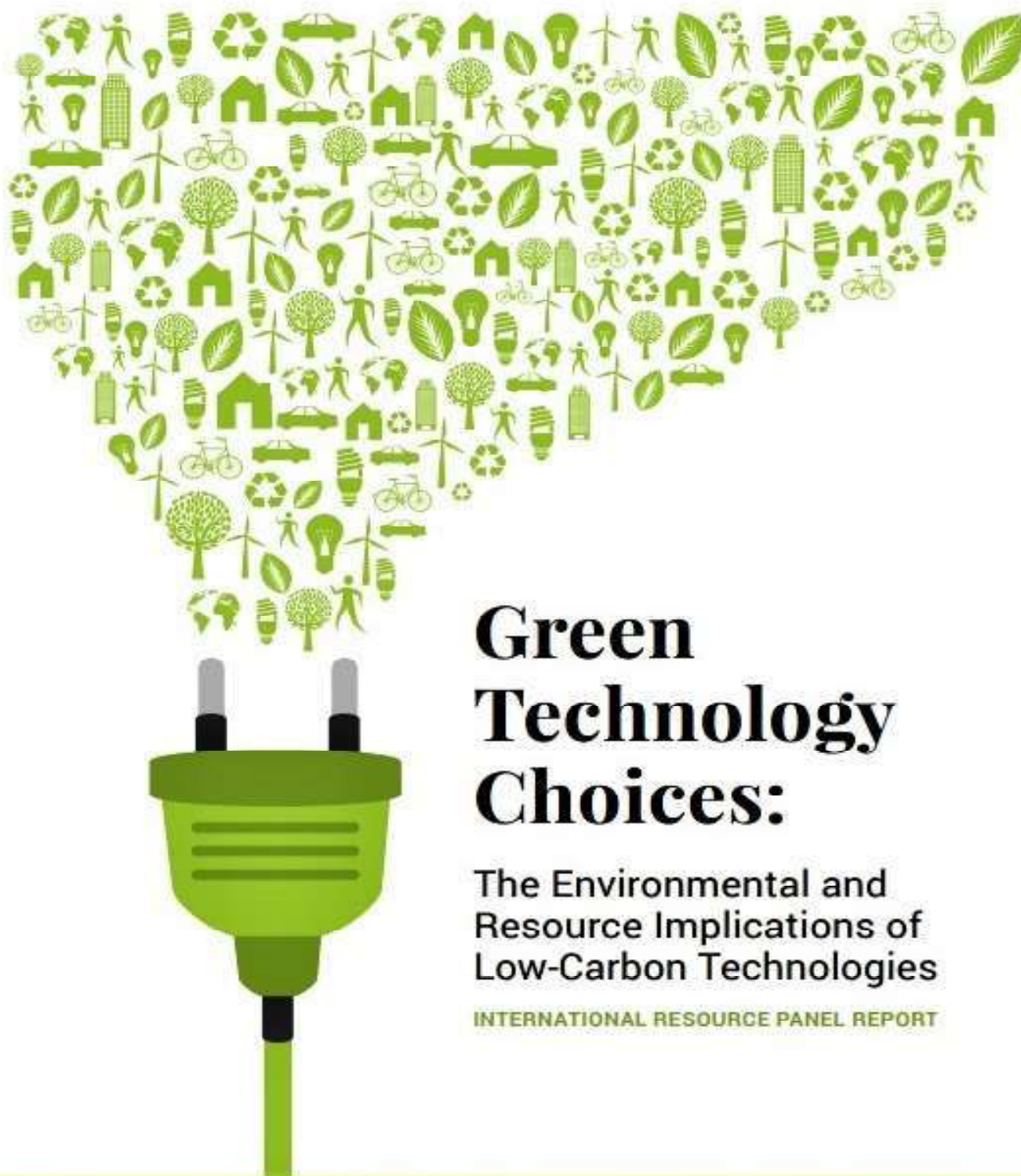
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Green Technology Choices:

The Environmental and
Resource Implications of
Low-Carbon Technologies

INTERNATIONAL RESOURCE PANEL REPORT

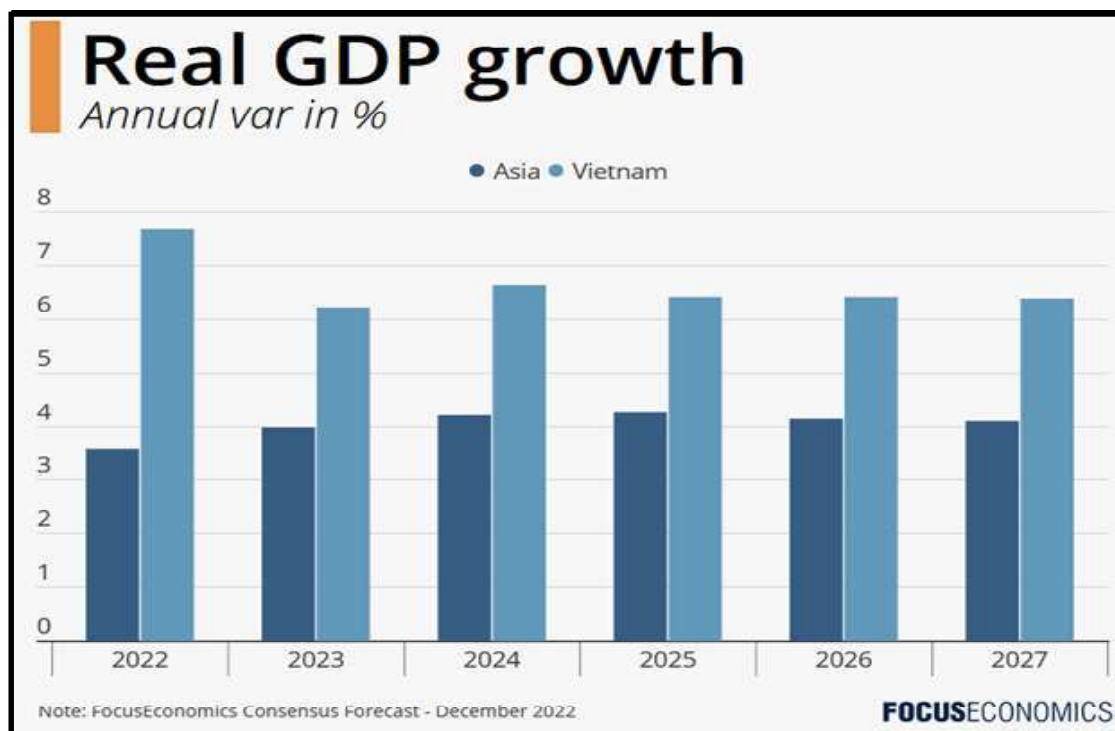
Vietnam is the Next Global Business Node



GDP growth in Vietnam averaged 6.3%—one of the strongest readings in Asia in the decade leading up to the Covid-19 pandemic. Even at the height of the pandemic in 2020 and 2021, the economy continued to expand, unlike many other parts of the world and over our forecast horizon to 2027, growth is forecast to stay above 6%, a feat few other Asian economies will match. A booming manufacturing sector has been the key to past economic success. Vietnam is now one of the world's major electronics exporters, with multinationals such as Samsung, Foxconn, IG and Intel/ present in the country. Firms are attracted by the political stability, low labor costs, large web of free trade agreements—including with the EU—and proximity to China's huge market and vast industrial supply chains. These factors have made Vietnam the largest beneficiary of companies' diversifications away from China in recent years, with Apple and Xiaomi among the latest firms switching production away from China to Vietnam. Our analysts

expect this industrial outperformance to continue ahead: Industrial production has been observed as rising by over 8% annually over the next four years, with merchandise export growth projected to be well into double digits. However, the economy still has weak spots. Vietnam lacks the vast network of firms across all aspects of the supply chain that China boasts, for instance, corruption is a major scourge, the reform of state-owned enterprises has been slow and financial risks are elevated—particularly in the real estate sector. These financial risks are likely to be amplified as the Central Bank continues its monetary tightening cycle.

Vietnam is not expected to dominate global manufacturing in the same way that China has so far this century in the recent past. But, Vietnam will become an important nodal country in a more multi-polar, fragmented global supply chain in the years ahead, with positive implications for the country's growth rate and living standards.



Regarding Vietnam's long-term growth prospects, **analysts at the EIU** said: "EIU forecasts that growth in real GDP per head will average 4.8% per year in 2022-50. Vietnam's long-term economic growth profile remains favourable compared with those of its fellow ASEAN members. Nonetheless, even by 2050 it will remain behind the more advanced economies in Asia and Australasia on an economy-wide and per-head basis."

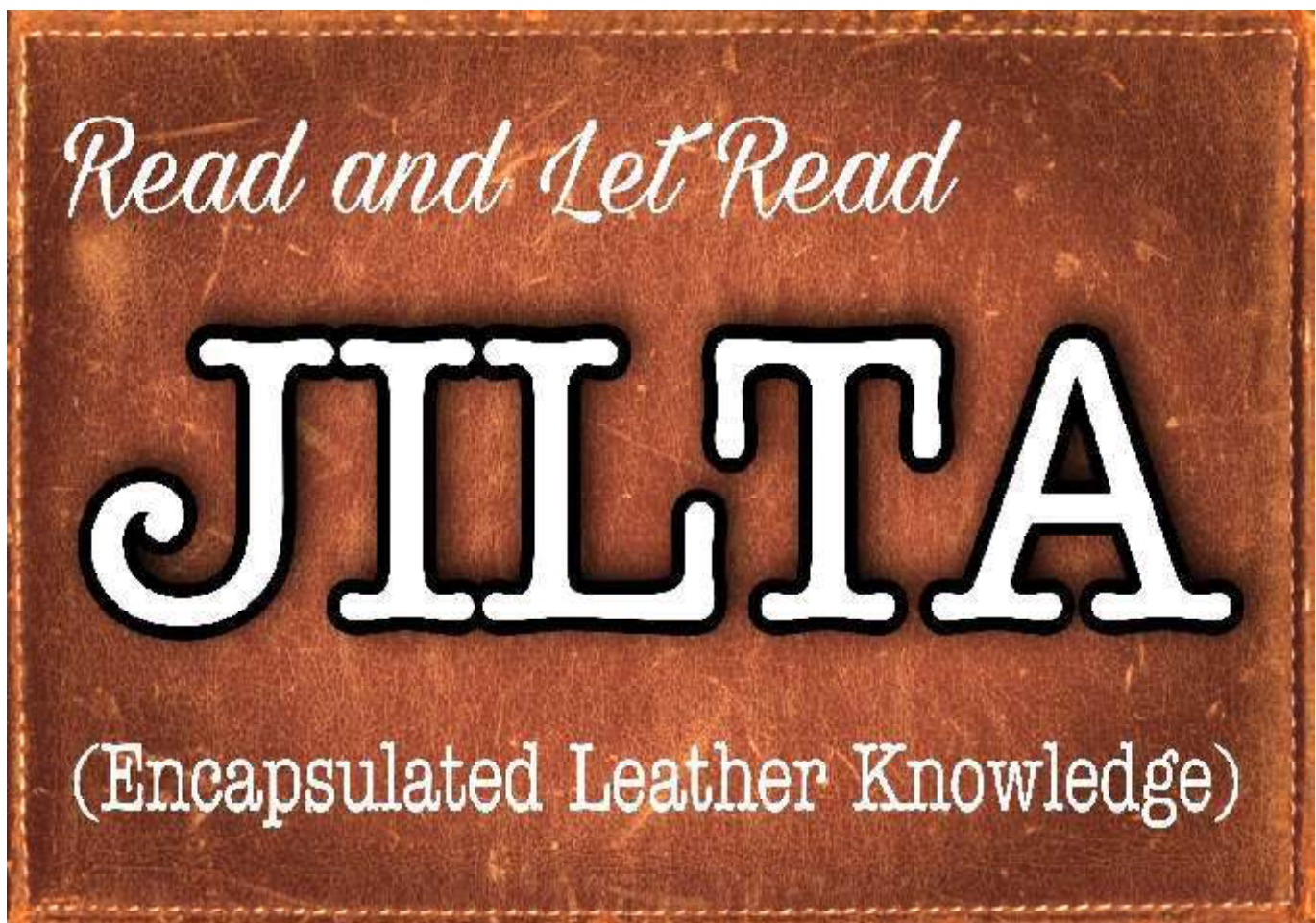
On the outlook, **the World Bank** said:

"In the medium to long term, achieving Vietnam's goal to become an upper-middle income economy will depend on transitioning to a productivity and innovation-led growth model based on a more efficient use of productive, human, and natural capital. This transition

requires strengthened institutional capacity to pass and implement structural reforms aimed at building a more competitive and resilient economy."

Therefore, another eco - geopolitical war is going to warm up Asian countries leading to influx of big brothers across the world flex their muscles all around. Indian economy and think tanks need to rise up to catch the occasion fast and set up strong economic footprint, defense footprint in Vietnam and be an all-weather ally.

Goutam Mukherjee
Dr. Goutam Mukherjee
Hony. Editor, JILTA



Tell me and I forget, teach
me and I may remember,
involve me and I learn

Stahl Campus[®]



As an active proponent of responsible chemistry, Stahl has established the Stahl Campus[®] training institute in its Center of Excellence for sustainable leather technologies in Kanpur. With our Stahl Campus[®] Leather Modules, we can offer training and information, such as responsible chemistry and sustainability in leather production. We believe that in this way, we facilitate transparency that inevitably will lead to a better supply chain with responsible chemistry.

Our approach is modular, making it easy to tailor learning programs to specific needs. Stahl Campus[®] has at its core the drive to unlock human potential and make that new

competitive advantage. By providing the possibility of sharing knowledge, we embrace our role in the dynamic leather and chemical industry. Stahl Campus[®] is a great opportunity to strengthen skills and capabilities in order to make working methods more efficient by sharing experiences and studying products and procedures.

If you're interested to receive more information on Stahl Campus[®], please contact Prasanna Maduri (Prasanna.maduri@stahl.com).

If it can be imagined, it can be created.





Stahl

We imagine sustainable pickle-free leather tanning

If it can be imagined,
it can be created.

Tanners benefit from higher process efficiency, reduced water, chemical and salt consumption and a reduced environmental impact. This makes it possible for tanners to have an efficient process that is also sustainable and yields ecofriendly premium leathers.

High-quality leather no longer forces a choice between responsible processes and efficiency. The main benefits of a pickle-free system that avoids salt addition during pickling are:

- Reduction of water consumption by up to 40%
- Shorter process time on cow, sheep and goat
- Cleaner effluent, TDS reduction by up to 60%

STAHL TO EXPAND LOW-IMPACT AUTOMOTIVE CUSTOMER OFFERING WITH DEDICATED RANGE OF RELCABOND® ADHESIVE AND BONDING SOLUTIONS

Stahl, an active proponent of responsible chemistry, is to offer a dedicated portfolio of low-impact, high-performance adhesive and bonding solutions. As an initial step, Stahl will introduce three dedicated adhesive products, under the RelcaBond® brand name, designed primarily for customers operating in the automotive sector, as well as other markets.

Stahl's expansion into the adhesive and bonding segment builds on the company's longstanding presence in the elastomer coatings market. With the RelcaSil® product range, Stahl has developed a reputation for offering durable, reliable, high-performance coatings. The company is also leading

on environmental stewardship by developing solutions that have a lower environmental impact than traditional market alternatives.



Stahl's adhesive and bonding product offering draws on the company's long-standing research and innovation focus in the automotive space. This is channelled through Stahl's dedicated Centres of Excellence for Automotive, from supporting product development to advanced technologies and testing equipment. Equally, Stahl is able to offer extensive technical and research and development support to automotive customers, including original equipment manufacturers (OEMs) and Tier 1 suppliers.

Mel Micham, Global Market Director, Stahl Performance Coatings: *"At Stahl, our aim is always to remain close to our customers and give them the tools and support they need to keep pace with fast-changing market requirements. This includes improving both the performance and the environmental credentials of products and applications. By building on our strong foothold in adjacent markets, we are proud to offer a unique range of low-impact, high-performance adhesive products that are truly best in class."*

Stahl's expansion into the adhesive and bonding market will begin with the following products:

RelcaBond® 815

RelcaBond® 815 is a low-VOC flock adhesive that provides excellent adhesion to vulcanized rubber and is ideally suited to automotive customers. This adhesive is non-staining, as well as being BTX- and HAP-free. It also offers superior flock density, durability, adhesion, and chemical resistance.

The product is designed for the adhesion of polyester or nylon flock fibers to a variety of elastomer substrates. It protects the rubber sealing from wear, facilitates glass sliding, and contributes to noise reduction and increased passenger comfort.

RelcaBond® 650

RelcaBond® 650 is a glass encapsulation adhesive that offers a more sustainable, water-based alternative to traditional solvent-based solutions. RelcaBond® 650 provides a glass-to-polymer bond for automotive modular windows, including encapsulated side and rear windows and windshields. It works by forming a strong bond between the polymer and the

window glass during the encapsulation process. Stahl is initially launching RelcaBond® 650 in selected markets, with roll-out on a global scale.

Rubber-to-metal adhesives

Stahl currently has a portfolio of rubber-to-metal adhesives in the development phase. These innovative solutions work on elastomers that need to be bonded to metal, and their applications extend far beyond the automotive industry. In particular, Stahl is focused on exploring the development of more sustainable, water-based alternatives to the traditional solvent-based products that currently dominate the rubber-to-metal adhesives segment.

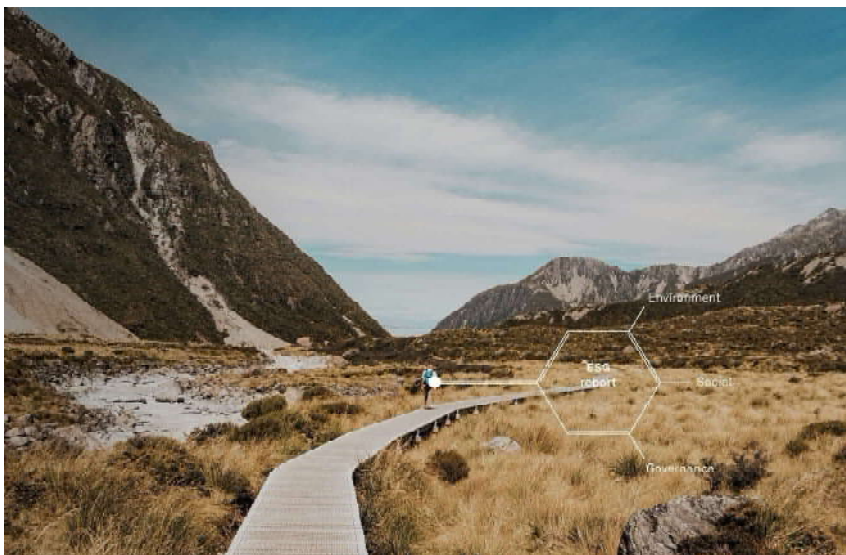
Uwe Siebgens, Group Director, Performance Coatings & Polymers: *"With the new RelcaBond® series, Stahl is extending its portfolio of responsible chemicals into the field of adhesives and bonding agents. This represents a natural next step in our successful journey to offer sustainable, high-performing solutions for the coatings industry."*

(Stahl News – 12/10/2022)

STAHL UNDERLINES RESPONSIBLE SUPPLY CHAIN COMMITMENT WITH ECOVADIS PLATINUM RATING

Stahl, an active proponent of responsible chemistry, has been awarded the highest Eco-Vadis Platinum rating, placing it within the top 1% of companies assessed by Eco-Vadis. The award underlines Stahl's commitment to collaborating with its partners to reduce its environmental impact and build a more responsible and transparent supply chain.

Eco-Vadis is a globally recognized evidence-based assessment platform that reviews the performance of organizations across areas key of more than 90,000 companies including environmental impact, labour and human rights standards, ethics, and sustainable procurement practices. The latest report from Eco-Vadis highlights Stahl's positive progress across all these areas and builds on the Gold rating achieved by the company in 2021. Stahl's 2030 target is to maintain the Eco-Vadis Platinum rating by working closely with its value-chain partners to help them reduce their environmental impact – including by supporting their transition to renewable feedstocks. In 2021, 80% of Stahl's total spend on raw materials was supplied by Eco-Vadis-rated suppliers.



The new Eco-Vadis rating comes as Stahl accelerates its efforts to ensure a more responsible and transparent supply chain. Recent steps have included establishing a dedicated Supply Chain Transparency division within the company's ESG department. The division will be tasked with coordinating a new product development framework that prioritizes the responsible sourcing of raw materials. Furthermore, in July 2022 Stahl submitted a new greenhouse gas (GHG) emissions reduction target, including a specific commitment regarding the company's Scope 3 upstream emissions. Stahl aims to reduce these by at least 25% over the next 10 years, compared with the base year (2021). Stahl expects to achieve this reduction primarily by working with its suppliers to replace fossil-based raw materials with lower-carbon alternatives.

Ingrid Weijer, ESG Performance Manager: *“Achieving an Eco-Vadis Platinum rating is further evidence of Stahl’s strengthened ESG focus and our commitment to working with our suppliers and other industry partners to reduce our environmental impact and build a more responsible value chain. By working side by side, we can achieve our common objective of helping limit the global temperature increase to 1.5°C above pre-industrial levels by 2050, as agreed at the 2015 Paris Climate Accords.”*

(Stahl News – 19/09/2022)

RESPONSIBLE CHEMISTRY INVOLVES RETHINKING PRIORITIES

Stahl’s road to responsible chemistry started in 1978 with the launch of our first water-based leather finishing product. Since then, and over the last 20 years in particular, we have defined Responsible Chemistry and ushered it into our industry. Using our expertise to improve the performance of existing materials and productionize breakout ones, like fruit textiles, for example, that are even more sustainable. But we recognize there are more opportunities to do more. And that starts with our supply chain and the journey our products undergo from raw material to end of life.



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Our vision on responsible chemistry

As a company, we are actively trying to replace petrochemicals with renewable resources. But our road to responsible chemistry doesn’t end there. From a sustainability viewpoint, it is equally important to look at what happens when the products we help to make reach the end of their respective roads. We focus on three priorities to improve our environmental footprint and that of our customers:

1. Using low-impact manufacturing chemicals
2. Using biotechnology to replace non-renewable resources
3. Using waste and recycled content contributing to circularity

Using the Life Cycle Assessment methodology, we measure the impact of a product on the environment over the course of its life.

(Source : <https://www.stahl.com/responsible-chemistry/vision>)





From the desk of **General Secretary**



LEXPO – XXXXI AT KOLKATA

The Kolkata LEXPO – XXXXI at Kolkata Ice Skating Rink from 23rd December to 1st January' 2022 are in progress. Booking of Stalls have been started. Publicity of the event is likely to be started within few a days.

However, status of the progress may be obtained from ILTA office.

SANJOY SEN MEMORIAL LECTURE (21ST EDITION)

The 21st Sanjoy Sen Memorial Lecture will be organized by our association on 14th January' 2023 as it had been organizing in Pre Covid period.

Update of the progress will be shared in due course.

PROF. S. S. DUTTA MEMORIAL LECTURE (4TH EDITION)

The 4th Prof. S. S. Dutta Memorial Lecture will be organized by the South Regional Committee of ILTA on 2nd February' 2023 at Chennai Trade Centre during India International Leather Fair' 2023.

Update of the progress will be shared in due course.



(Susanta Mallick)
General Secretary

YOUTUBE CHANNEL & FACEBOOK PAGE OF ILTA

An official **YouTube Channel** namely **ILTA Online** and a **Face Book Page** namely **Indian Leather Technologists' Association** has been launched for sharing the activities of our Association since November' 2020 and July' 2021 respectively.

You may find all the Lives / Video recordings of different Seminar, Symposiums & Webinars on both of these social medias along with our website **www.iltaonleather.org** time to time.

You are requested to kindly do **Like & Subscribe** the YouTube Channel and **'Follow'** the FaceBook Page to get regular updates on the activities of our Association.

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Interested author may sent their paper (in MS Word format) along with a PP Photograph and Contact details like Email, Mobile etc. to our email IDs : admin@iltaonleather.org / jiltaeditor@gmail.com

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- b) Kindly mention your **Membership No.** (If any) against your each and every communication, so that we can locate you easily in our record.



General Secretary and the Members of the Executive Committee are available to interact with members at 18.30 hrs, at our Registered Office on every Thursday



ILTA
Since 1950

Solidaridad

With over 50 years of experience in developing sustainable solutions to make communities more resilient, Solidaridad has been working on many different issues, from supporting marginalized communities to fostering a more sustainable supply chain.



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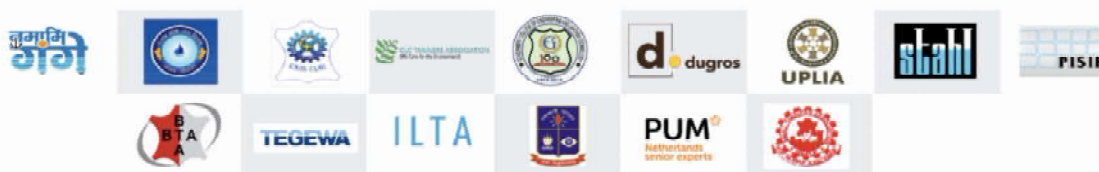


**EFFECTIVE WASTE MANAGEMENT AND SUSTAINABLE
DEVELOPMENT OF MSME TANNING COMPANIES IN KOLKATA
LEATHER CLUSTER (BANTALA)**

2022-2023



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LEATHER DYING BY PLANT-DERIVE COLORANTS USING DIFFERENT MORDANTS

Dr. Dibyendu Bikas Datta¹, Jhanavi Banerjee²

¹Associate Professor, National Institute of Fashion Technology, Kolkata

²Entrepreneur, Leather Crafts, Kolkata



Abstract

The colorfastness of naturally dyed substrates is vital from an industrial point of view. The present study focuses on isolating eco-friendly dyes from the bark of *Mangifera indica* L (commonly known as mango), and *Eucalyptus globulus* L was used to dye the vegetable-tanned goat leather. Copper sulphate [CuSO₄], ferrous sulphate [FeSO₄], potassium aluminium sulphate [KAl(SO₄)₂], and potassium permanganate [KMnO₄] were used as mordants. The colorfastness properties, viz., mild washing, rubbing, and sunlight, was evaluated and compared with and without mordants. The study results demonstrated good to excellent responses in mild washing and rubbing with *Eucalyptus globulus* and *Mangifera indica* dye. Colorfastness to daylight rendered between fairly good to good results. The comparative analysis of results concluded that *Eucalyptus globulus* dye gave better results than the *Mangifera indica* in colorfastness properties of dyed leather samples.

Keywords: eco-friendly, natural dye, plant bark, leather, mordants

Introduction

Leather is a commonly used material in different industries to produce items such as clothes, shoes, bags, furniture, sports equipment, tools, and many other articles. Most popular are leathers obtained from animals such as cattle, goats, pigs, or sheep. The leather industry is undergoing radical transformation due to pollution and discharge legislation. Synthetic dyes harm the environment and human beings. In humans, these dyes lead to liver tumors, kidney damage, and heart disease (Prabhu & Bhute, 2012). Leather manufacturers are under pressure to use natural materials when processing raw hides and skins. The conventional dyeing method generates colored effluent with toxic substances (Chequer et al., 2013). Leather tanners are therefore looking for eco-dyeing techniques.

Nowadays, there is a growing interest in the revival of natural dyes in leather dyeing. Natural dyes are non-toxic, non-carcinogenic, exhibit better biodegradability, and are generally more compatible with the environment. Despite their inferior fastness, natural dyes are more acceptable to environmentally conscious people worldwide (Deo & Desai, 1999). Textiles have long used them, but their application to genuine leather has been infrequent.

Natural dyes are derived from insects like Cochineal and *Kerria lacca* and can be used for coloring food products. Shellfish and lichen are also used for the extraction of dyes. Natural dyes derived from plants are eco-friendly, making them a priority for use in the textile industry (Sundari, 2015; Bhuyan & Saikia, 2008). The dye can be produced from fruit, seed, flowers, wood, and bark of plants and can be used as coloring compounds in the textile, ink, and cosmetics industries (Siva, 2007). Natural dyes show antimicrobial activity, have medicinal applications (Samanta & Agarwal, 2009), and gained an economic advantage over synthetic dyes. Helmy (2020) described natural dyes extracted by solid-liquid extraction and applied to cotton and silk. The dyes were extracted from *Terminalia arjuna*, *Punica granatum*, and *Rheum emodi* and used on cotton and silk. These dyes were developed with enzyme complexes (protease, amylase, and lipase) and the addition of tannic acid. Enzyme-treated samples exhibited faster dye adsorption than untreated samples. The tannic acid enzyme is used as an alternative to metal mordants (Vanker et al., 2007).

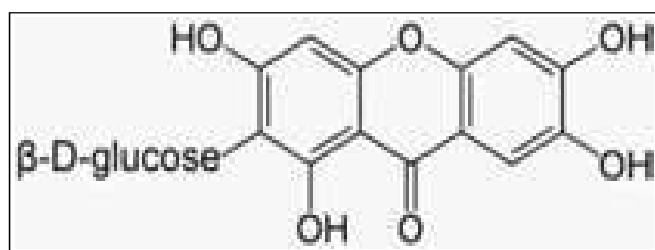
Velmurugan et al. (2010) studied the dyeing effects of fungal pigment on wet blue goat leather. They evaluated fungi that have been an important source of anthraquinone carboxylic acids and pre-anthraquinones. For the analysis, five different water-soluble pigments were extracted from *Monascus purpureus*, *Isaria* spp, *Emericella* spp, *Fusarium* spp, and *Penicillium* spp, which were used for dyeing afterward. They

also studied the different parameters such as pH, temperature, dye exhaustion, and color intensity. The results of their study inferred that fungal pigments can be used as a natural dye and would help reduce the pollution of the leather dyeing process.

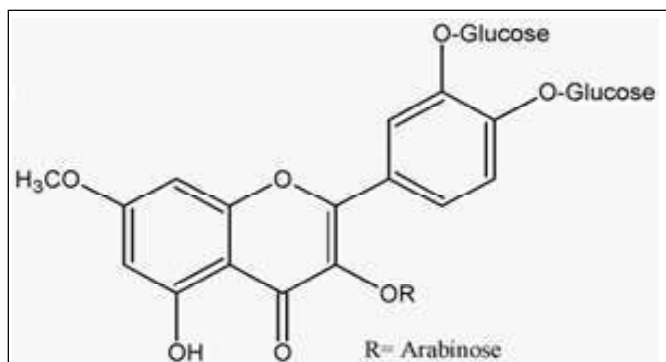
Mango tree bark contains Mangiferin (1,3,6,7 tetra hydroxyxanthone C2-b-D-glucoside) (Figure 1) which is responsible for providing color (Luo et al., 2012). Mangiferin is a bioactive ingredient with potent antioxidant activity and multifactorial pharmacological effects, including antidiabetic, antitumor, lipometabolism regulating, cardioprotective, antioxidant, anti hyperuricemic, neuroprotective, antiviral, antipyretic, anti-inflammatory, antibacterial, analgesic and immunomodulatory effects. Therefore, it possesses many

health endorsing properties and is poised for further research and development.

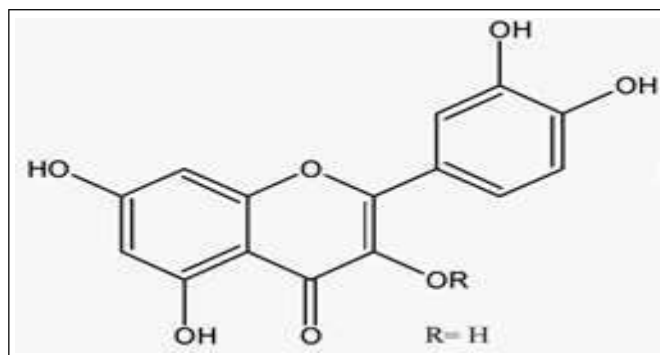
Eucalyptus bark is one of the most important sources of yellowish-brown colorant. The coloring matter of eucalyptus has abundant natural tannins and polyphenols varying from 10% - 12%. Apart from tannins, the important compounds in the eucalyptus bark are eriodictyol, naringenin, quercetin, rhamnazin, rhamnetin, and toxifolin, of which some are colorants. The major coloring component of eucalyptus bark is quercetin, which is also an antioxidant. The structures of two important coloring components of eucalyptus, viz. Quercetin and rhamnetin (Ali et al., 2007) are given in Figure 1.



(a) Mangiferin



(b) Quercetin



(c) Rhamnetin

Figure 1. Chemical structures of (a) Mangiferin, (b) Quercetin, and (c) Rhamnetin.

Natural tannins and polyphenols varying from 10% - 12% are abundant in eucalyptus as a coloring matter, ranging from 10% to 12%. Aside from tannins, eucalyptus bark contains compoJhanaunds such as eriodictyol, naringenin, quercetin, rhamnazin, rhamnetin, and toxifolin.

This study aims to extract eco-friendly dyes from the bark of *Mangifera indica* and *Eucalyptus globulus* and apply them to vegetable-tanned goat leather to attain desirable fastness properties.

Materials and methods

Materials

Leather

Undyed vegetable tanned goat leather purchased from the wholesale market Brisul Haat (as it is colloquially known) located at Padmapukur, Kolkata, India, was used in the experiment.

Natural dye

Tree barks of the mango '*Langda*' variety (*Mangifera indica* L.) and eucalyptus (*Eucalyptus globulus* L.) were used for this study to extract natural dyes. Tree bark was collected from the Amlachati Medicinal Plant Garden, Jhargram Research Range, Directorate

of Forests, Government of West Bengal. The collected bark was cleansed with water to remove impurities and soaked in 1% ascorbic acid. Afterward, the bark was cut into small pieces between 25 mm and 50 mm in size and shade dried until it had moisture content below 10%. Pulverized bark was sieved using a 0.6 mm sieve and stored (Figure 2).



(i) Mango bark



(ii) Mango bark dust



(iii) Eucalyptus bark



(iv) Eucalyptus bark dust

Figure 2: Sources of dye from mango and Eucalyptus tree bark

Chemicals and mordants

All the chemicals used in the study were of laboratory reagent grade and different mordants, i.e., copper sulphate [CuSO_4], ferrous sulphate [FeSO_4], potassium aluminium sulphate (commonly called alum) [$\text{KAl}(\text{SO}_4)_2$], and potassium permanganate [KMnO_4] were utilized separately to form specific affinity between the leather and the dye in the process of simultaneous mordanting.

Methods

Aqueous dye extraction

The 150g of dried crushed powdered bark dust of mango and eucalyptus were soaked in RO purified water separately for 24 hours (100 g/L), heated to 100°C , stirred well, and left boiling for 1 hour until the solution became approximately 500ml. The dye solution was cooled and filtered using muslin fabric and stored in a refrigerator for further use.

Dyeing of leather and mordanting

Leather dyeing was carried out in rotary micro drum assembly equipped with programs to control temperature, time, and circulation speed. The undyed vegetable-tanned goat leather pieces (100g) were placed in the drum containing 150 ml of aqueous dye and 0.5 ml wetting agent (Silastol R-687 from BASF). Formic acid was then slowly added to the aqueous dye after 10-25 min for efficient regulation of pH at 3.5. Four

mordents CuSO_4 , KMnO_4 , FeSO_4 , and $\text{KAl}(\text{SO}_4)_2$ of weight 0.5g, were added to the drum separately in each dyeing process with individual simultaneous mordanting for fixation and to improve the color of the leather. The drum was run for 1 hr at 25°C using 50 rpm. The extract was drained, the leather strip was rinsed, hung in the open air for drying, and the color was checked.

Evaluation of fastness properties

A colorfastness test determines the resistance of colors against specific conditions. All the dyed leather samples were evaluated in terms of mild washing (ISO 15703:1998), colorfastness to rubbing (BS 1006:1990), and daylight (ISO 105-B01:1999).

Results and discussion

Visual assessment of dyed leather

The visual appearance of dyed leather samples exhibited a good variety of shades with *Mangifera indica* and *Eucalyptus globulus*. Moreover, good levelness and depth of shades were obtained by adopting dyeing using different mordants.




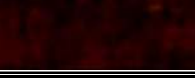






Dye penetration

Dye penetration was relatively good with and without mordants when dyed with *Mangifera indica* and *Eucalyptus globulus* dyes. In the present study, simultaneous mordanting is used, which is more convenient. Four different mordants [CuSO_4 , KMnO_4 ,

FeSO_4 and $\text{KAl}(\text{SO}_4)_2$ were used to fix the shade. The color of the extract of *Mangifera indica* and *Eucalyptus globulus* bark was brown. Using four mordants, each dye yielded four shades. CuSO_4 gave a dark brown color with mango dyes and a chocolate brown color for *Eucalyptus* dye. FeSO_4 gave black for mango and a dark blue shade when dyed with *eucalyptus* bark dyes. KMnO_4 and $\text{KAl}(\text{SO}_4)_2$ gave light brown colors to mango dyes. KMnO_4 gave dark brown, and $\text{KAl}(\text{SO}_4)_2$ gave greyish brown when dyed with *eucalyptus* bark dye. Mango bark dyes gave a light brown color with KMnO_4 and $\text{KAl}(\text{SO}_4)_2$ mordants (Table 1).

After mild washing and rubbing, the fastness properties ranged from good to excellent. The colorfastness to daylight range from fairly good to good in greyscale reading. (Table 2-4). The intense colorfastness of the two natural dyes depends on the mordant, which plays an essential role in forming an excellent chelating bond with dye molecules (Siva, 2007).

Table 1. Leather dyed with aqueous extract of *Mangifera indica* and *Eucalyptus globulus*

Mordants	<i>Mangifera indica</i>	<i>Eucalyptus globulus</i>
Without mordant		
Copper sulphate [CuSO_4]		
Ferrous sulphate [FeSO_4]		
Potassium aluminium sulphate [$\text{KAl}(\text{SO}_4)_2$]		
Potassium permanganate [KMnO_4]		

Colorfastness to mild washing

The dyed leather sample was assessed based on staining on the multifiber and sample change in color using greyscale. Colorfastness to washing results has been shown in Table 2. *Mangifera indica* dye showed excellent staining results (5) on acetate, cotton, and nylon with and without mordants. Excellent staining results (5) on cotton, nylon, polyester, and acrylic were found with CuSO_4 , FeSO_4 , $\text{KAl}(\text{SO}_4)_2$, and KMnO_4 mordants. Very good staining results (4-5) were obtained on wool with all selected mordants. Analyzing the results of mild washing, it was found that very good changes in color ratings (4-5) were obtained with CuSO_4 mordant. Good results of change in color were observed with all selected mordants.

Moreover, with *Eucalyptus globulus* dye, excellent staining grade (5) was observed on acetate with and without mordants. Excellent staining on cotton was evaluated with $\text{KAl}(\text{SO}_4)_2$ and KMnO_4 and without mordant. Moreover, very good staining grades on cotton were observed with CuSO_4 and FeSO_4 mordants. Analyzing staining results on nylon, it was found that the mordants rendered very good grades (4-5). Excellent results were obtained on polyester and acrylic without mordants, and nylon had a very good rating (4-5) for all the mordants. Results of staining on wool depicted an excellent rating. Moreover, a very good change in color results was obtained with and without mordants.

Colorfastness to rubbing

Results of rubbing (dry and wet) with *Mangifera indica* and *Eucalyptus globulus* dyes are presented in table 3. It was noticed that very good staining results were observed in the dry state with and without mordants. Moreover, very good staining results in the wet state were found with CuSO_4 , $\text{KAl}(\text{SO}_4)_2$, KMnO_4 and without mordant. While FeSO_4 rendered good staining results in wet rubbing. Observing the change in color results in a dry state, it was revealed that an excellent grade (5) was obtained with $\text{KAl}(\text{SO}_4)_2$, whereas the rest of the mordants gave very good results, including without mordant. Further analyzing the change in color in the wet state, very good results were obtained with and without mordants.

Furthermore, it was evident from the results that excellent staining (5) was obtained in a dry state with and without mordants using *Mangifera indica* dye. Staining in a wet state revealed that very good staining (4-5) results were obtained with CuSO_4 , FeSO_4 and $\text{KAl}(\text{SO}_4)_2$. While the un-mordanted dyed leather sample was also noted with very good staining results (4-5) in the wet state. In case of change in color results, it was found that very good results (4-5) in the dry state were developed with FeSO_4 , $\text{KAl}(\text{SO}_4)_2$ and KMnO_4 . Meanwhile, a good change in color (3-4) was observed with CuSO_4 mordant. Observing change in color results in a wet state, it was analyzed that very good results (4) were obtained with KMnO_4 mordant. A good change in color results was noted with FeSO_4 mordant. While very average results (3) of change in color in the wet state were observed with CuSO_4 , $\text{KAl}(\text{SO}_4)_2$ mordants. The results demonstrated that the *Eucalyptus globulus* dyed sample showed good to very good rub fastness results compared to *Mangifera indica* dye.

Table 2. Colorfastness to mild washing with *Mangifera indica* and *Eucalyptus globulus* dyes

Use of Mordants	<i>Mangifera indica</i>							<i>Eucalyptus globulus</i>						
	Staining						Change in color	Staining						Change in color
	CA	CO	PA	PES	PAN	WO		CA	CO	PA	PES	PAN	WO	
Without Mordant	5	5	4-5	4-5	5	4-5	4	5	5	5	5	5	5	4-5
CuSO ₄	5	5	5	5	5	4-5	4	5	4	4-5	5	5	5	4-5
FeSO ₄	5	5	5	5	5	4-5	4	5	4-5	4-5	5	5	5	5
KAl(SO ₄) ₂	5	5	5	5	5	4-5	4	5	5	4-5	5	5	5	5
KMnO ₄	5	5	5	5	5	4-5	4-5	5	5	4-5	5	5	5	4-5

Where: CA=Acetate, CO= Cotton, PA= Nylon, PES= Polyester, PAN= Acrylic, WO= Wool, 5= Excellent, 4= Good, 3= Average, 2= Poor, 1= Very Poor

Table 3. Colorfastness to rubbing with *Mangifera indica* and *Eucalyptus globulus* dyes

Use of Mordants	<i>Mangifera indica</i>				<i>Eucalyptus globulus</i>			
	Staining		Change in Color		Staining		Change in Color	
	(Dry)	(Wet)	(Dry)	(Wet)	(Dry)	(Wet)	(Dry)	(Wet)
Without Mordant	5	4-5	3-4	3	4	4	4-5	4-5
CuSO ₄	5	4	3-4	3	4-5	4-5	4-5	4-5
FeSO ₄	5	4	4	3-4	4	3-4	4	4
KAl(SO ₄) ₂	5	4	4	3	4-5	4-5	5	4-5
KMnO ₄	5	3-4	4	4	4-5	4	4-5	4-5

Where: 5= Excellent, 4= Good, 3= Average, 2= Poor, 1= Very Poor

Colorfastness to daylight

Light is an important factor that affects dye durability. Therefore, dyed samples were assessed for sunlight exposure. Results of color fastness to daylight (Table 4) with *Mangifera indica* dye produced a very good change in color grade (5) with KAl(SO₄)₂ and KMnO₄ mordant. A fairly good grade (4) was obtained with CuSO₄, FeSO₄, and without mordant.

Table 4. Colorfastness to daylight with *Mangifera indica* and *Eucalyptus globulus* dyes

Use of Mordants	<i>Mangifera indica</i>	<i>Eucalyptus globulus</i>
	Change in color according to blue wool scale	Change in color according to blue wool scale
Without Mordant	4	4
CuSO ₄	4	5
FeSO ₄	4	5
KAl(SO ₄) ₂	5	4
KMnO ₄	5	4

Where: 8= Exceptional, 7= Excellent, 6= Very Good, 5= Good, 4= Fairly Good, 3= Average, 2= Poor, 1= Very Poor

Results of colorfastness to daylight with *Eucalyptus globulus* dyed sample were fairly good to very good. A good change in color (5) was obtained with CuSO₄ and FeSO₄ mordant. Applying without mordant and with FeSO₄, KAl(SO₄)₂ and KMnO₄ mordants produced a fairly good change in color results.

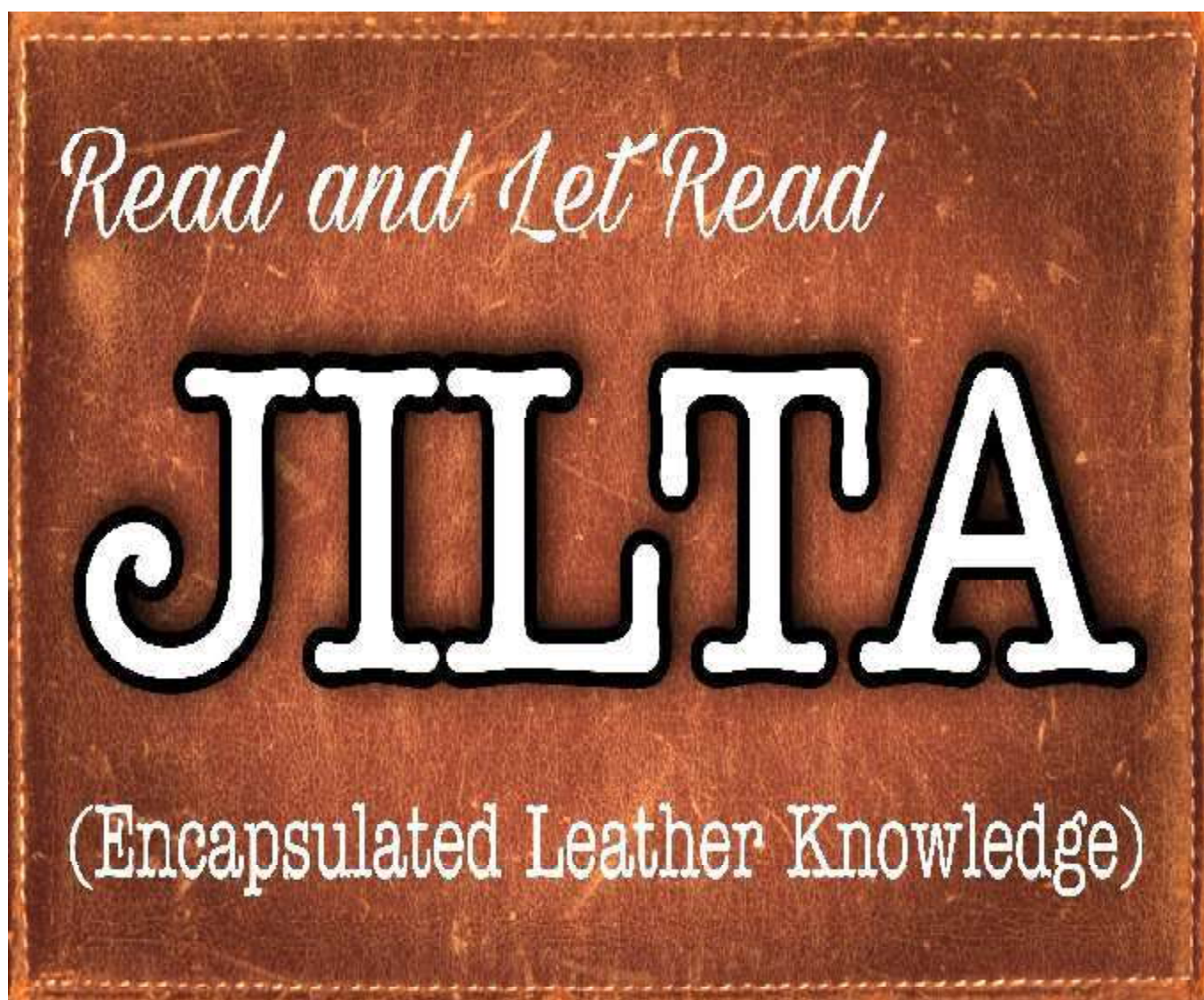
Conclusion

Colorants of plant origin have the potential to dye leather with a negligible effect on their structure and no negative impact on the environment. The application of various mordants in the dyeing process can beneficially influence the dyeing process and properties of dyed leather, such as color intensity and colorfastness. This study concludes that natural dyes from *Mangifera indica* and *Eucalyptus globulus* can be successfully applied to leather, and different shades can be produced from the same extract using different mordants. These dyes are eco-friendly and an excellent alternative to synthetic dyes. Further research can develop the dyeing process using natural colorants and improve the parameters of dyed leather.

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INTERNATIONAL UNION OF LEATHER
TECHNOLOGISTS AND CHEMISTS SOCIETIES
(www.iultcs.org)

IULTCS Young Leather Scientist Grant Programme 2023 Announced

The Executive Committee of the IULTCS is pleased to announce the 2023 grants to be awarded to three young scientists, under the age of 35, for research projects in the categories: Basic Leather Research, Machinery / Testing and Sustainability / Environment – to be conducted at a recognised institution in 2023.

As in previous years Leather Naturally will again sponsor the Dr Mike Redwood Sustainability / Environment grant with the monetary sum of € 1,000 sponsorship and Erretre will similarly sponsor the Machinery / Testing grant also with a sum of € 1,000 sponsorship and Erretre will similarly sponsor the Machinery / Testing grant also with a sum of €1,000. In addition, IULTCS is delighted to receive the support of a new sponsor, Tyson Foods, who will provide a € 1,500 Basic Leather Research grant for research on the topics such as innovative leather processing, new chemicals for leather processing, analytical method development, hide/skin preservation, environmental studies applied to the tanneries, tannery waste treatment and basic research in collagen and leather.



2023 will be the ninth year of the grant and Professor Michael Meyer, Chairman of the International Union Research Commission (IUR) of IULTCS and Research Director at Freiberg (Germany) based FILK Freiberg Leather Institute expressed his appreciation of the continued engagement: "We are very happy to announce the award for the 9th year. The detailed project results of previous winners are presented in their reports on the IULTCS web site. It is worthwhile reviewing these substantial and significant investigations. We very much value the contribution of all sponsors to our YLSG programme. It is a vital instrument to encourage young leather scientists to acquire awareness and become more connected to the established research community of our industry. We have seen the programme growing stronger over the past years. Last year's awards resulted in numerous, ambitious applications with innovative ideas and sustainable technologies."

Application submissions for the 2023 YLSG programme open on 01 October 2022 and Luis Zugno, immediate past President and now secretary of IULTCS, asks young research talents of the industry to file innovative and thought-provoking project ideas before the 30 November 2022 deadline.

Details of the eligibility requirements are available on the IULTCS website [YLSG_application_rules_and_procedure_2023.pdf \(iultcs.org\)](http://www.iultcs.org). The IULTCS requests that readers of this announcement forward the information to those institutions and individuals who could benefit from the award.



INTERNATIONAL UNION OF LEATHER
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INTERNATIONAL UNION OF LEATHER
TECHNOLOGISTS AND CHEMISTS SOCIETIES

INDIA INTERNATIONAL LEATHER FAIR - CHENNAI 2023



The 2023 edition of India International Leather Fair is occurring the 1st, 2nd and 3rd of February 2023 at Chennai trade centre in Chennai (India).

This fair is India's leading trade event and exhibition, displaying the entire range of products relating to leather industry from raw material to finished products and auxiliary products such as finished leather; shoes; shoe components - uppers, soles, heels, counters, lasts; leather garments, fashion accessories, leather goods, machinery, equipment, and chemicals. India International Leather Fair - Chennai 2023 is scheduled to be held from 01- 03 Feb 2023 at Chennai trade centre, Chennai, India. IILF has all along been a vivid presentation of the leather industry. Latest expressions of the trends, styles, designs and colours in world fashion are shown.

Exhibitor Product Profile

Profile of exhibit based on finished leather; shoes; shoe components - uppers, soles, heels, counters, lasts; leather garments, fashion accessories, leather goods, machinery, equipment, and chemicals.

(Source: <https://www.tradeindia.com>)

LEATHER EXPORTERS IN KANPUR FACE EUROPE MELTDOWN HEAT



Exporters are pinning hopes on the growing tendency among foreign buyers to prefer Indian makers over China when it comes to buying leather products. (Pic for representation) Industry fears 25-40 % drop in exports this quarter; chemicals imported from Europe have become costlier and reflect in pricing of the final product from India, say bizmen.

KANPUR leather industry, which saw a recovery from Covid blues, is in dire straits again, fearing a 25-40 % drop in exports this quarter due to a slump in its biggest market - Europe - because of the Russia-Ukraine conflict. Exporters here said that there has been bulk cancellation of orders from Europe and the situation is such that factories working in three shifts a day have reduced operations to one shift.

After the Covid impact receded, exports bounced back and matched the 2018-19 levels, said Asad Iraqi, an exporter of footwear and leather hide. He said business would not improve throughout 2023 as the cost of leather had gone up considerably. "Chemicals imported from Europe have become costlier and reflect in pricing of the final product from India. People in Europe and the US are not buying expensive items," said Iraqi.

"All was going well, but Russia stopped gas supply to Europe in July-August, following which prices shot up. The impact of inflation has hit exports hard and orders placed in advance have been cancelled. Such is the impact in October that factories are running in one shift compared to three earlier. Even the US market isn't picking up," he added.

The Christmas season is considered the best for leather business in Europe and the US, but the demand is negligible this year, said another exporter Yadvendra Singh. "The business was excellent between January and August this year, but there has been a major slowdown since October," he said.

Perna Varma, who exports leather apparels, said the demand for horse gear had also dropped drastically in Europe. "It is feared that exports would go down by 25-40% in the October-December quarter. And if the Russia-Ukraine conflict is not resolved, the situation is unlikely to improve in the next quarter," she opined. Council for Leather Exports regional chairman, Javed Iqbal, said the industry has tough days ahead and should brace for it. "All hopes for a recovery in this quarter are lost. Exporters hardly have any orders," he said.

However, exporters are pinning hopes on the growing tendency among foreign buyers to move from China when it comes to buying leather products. According to them, China is losing

orders to Indian makers. "British buyers have asked us to make some changes to our products so that they don't have to buy them from China," said Singh and Varma. Unnao-Kanpur Leather Cluster director, OP Jha, said this was an encouraging development and its impact would be visible soon.

(HinduatanTimes.com – 16/11/2022)

BLACK LEATHER FORMAL SHOES FOR MEN: TOP PICKS



Every man requires a dapper pair of formal shoes for the office and special occasions. It's natural to be perplexed by today's dizzying array of dress and leather footwear options. For any occasion, you can't go wrong with a pair of traditional formal or Derby shoes. If, on the other hand, you're not sure which company makes the most dependable men's black formal footwear, you've probably come to the right place. However, the top Indian formal shoe brands have demonstrated that a nice-fitting pair of formal shoes can boost a man's self-esteem as well as his own confidence. You must wear appropriate footwear when attending a business meeting or other formal event. The most expensive men's dress shoes can cost anywhere between Rs 2,000 and Rs 10,000. Here you will find some of the most reputable and best-quality formal shoes. They have been mentioned on this list because they met a number of criteria, including being high-quality, comfortable, and affordable. However, though variety is the spice of life, having too many options can make it difficult to find the best formal shoe brands in India. Here are some of the most stylish and best black leather formal shoes for men that are available online:

Amazon Brand - Symbol Men's Formal Shoes

Get started on this list of the best black leather formal shoes for men with this popular black formal shoe for men from Amazon Brand. These pure black shoes from Amazon Brand have been



made of high-quality synthetic material that gives these pair of shoes a lot shinier look from the outside. The thermoplastics elastomers on the footbed have been placed perfectly to give your feet that extra bit of comfort while wearing it for a long period of time.

Fentacia Men's Genuine Leather Oxford Formal Shoes



Next up on this list of black formal shoes for men are these beautiful and amazing black men's formal shoes from Fentacia. These pairs of shoes will surely be your perfect office companion in terms of footwear. Its relaxed and comfortable footbed will not cause you any type of discomfort. Moreover, the stylish synthetic mix on the front along with the elegant black stitching around these shoes makes them one of the best value-for-money formal shoes for men available online.

Centrino Men's Shoes

Moving ahead next up is this one of the best-selling products from Centrino when it comes to formal shoes in black colour. These shoes from Centrino have caught everyone's attention since they have been out for sale. Their superb quality material has been the main point of attraction. Available at such an affordable price these shoes from Centrino will surely be with



you for a long time. Furthermore, the slightly rounded shape on the toe side of these shoes gives them a more sophisticated look. You can wear these shoes on both formal and traditional occasions thanks to their brilliant design on the front.

Kraasa Men Slip-On Formal Office Wear Shoes



Getting along on this list of elegant black formal shoes for men, next up are these pair of modish shoes from Kraasa. These no-lace shoes from Kraasa are one of the best shoes at this price point. If you are looking for a pair of shoes without laces, then this product from Kraasa might be your go-to choose. Its brilliant synthetic leather build quality and cushioned footbed on the inside makes it a complete product to wear to your office on a daily basis.

Red Tape Men's Black Formal Shoes

Following this list of the most graceful and amazing formal black shoes for men, next up are these Red Tape black formal shoes. These pure black formal shoes from Red Tape are made of genuine quality leather along with high-quality soles and footbeds on the inside. These brogue shoes are best suitable for your office. Moreover, these Red Tape shoes can also be worn at a party when paired perfectly with nice and stylish



formal attire. However, the main talking point of these brilliant Red Tape shoes is their fitting. These shoes fit just perfectly which ultimately makes your feet relaxed on every occasion.

Bacca Bucci Men's Tuxedo Oxford Patent PU Leather



Bacca Bucci is one of the finest formal shoe-making brands in India and these men's tuxedo oxford shoes are also one of the best on this list. The look of these Bacca Bucci shoes is something that will surely make you fascinated watching them. The shiny synthetic and leather material on the front gives them more of a party-wear look whereas the composed and sleek shape also makes it perfect enough to wear along with simple formal clothes to your office. Being a multipurpose shoe, these Bacca Bucci men's tuxedo oxford patent shoes are made of excellent quality PU leather that assures its durability.

Black leather formal shoes for men- FAQs

1. What goes with black leather shoes?

Jeans often look great with black formal shoes. Also, while wearing black shoes, choose black or navy chinos to look great

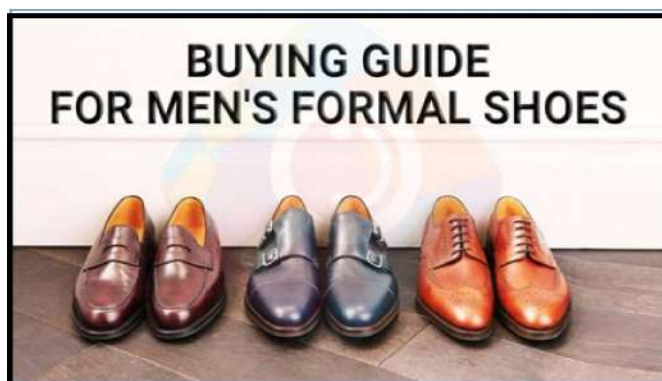
2. What makes formal shoes so useful?

Wearing comfortable and stylish formal shoes can help you work without any pain or discomfort all day long. Also, formal shoes enhance your overall formal look and appearance.

3. When is it appropriate to wear black shoes?

Black formal shoes can be worn anytime or on any formal occasion. Dark-coloured or black shoes are ideal for a daytime, casual summer event. Black shoes are appropriate in the winter, on formal occasions.

DERBY SHOES FOR MEN: TOP PICKS



Derby shoes are frequently confused with their more formal cousins, leather shoes, but their open lacing system can distinguish them. When the laces are undone on a Derby, the tab between the eyelets flaps open, whereas on a leather shoe, it remains closed. Derby shoes, with their laid-back vibe, are a great compromise between smart and casual. You'll wear them a lot because of their chunky sole and loose lacing, also they're much more relaxed and easier to move around. Also, the upper construction of a derby shoe, specifically the area where the laces go, can be used to judge its quality. Though sneakers have long since supplanted derby lace-ups as the casual shoe of choice, a good pair of derbies remains an essential component of any man's wardrobe. They are the bare minimum of footwear required in formal settings. These shoes will look great with any outfit, whether you're going to the office or out on the town. Here is a compiled list of some of the most stylish and affordable derby shoes for men:

Centrino Men's Formal Shoe

Getting started on this list of derby shoes for men, first up are these pair of leather shoes from Centrino. These shoes from Centrino have been made exclusively to make you look stylish



and smart. Centrino has used some of the best quality leather while making these shoes. Moreover, the extra padded footbed on this Centrino derby shoe makes it an even better and more comfortable product. Wearing this pair of derby shoes with nice formal clothing will surely make you look smarter.

Bata Men Tazo Derby Formal Shoes



Moving ahead on this list of best derby formal shoes here are these brown shoes from Bata. Bata has been a prominent brand in the Indian footwear industry for decades and this brand is trusted by millions of Indians even today. These shoes from Bata have been made of premium and good quality synthetic material which makes them look shinier and smarter. The extra cushion on the footbed adds to its comfort whereas the lace-up design makes it one of the perfect derby shoes for men available online. These shoes are surely one of the best pairs if you are looking to wear something formal yet stylish footwear at a party.

Red Tape Men Black Derby Shoes

Getting along on this list of best black derby shoes for men available online, here is this pair of black formal shoes from Red Tape. Red Tape is a brand that is trusted by every other person when it comes to choosing reliable footwear. However, these Red Tape derby shoes come in all-black colour with a



decent formal stance that gives it a look worth appreciating. Moreover, these derby shoes have a decent heel height of 0.5 inches which surely gives these shoes a better stance and comfort level.

Advick Men's Black New Look Derby Shoes



Going ahead on this list of stylish derby shoes for men, next up are these pairs of shoes from Advick. These stylish and funky-looking derby shoes have a unique and amazing design that will surely catch anyone's eye after the first look. The design of these shoes is surely one of their main attractions. The white lining just above the heel that runs all the way around these shoes makes them look way better than other derby shoes. Also, the outer part of these shoes is made of high-quality PU faux leather that assures its durability.

Auserio Men's Derby Laceup Genuine Leather Formal Shoes

Next up, here on this list of best derby formal shoes for men are these exquisite and fancy-looking leather derby shoes from Auserio. These derby shoes from Auserio are of superior quality genuine leather which will surely be with you for a long time. Moreover, the the height of heels on these shoes by Auserio is sufficient enough to give you that sleek look. Furthermore, the



round-up wooden coated laces on these Auserio men's derby formal shoes give them an even better and more furnished look from the outside.

Advick Men's Black Plain Look Shiny Derby Formal Shoes



Here is one more product from Advick on this list of derby shoe men that are available at a discount online. These derby shoes from Advick are slightly different from what the other one has on offer. These derby shoes have a solid black design on the front along with a nice strip of leather wrapped around on the front side to give it a more stylish and sleek look. However, the extra padding on the sole assures its superb level of comfort.

Derby Shoes for men- FAQs

1. Can these shoes be worn on a daily basis?

Derby shoes can be worn with chinos, jeans, and, in some cases, shorts due to their open lacing system. Choose a pair of Derbies with a chunkier profile, a thicker heel, or brogueing to achieve this look.

2. What outfits go well with derby shoes?

Derby shoes are traditional and comfortable dress shoes appropriate for formal occasions. Their simple, sleek design, on the other hand, makes them a great complement to smart-casual pants like jeans or wool trousers.

3. Derby shoes are made of what material?

The Derby shoe is a traditional leather or suede shoe with an open lacing system. High-quality derby shoes are usually made of leather with a long-lasting sole below. Derby shoes are basically the best alternative to formal leather shoes that are now considered too old-school.

(Times of India – 24/11/2022)

ALL CHINA LEATHER EXHIBITION STOOD CANCELLED FOR 2022



Organisers of the All-China Leather Exhibition (ACLE) have announced that the event will be cancelled for 2022, with new dates announced for 2023. The trade fair, originally intended to be held from December 20-22, 2022, will be rescheduled to August 29-31, 2023 at the same venue, the Shanghai New International Expo Centre. The event has reportedly been rescheduled due to ongoing Covid-19 restrictions in China as a result of the epidemic prevention and control requirements of Shanghai and the Joint Prevention and Control Mechanism of the State Council. In a statement, the ACLE organisers said: "We sincerely apologise for the inconvenience caused to our exhibitors, buyers, invited guests and industry friends. We appreciate your patience and understanding." They further said that, with the improvement of the epidemic situation in China and implementation of new policy, they are confident in putting on the 2023 event and look forward to welcoming the industry to Shanghai again.

(internationalleathermaker.com – 23/11/2022)

EXPORTER OF FINISHED LEATHER GOODS PADMA SHRI IRSHAD MIRZA PASSES AWAY



EX Padma Shri Irshad Mirza, chairman of Mirza International, passed away on Sunday at a private hospital in the city. He was 95, and had been ailing for the past several years. He breathed his last around 9.45 in the morning. As soon as the news of his death spread, a gathering of well-wishers thronged his Civil Lines residence. As per the family sources, his funeral will take place in the evening.

Irshad Mirza was a recipient of many awards, including Padma Shri. He has made a significant contribution in the development of the city and has also registered his name in the Forbes magazine. He had also been the former chairman of the Uttar Pradesh Minorities Commission. He founded company Mirza International in 1979. His glorious journey began with the setting up of a small tannery which used to manufacture finished leather at Magarwara in Unnao. In the initial years, his tannery supplied high-quality leather and leather products to the overseas markets, but gradually, commitment to excellence and client satisfaction and the scale of operations expanded exponentially making Mirza International Private Limited, India's largest exporters of finished leather.

The global footprint of the company spans 28 countries over five continents. In the international market, the company is among the few Indian footwear companies to sell under its brand name. Their brands have gained a strong foothold and carved a niche in the markets of the UK and US.

Former chairman of Council for Leather Export, Mukhtar-ul Amin, condoling the death of Irshad Mirza said he took the leather industry to great heights. "He always led from the front and fought for the rights of the leather traders. He always kept his words firmly in front of the government," Amin further said.

(Times of India – 05/12/2022)



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Extraction of value added byproducts from the treatment of chromium containing collagenous leather industry waste

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Summary

In the United States, over 60,000 metric tons of chromium containing solid waste is generated by the leather industry each year, and approximately ten times this amount is generated world wide. Environmental concerns and escalating landfill costs are becoming increasingly serious problems to the leather industry and alternative disposal methods are needed. We have developed two processes in which this waste is treated with alkali and enzymes to extract hydrolyzed and gelable protein products and a recyclable chromium cake. We have demonstrated that these processes are repeatable with respect to their chemical and physical properties and that good and repeatable material balances are obtained. The isolated chromium can be chemically treated and recycled into the tanning process. The recovered protein fractions, practically devoid of chromium, could be used in a wide range of products including adhesives, cosmetics, films, animal feed and fertilizer.

Introduction

Historically, shavings, trimmings and splits from the chrome tanning of hides and skins have been disposed of in landfills. Increased local restrictions on land disposal have encouraged the tanning industry to explore more innovative methods to treat this waste product. Basic hydrolysis has been the most investigated process. Chromium and a protein fraction can be isolated

using $\text{Ca}(\text{OH})_2$ with steam¹⁻² or NaOH ³. Fertilizer is produced when ammonia is the basic agent, use of Na_2CO_3 and NaOH in combination produces coagulants for natural rubber and leveling agents for leather dyeing⁴.

Acid hydrolysis using sulphuric acid has produced a chromium containing hydrolysate useful as a retanning agent⁵⁻⁶ as well as amino acids useful as an animal feed supplement⁷. These

hydrolysates also may be used to produce fatliquors, surfactants and fillers for leather manufacture⁸. Organic acids have been used to obtain oligopeptides⁹. When acrylic acids were used the resulting hydrolysate was copolymerized with vinyl monomers to give fillers for leathers¹⁰.

Wet air oxidation¹¹, peroxide treatments¹², and incineration at a variety of tempera-



ures¹³⁻¹⁵ have been used for the recovery of chromium. Unfortunately, Cr(VI) is generated in these reactions requiring an additional reduction step. In addition to further use in the tanning industry, recovered chrome has been added to cements and mortars¹⁶. Several researchers have detanned the chrome product for the purpose of gelatin preparation¹⁷⁻¹⁸ and the isolation of collagen fibres¹⁹⁻²⁰.

Uses not requiring extensive pretreatment of these waste materials have also been developed. Leather scraps have been reacted with polyisocyanates to make insulators and building materials²¹. Shavings have been grafted with hydrophilic acrylates to make fibrous sheets²², with vinyl acetate to produce material for shoe soles²³, polymerized to make fillers for leathers²⁴, or used in the manufacture of composites for footwear²⁵. Paper making methods have been used to produce both leather²⁶ and paper²⁷ substitutes.

We have developed a process that can help the leather industry in solving this potentially difficult waste disposal problem. In this process, the chrome waste is treated with alkaline proteo-

lytic enzymes at moderate temperatures for a short period of time. The process is unique because the pH at which the reaction takes place (8.3 to 10.5) prevents the chromium from going into solution, thus averting the poisoning of the enzyme by chromium and enabling the recovery of chromium as $\text{Cr}(\text{OH})_3$ by filtration. The resulting protein solution may have commercial use as a feed or a fertilizer. The isolated chromium cake may potentially be recycled into the tanning process by treatment with sulphuric acid²⁸.

It is well documented²⁹⁻⁴⁰ that chromium containing leather waste can be treated with enzymes, but only after pretreatment to denature the collagen. The methods developed at this laboratory demonstrated that collagen may be denatured in the presence of alkali at moderate temperatures, such that enzyme may be added directly to the alkali treated shavings. Maintenance of these temperatures throughout the entire digestion process eliminates the need for additional cooling equipment. In preliminary investigations using $\text{Ca}(\text{OH})_2$ to control the pH³⁸⁻⁴⁰ 6% (based on wet weight of shavings) of

an alkaline proteolytic enzyme was needed to solubilize 78% of the shavings. When MgO was used in conjunction with other alkaline agents⁴¹⁻⁴⁴, higher solubilization of protein was achieved with lower amounts of enzyme, thus making the treatment more cost effective.

Using a more recently developed two-step process, we have isolated a gelable protein product that should provide a higher economic return. In this patented process⁴⁵ the chromium waste is treated with alkaline agents for 6 hours at 70–72°C and then filtered to recover the gelable protein⁴⁶⁻⁴⁸. The remaining sludge is then treated with the enzyme as in the original process, resulting in a protein hydrolysate and a chromium cake that may be chemically treated and recycled.

The gelable protein products isolated from our treatment of chromium containing leather waste have a high ash content not only because of the alkali used to extract the gelable protein, but also because of the high mineral content in the original substrate. During the commercial preparation of gelatin, it is common practice to pass the protein solutions through ion-exchange resins in order to lower



the ash content and improve the quality of the product⁵³⁻⁵⁵. In this study we show the effects of deionizing these gelable protein solutions on their physical properties. This report discusses experiments that were designed to determine the yield of the protein products isolated from the chrome waste. From the data we were able to calculate material balances and determine the repeatability of the processes as well as the chemical and physical analyses.

The protein products that result from the one- and two-step treatments have many possible uses. Because of its high nitrogen content, the isolated protein has potential as a fertilizer and in animal feed additives. The gelable protein has potential use in cosmetics, adhesives, printing or photography.

Experimental

Materials

Alcalase* (alkaline protease) was obtained from Novo Nordisk Biochem, Inc. (Franklinton, NC). It is a proteolytic enzyme

* Reference to brand or firm does not constitute endorsement by the U. S. Department of Agriculture and the authors over others of a similar nature not mentioned.

with optimal activity at pH 8.3–9.0 and 55–65°C. It is supplied either as a granular solid (absorbed onto an inert carrier and standardized to contain 2.0 Adson Units/g (AU/g)), or as a liquid (standardized to contain 2.5 AU/g). Liquid Alcalase was used in these experiments.

Pluronic 25R2, a non ionic surfactant, was obtained from BASF (Parsippany, NJ). MgO was obtained from J. T. Baker Chemical Co. (Phillipsburg, NJ) and from Martin Marietta Magnesia Specialties (Hunt Valley, MD) as MagChem 50. NaOH (50% solution), KOH, Na₂CO₃ and K₂CO₃ were obtained from J. T. Baker Chemical Co. (Phillipsburg, NJ).

Chromium containing leather waste used in the development of the one-step process was obtained from commercial tanneries. Sample A shavings came from a conventional chrome tannage. Sample B shavings came from a tannage in which a high exhaust chrome treatment had been used in order to reduce the chromium in the effluent. Sample C shavings came from a tannage in which the final pH was slightly more acidic (pH 3.6) than other chrome offal investigated (pH 3.8–4.2). For deve-

lopment of the two-step process chromium containing leather waste from a high exhaust chrome tannage was obtained from a commercial tannery (sample D). Two samples were received over a four month period.

Procedures

Recovery of hydrolyzed protein products from the onestep process

Each (11.5 kg) of shavings samples (A, B and C) was pretreated at 67–69°C with 11.5 g of surfactant in 56L (500% float) of water for two hours. Bench type experiments determined the best pretreatment for each individual sample prior to the pilot scale runs. This pretreatment step is necessary to obtain the optimal pH for the enzymatic digestion. Thus, Sample A was pretreated with 575 g MgO, and Sample B with 345 g NaOH and 230 g MgO. After several preliminary experiments, it was found that Sample C required 690 g MgO (C1) in 345 g NaOH and 345 g MgO (C-2). The enzyme (345 ml) was added in three feeds (115 ml in each feed) to each of four reactions, over a three hour period. After the enzyme digestion (67–69°C for 3 h), the sample was pumped from the reaction vessel and allowed to



settle overnight. The upper, protein hydrolysate, layer was decanted and the lower chromium layer was filtered through Whatman No. 1 filter paper. Protein layers were stored at 4°C. The unwashed chrome cake was collected and stored at 4°C.

Recovery of protein products : gelable and hydrolyzed protein from the two-step process

In the first step of the two-step process, 200 g of the chrome shavings (sample D) were shaken in PL of water (500% float), 0.2 g of a non-ionic surfactant and the alkali at 70–72°C for 6 h. The samples were then centrifuged at 70–72°C and the supernatant filtered through Whatman No. 1 filter paper. The chrome sludge and the filtered gelable protein solutions were stored at 4°C. In the second step, the chrome sludge was warmed to room temperature and 200 to 300 ml water (100 to 150% float) and 0.2 g non-ionic surfactant were added. The samples were shaken at 70–72°C for 1.5 hours. The pH was adjusted with MgO to the optimal pH for the enzyme. The enzyme (0.025 to 0.2 g) was added the samples were shaken at 70–72°C for 3.5 h. The solutions were filtered hot through Whatman No. 1 filter paper and the pro-

tein solutions were stored at 4°C. The chrome cake was air dried.

Treatment of the chrome cake

1 g of air dried chrome cake was dissolved in 50 ml of 3.6N (10%) H_2SO_4 . The pH was <1.0. The pH of the solution was slowly raised to 1.85–2.00 with 0.25N NaOH. A flocculated precipitate formed that coagulated when the solution was heated for several minutes at 60°C. The solution was allowed to stand overnight at ambient temperature and was then filtered. The residue was washed with 0.01N H_2SO_4 to remove trapped chromium. The residue was dried overnight at 60°C and then weighed; the percent residue was calculated. The residue was ashed at 600°C in a muffle furnace and percent ash and volatile solids were calculated.

Deionization

The protein fractions were deionized batchwise using Bio-Rad Ag[®] 501 X8 (D) mixed bed resin (5g/100 ml of protein solution was stirred and additional resin was added until there was no further change in colour of the resin. This resin changed from blue when fully active to gold when exhausted. After treatment, the solutions were filtered

through sintered glass funnels and freeze-dried in preparation for chemical and physical analyses.

Analyses

The chromium containing shavings were analysed for moisture, ash, total solids, total Kjeldahl nitrogen (TKN), fat, calcium, magnesium, and chromium as described in a previous publication⁵⁴. Amino acid analyses were carried out on a Beckman Model 119CL Analyzer.

Chromium in the gelable and hydrolyzed protein products were determined on a Perkin-Elmer Atomic Absorption Spectrophotometer, Model 3300 (Norwalk, CT) as described previously.⁵⁴ Moisture in the dried gelable protein products was determined by heating the sample at 105°C for 17 h.⁵⁰ Ash in the dried protein products was determined by heating the sample at 600°C for two hours.⁵⁴

Protein molecular weights were estimated by SDS-PAGE (polyacrylamide gel electrophoresis in sodium dodecylsulphate,⁵⁵⁻⁵⁶ on Phast System by Pharmacia. Gel strengths were measured by Bloom determination⁵ with TA.XT2 Texture Analyzer from Texture Technologies Corporation (Scarsdale,



NY). For most experiments, the dried gelatin (7.5 g) was weighed into a Bloom jar (50 ± 1 mm, inside diameter) and 105 ml of water was added, to give a 6.67% weight/weight concentration. For comparison some experiments were done by a modification of the Bloom method utilizing a 39 mm jar (inside diameter) with 2.5 g sample and 35 ml of water.⁵⁸ The water was allowed to absorb for a set period of time (10 min to overnight), the sample was heated in a 65°C bath for 15 min, cooled at room temperature for 15 min and then placed in a 10°C bath for 17–18 h. The sample was placed under a 0.5 inch diameter analytical probe and the probe was driven into the sample to a depth of 4 mm at a rate of 1 mm sec⁻¹. The grams force required for this is expressed as the Bloom Value.

Viscosities were measured in a Cannon Manning viscometer.⁵⁹ The samples, which were 6.67% weight concentration, were heated in a Cannon Instrument Company (State College, PA) constant temperature bath. The determinations were carried out at 60°C. Kinematic viscosity was calculated by multiplying the time in seconds by the viscometer constant at 60°C (0.00368). The dynamic viscosity was cal-

culated by multiplying the kinematic viscosity by the density at 60°C.

Results in Discussion

Recovery of protein solely as a hydrolyzed product from the one-step process

Not all chromium containing leather waste is the same. Tanneries use different processes to tan the leather. These differences are introduced not only to affect the properties of the tanned leather, but also, in some cases, to allow high chrome exhaustion of the tanning liquor for environmental reasons. The protocol for the preliminary pretreatment of these shavings

must be adjusted to achieve optimal solubility. The commercial value of this process depends not only on the savings from decreased landfill fees, but also on the value of the reaction products. Thus, it is important to know the chemical composition of the isolated chrome cakes.

Chrome shavings (A, B, and C) from various tanneries were analyzed for moisture, ash, chromium, nitrogen, fat, calcium, and magnesium. The results of these analyses, shown in Table I, allow a prediction of the chemical composition of the chrome cakes. Each of the shavings contained about the same

TABLE I
Analyses of chrome shavings^a

Parameter % ^b	A	B	C
Moisture	53.51 ± 0.28	53.47 ± 1.04	51.47 ± 0.36
Ash ^c	14.32 ± 0.10	8.40 ± 0.48	14.95 ± 0.37
Chrome Oxide ^d	4.21 ± 0.03	4.28 ± 0.09	3.99 ± 0.11
TKN ^e	14.54 ± 0.48	14.56 ± 0.24	14.13 ± 0.16
Fat ^f	0.09 ± 0.01	1.51 ± 0.36	1.79 ± 0.22
Calcium ^g	0.34 ± 0.01	0.40 ± 0.01	0.48 ± 0.01
Magnesium ^h	0.33 ± 0.02	0.08 ± 0.01	0.16 ± 0.01

^a Chrome shavings A came from a conventional chrome tannage, B, from a high exhaust chrome tannage, and C, from a tannage in which the final pH was slightly more acidic (3.6) than other chrome offal investigated (3.8–4.2).

^b N = where N = number of replicates for each sample.

^c Moisture free basis.

^d Total Kjeldahl nitrogen.

^e Protein content can be estimated by multiplying TKN by 5.51.



amount of moisture, from 51.5 to 53.5%. Ash content ranged from 8 to 15%. Chromic oxide content ranged from 3.99 to 4.28%. The nitrogen content was 14.1 to 14.6% and may be correlated to the protein content of the shavings (roughly 80% on a moisture-free basis). The fat content varied from 0.1 to 1.8%. Calcium values ranged from 0.34 to 0.48% and magnesium from 0.08 to 0.33%.

The chemical compositions of the chrome cakes recovered from one-step treatments is shown in Table II. The fat contents reflect the amount of fat found in the untreated shavings (Table I). The fat content in Sample B may also reflect the compounds that had been used in the high-exhaust chrome treatment. Because the cakes were not washed during filtration, the nitrogen content reflects the hydrolyzed protein that remains and the amount is dependent on the efficiency of the filtration process. The magnesium content reflects the amount of magnesium used in the pre-treatments. The value for calcium found in the cakes may reflect the approximately 1% calcium impurity in the MgO.

The isolated protein hydrolysates were analyzed for chro-

mium, total Kjeldahl nitrogen (TKN), total solids and ash (Table II). Data for samples A, B, C-1 and C-2 show that the chromium content was less than 1 ppm. This chromium concentration is similar to the concentrations found in protein from pilot studies, and also in the protein solutions recovered from industrial scale trials. The TKN, total solids and total ash averaged about 11 000 ppm, 72 000 ppm and 8000 ppm, respectively. The molecular weight distribution of the hydrolyzed protein ranged from 1000–3000. Amino acid analyses for each of the dried protein samples are shown in Table III. When the amino acid profile of the protein hydrolysate is compared to the profile of collagen, the results are quite similar, suggesting that no modification of amino acids occurred during processing.

It was demonstrated that full splits and trimmings could be enzymatically hydrolyzed. In this treatment the alkali pre-treatment time was extended to three hours and the temperature was increased to 70–72°C. The structure of the hides was so totally disrupted that upon addition of the enzyme, the samples were digested. It was decided to apply this extended holding

time and higher temperature to chrome shavings and it was found that 0.3% of an alkaline protease was successful in digesting the shavings and giving a clean cake. Thus, the amount of enzyme that was suggested previously had been reduced to almost one-fifth.

Recycling of the protein solution containing the enzyme was attempted. The enzyme was still active after being subjected to high temperatures and pH and it was found that one could successfully recycle the protein solution and enzyme, not once, but four times. The salt concentration eventually became quite high and the enzyme lost its activity. A 1% concentration of the enzyme initially is recommended if one is recycling.

Recovery of gelable and hydrolyzed protein products from the two-step process

The next important step in the investigations was to obtain a higher molecular weight protein fraction than was previously isolated. The original one-step process gave a re-cyclable chromium product but also gave a low value protein hydrolysate that could possibly be used as animal feed and fertilizer. Even though we demonstrated that this protein solution and enzyme

TABLE II
Analyses of products isolated from the one-step treatment of chrome shavings

Parameter (%) ^a	Chrome cake ^a			
	A	B	C-1	C-2
Moisture	85.42±0.17	85.54±0.22	82.93±0.60	82.53±0.04
Ash ^b	35.45±0.08	32.55±0.19	34.14±0.83	36.99±0.38
Chromic Oxide ^c	7.76±0.30	11.82±0.54	8.74±0.10	11.4 ±0.03
TKN ^{d,e}	7.51±0.09	8.40±0.66	6.66±0.24	8.09±0.55
Fat ^e	1.37±0.10	6.31±0.38	4.26±0.07	4.93±0.06
Calcium ^e	0.35±0.01	0.82±0.02	0.75±0.06	1.18±0.08
Magnesium ^e	9.96±0.12	5.00±0.06	9.47±0.06	6.73±0.22
Protein hydrolysate				
<i>Protein hydrolysate (liquid)^a</i>				
Chromium	(AV)	(AV)	11.000	<1
TKN	(AV)	(AV)	72.000	
Total Solids	(AV)	(AV)	8.000	
Total Ash	(AV)	(AV)		
<i>Protein hydrolysate (dried)^a</i>				
TKN			13.8	15.0
Ash			9.7	18.9
Molecular weight distribution^b				
			1000	3000

^a Chrome cake A isolated from chrome shaving treated with 575 g MgO, B from shavings treated with 345 g NaOH and 230 g MgO, C-1, from shavings treated with 690 g MgO, and C 2, from shavings treated with 345 g NaOH and 345 g MgO.

^b N = 3 where N = number of replicates for each sample.

^c Moisture free basis.

^d Total Kjeldahl nitrogen.

^e Protein content can be estimated by multiplying TKN by 5.51. Expressed in PPM.

^f Expressed as percent.

^g Daltons.

could be recycled in order to reduce the cost of the process, a higher return from a better quality by-product would be desirable.

Extraction of gelatin from chromium leather waste has been described in the literature.^{24, 25} However, a considerable amount

of chromium sludge remains after this extraction and disposal of this sludge is necessary.²¹ We proposed a new two-step process that would isolate a gelable protein in the first step and a lower molecular weight, hydrolyzed protein after enzymatic treatment of the remain-

ing chromium sludge. A filterable and recyclable chromium product would also be obtained.

Fig. 31 is a flow diagram of the new process. After isolation of the gelable protein product by filtration, the chrome sludge is prepared for enzymatic hydrolysis. The pH is measured and



adjusted if necessary for optimal enzyme activity and the alkaline protease is added. The reaction is carried out for 3.5 h. If one has whole splits or large trimmings, chipping or grinding is recommended before the first step is carried out. These splits and trimming have been dissolved in their intact state, with 1% enzyme or less, but the protein product is low molecular weight.

Gel Extraction

Chrome Shavings	100%
Alkali	Vary
Water	500%
Surfactant	0.1%

Shake at 70-72°C/6 hr

Centrifuge

Protein Solution (Filter; store at 4°C) Chrome Sludge (Store overnight at RT)

Hydrolysis

Chrome Sludge	100%
Water*	150%
Alkali	Vary
Surfactant*	0.1%

Shake at 70-72°C/1.5 hr

Alkali Vary

Enzyme* <0.1%

Shake at 70-72°C/3.5 hr

Filter

Protein Solution (Filter; store at 4°C) Chrome Cake (Air dry)

*Based on weight of chrome shavings

Figure 1 Outline of two-step procedure for treatment of chromium-containing solid leather waste.

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TABLE III

Amino acid composition of hydrolyzed protein*

Residue	Collagen (Type 1), ^a	Hydrolyzate	Std. Dev. ^b
Gly	32.7	33.0	1.7
Hyp	8.6	10.0	1.2
Pro	13.0	12.5	0.5
Ala	11.4	8.4	0.6
Arg	5.2	4.8	0.3
Asp	4.6	5.1	0.1
Cys	0.0	0.0	0.0
Glu	7.5	7.7	0.3
His	0.5	0.9	0.6
He	1.2	1.4	0.2
Leu	2.5	2.6	0.1
Lys	2.8	2.7	0.2
Met	0.6	0.2	0.3
Phe	1.3	1.3	0.0
Ser	3.1	4.1	0.9
Thr	1.6	2.1	0.7
Tyr	0.4	0.5	0.1
Val	2.3	2.4	0.1
Total	99.3	100.0	

* Expressed as mole percent.

^b Prez, K.A., Extracellular Matrin Biochemistry (Piez, K.A. and Reddi, A.H. eds.), Elsevier, New York, (1984), p. 1.

* Hydrolysal, samples.

In the one-step process, the chromium containing waste was pre-treated with a variety of alkalis at 67–69°C, not only to aid in the denaturing of the collagen but also to prepare the system for the optimal pH for the enzyme. At that time MgO, Ca(OH)₂ and various combinations of MgO, NaOH, Na₂CO₃ and Ca(OH)₂ were used. These

various agents were used so that the process could be worked into whatever chrome recycling system the tannery would be using, since all these chemicals have been used in chrome precipitation⁶⁰⁻⁶¹.

The effect that MgO alone and in combination with varying amounts of NaOH, Na₂CO₃, KOH and K₂CO₃ has on the



chemical and physical properties of the gelable and hydrolyzed protein products has been investigated. As has been shown in previous publication^{4,11-13}, careful control of the concentrations of the alkali-inducing agent will give optimal pH range for enzyme hydrolysis and as will be shown—the optimal range for gelable protein extraction. Also, the pH of the reaction should not fall below 8.5, for then there would be the risk of solubilizing the chromium. Shavings from different tannery processes have different pH values, ranging from 3.50 to 4.20. The shavings used in these experiments had a pH range of 3.95–4.00. The concentrations of alkalis to be added were arrived at experimentally in small bench trials prior to larger scale runs.

Table IV summarizes the chemical and physical properties of the gelable protein that has been extracted using various combinations of the above-mentioned alkali treatments. The percent total solids can range from 1.75 to 4%. The chromium content of the protein products can range from 0.005 to 0.0126%. These gelable protein solutions were freeze-dried to a white solid with a moisture content ranging from 4 to 13% and the ash content from 8.9 to 21%.

TABLE IV
Characterization of protein products from the two-step process

Parameters	Gelable Protein	Hydrolyzed Protein
Total solids	1.75–4.00%	6.00–9.50%
Moisture	4.00–13.00%	—
Ash ^a	8.90–20.00%	3.30–7.70%
Chromium ^b	0.005–0.013%	0.0005–0.005%
Molecular weight distribution ^c	75,000–200,000	10,000–20,000
Bloom value ^c	34–200	—

^a Moisture-Free Basis (MFB).

^b Daltons.

^c Grams.

Molecular weight distribution can range from 75,000 to more than 200,000, depending on the alkali treatment used. The Bloom values, or gel strengths, range from 34 to 200 g.

Table IV also summarizes the properties of the hydrolyzed protein products, the character of which will vary depending on the choice of alkali. The molecular weight ranged from 10,000 to 20,000, values much higher than those protein products isolated in the one-step process; this reflects the small amount of enzyme used in the sludge digestion. Also shown are the range of total solids and total ash content of the protein solutions along with the range for the chromium concentration. The total also content of the hydrolyzed protein products is much

lower than those found in the one-step process.

Possible uses of the gelable protein fractions include graft polymerized products, wastewater treatment, encapsulation, powdered filler for skid resistant tires and thermal printing materials. Possible uses for the hydrolysates include fertilizer; animal feed, and adhesives. Because there is concern that the character and quantity of ash in the protein products will effect the use of different proportions of alkaline agents on the ash content of the protein products was investigated^{4,6,12-15}. Increasing proportions of MgO resulted in lower ash content.

We have shown that the choice of alkali affects the physical properties of the gelable protein fraction fraction^{4,11}. We



also demonstrated (Table IV) that treating a gelable protein fraction with a mixed-bed deionizing resin, significant, lowered the ash content and improved the physical properties, such as the Bloom and viscosity, of the extracted gel. This improvement could be a function of the increased protein concentration or lack or lack of interference from the salt or a combination of these parameters. To better understand the effect of protein concentration and even the choice of alkali on the physical properties of the gelable protein products, an experiment was designed in which various alkalis were used to extract gelable protein from the chrome waste (Fig. 1). Then portions of each of the solutions were deionized using a mixed-bed deionized solutions were lyophilized. Solutions of each of the dried samples were prepared at 6.67% (w/w) concentrations; Bloom, viscosity and density-determinations were run on the samples. From these data an interpretation concerning the effect of protein concentration and choice of alkali was made.

In this present study the samples were batch-deionized. The ash content of all alkali treated samples decreased significantly to less than 1% and so

the values are within the 0 to 3% range reported for technical grade gelatin⁵¹. Physical tests were run on all samples before and after deionization and the results can be seen in Table V. The effects of deionization on the physical properties of gels extracted with various alkalis are shown. Bloom values increased 30% to 100% in the deionized samples where the concentration of the protein itself approached 6.6% w/w. The viscosity in the deionized samples increased 20% to 40% whereas the deionized samples have lower densities as would be expected.

Table V shows the effects of deionization on the physical properties of gels extracted with MgO, K₂CO₃ and MgO-Na₂CO₃ mixtures. The choice of sodium or potassium carbonate has little effect on either viscosity or density of the gelable protein fractions. The Bloom values are similar, but the Na₂CO₃ extracted gels appear to have slightly higher values than the K₂CO₃ extracted gels.

Table V also shows the effect of deionizing MgO-KOH and MgO-NaOH gel samples. The Bloom values of the untreated NaOH samples (70.0, 34.0) are lower than found in a previous study⁴⁸ where the Bloom values

for the 4% MgO-1% NaOH and 3% MgO-2% NaOH samples were 91.3 and 74.1, respectively. These reactions were run again and the Bloom value for the 4% MgO-1% NaOH sample was 79.1, which is midway between the other two runs. The sample that had been extracted with the higher concentration of NaOH, however, had an even lower Bloom value of 33.0. When the third set of samples were deionized, the 4% MgO-1% NaOH sample increased to 116 but the higher hydroxide sample fell to 26.1. These data indicate the difficulty of controlling the reaction when NaOH is used. Lack of control leads to more degraded gelable protein with poorer physical properties.

Table V also shows the effect of deionization on gelable protein samples isolated from a MgO-KOH extraction. The Bloom values for the untreated samples are slightly lower than those examined in a previous study but are not as low as those found when NaOH was used. When the deionized samples with the high protein concentration were examined, we found that the increase in the Bloom value was significant. The NaOH samples were apparently too degraded, so that even at a higher protein concentration no



TABLE V

Effect of deionization on physical properties of gelable protein

Alkali Treatment	Protein conc (w/w)	Bloom (g)	Dynamic viscosity (cp)	Density
Before Deionization				
5% MgO—1% K ₂ CO ₃	5.60	97.7	2.2745	1.0094
4% MgO—2% K ₂ CO ₃	5.64	106.4	2.3373	1.0082
5% MgO—1% Na ₂ CO ₃	5.51	108.2	2.2450	1.9106
4% MgO—2% Na ₂ CO ₃	5.69	100.5	2.3331	1.0108
4% MgO—1% KOH	5.55	94.2	2.2236	1.0087
3% MgO—2% KOH	5.53	68.7	1.9550	1.0116
4% MgO—1% NaOH	5.66	70.0	2.1662	1.0082
3% MgO—2% NaOH	5.84	34.0	1.6490	1.0092
After Deionization				
5% MgO—1% K ₂ CO ₃	6.63	178.3	3.1556	1.0039
4% MgO—2% K ₂ CO ₃	6.65	167.2	3.0809	1.0045
5% MgO—1% Na ₂ CO ₃	6.64	200.8	3.0959	0.9997
4% MgO—2% Na ₂ CO ₃	6.65	182.0	3.0324	1.0010
4% MgO—1% KOH	6.64	180.3	2.9109	1.0014
3% MgO—2% KOH	6.61	149.5	2.5094	1.0015
4% MgO—1% NaOH	6.66	89.1	2.6284	1.0012
3% MgO—2% NaOH	6.64	46.0	1.9426	1.0048

* @ 60°C.

* 6.67% (w/w) solutions.

* These samples were first deionized and then a 6.67% (w/w) solution was examined.

TABLE VI

Effect of deionization on physical properties of hydrolyzed protein*

Parameter	Protein conc (w/w)	Jellygram (g)	Dynamic viscosity (cp)	Density
Before deionization				
	12.0	12.8	2.2260	1.0254
After deionization				
	12.4	15.1	2.6278	1.0268

* Alkali treatment: 4% MgO—1% KOH

* 12.5% (w/w) solution.

* @ 60°C.

* These samples were first deionized and a 12% (w/w) solution was examined.

improvement could be seen.

This phenomenon was also observed in the product isolated by enzymatic hydrolysis, as shown in Table VI. If NaOH is used, it should only be used at low concentrations one wants to obtain a higher quality product.

We designed an experiment to see if a gelable protein could be isolated from the chrome sludge after it was treated with an enzyme. In this experiment, the chrome shavings were first treated with 4% MgO—1% KOH to extract the gel, only 0.0125% enzyme was used to treat the sludge. Indeed, a rather viscous, clear, gelable-like solution was isolated. The Jellygram value (similar to the Bloom value except that a 12.5% (w/w) concentration is used^{1,2}) of this sample was determined. Jellygram values are typically four times the Bloom values and are used to evaluate hide-glues. As shown in Table VI, the value obtained was quite low and did not change after deionization. However, the viscosity of this deionized sample was increased by 16%. These data indicate that the product will not give an increased gel strength as the higher protein concentration but will give a higher viscosity, suggesting that the structure of



the protein has been degraded. Rose^{5, 1} reported, in his chapter, "Inedible Gelatin and Glue", that there are gelatins produced in the United States that have very low or no gelling ability but do have a variety of applications. We have demonstrated that a higher quality gel-like hydrolyzed product can be obtained from the chrome sludge with careful control of the enzyme concentration.

An experiment was designed to determine the repeatability of the two-step process with respect to chemical and physical analyses and material balance and yields. MgO was the alkali used to extract the gelable protein. Fig. 1 shows a general description of the process. After the treatment to extract the gelable protein, the reaction mixture was centrifuged to separate the protein solution

from the chrome sludge. This centrifugation was necessary for these bench scale experiments because of the difficulty in filtering the viscous solutions. In pilot and industrial scale operations, a filter press, or a continuous centrifugation apparatus may be appropriate. After the enzymatic treatment, filtration was easy and proceed quickly. Table VII shows the material balances and

TABLE VII
Repeatability of process using 6% MgO as alkali

Parameter (%)	Run No. 1	Run No. 2	Run No. 3	Run No. 4	Run No. 5	Run No. 6	Average	Std. Dev.
Gelextraction step								
Material balance	94.8 ^a	98.0 ^a	97.2 ^a	98.5 ^a	96.9 ^a	97.8 ^a	97.2 ^a	1.19
Chrome sludge								
Moisture	83.71	84.04	83.72	83.80	83.61	84.20	83.84	0.20
Ash (MFB)	20.10	20.36	20.74	21.21	20.90	21.65	20.83	0.51
Gelable protein								
Total solids	2.71	2.98	2.67	3.12	2.78	2.96	2.87	0.16
Total ash (MFB)	9.92	9.23	11.88	10.55	10.25	9.48	10.22	0.86
Gel yield ^b	32.14	37.00	32.66	39.30	35.05	38.18	35.72	2.68
Hydrolysis step								
Material balance	92.2	92.9	91.1	91.5	95.5	95.1	93.0	12.9
Chrome cake								
Moisture	80.73	80.79	79.71	80.65	79.34	80.10	80.22	0.55
Ash (MFB)	34.58	35.52	35.18	35.59	35.90	31.61	35.56	0.62
Hydrolysed protein								
Total solids	6.07	5.80	5.85	5.70	6.12	5.92	5.91	0.15
Total ash (MFB)	3.03	3.18	4.09	3.47	3.00	3.27	3.19	0.15
Hydrolyzed prot. yield ^b	59.96	58.14	59.12	58.34	62.00	60.08	56.72	1.51
Total protein recovery ^b	77.55	79.12	74.84	77.35	80.67	77.96	77.92	1.78
Ash recovery		87.92	85.57	104.2	100.2	100.2	96.78	7.26

^a All values expressed as percent.

^b Based on 92.3% protein (moisture-free, ash-free basis) in chrome shavings.

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yields from 6 experiments. Also shown are the average values and the standard deviation. The data indicate the high repeatability of the process. Total solids, total ash, TKN and chromium determinations were performed on the isolated protein fractions. Table VIII summarizes the data collected from the analyses of the extracted gelable protein. These results were tabulated from 6 separate experiments and for the mixture of all. For each parameter the average and standard

deviation were calculated. The repeatability of the analyses in these experiments was quite good, as indicated by the standard deviation and comparing the 6 single experiments with the mixture. Also examined were Bloom, dynamic viscosity and density (Table VIII). The repeatability of viscosity and density were quite good. Although the standard deviation for Bloom was high, the average Bloom was very close to the Bloom of the mixture.

treated chemically, using the reported method, to give a recyclable chrome product. Table IX reports the percent residue that remains after the chrome cake is chemically treated. Residues of samples (1) through (5) were also analyzed for the percent non-chrome insoluble ash. The low ash content indicates that the bulk of the residue is organic, i.e. residual protein and/or the resins that are used in the high exhaust chrome tannages.

The chrome cake may be To develop an economic

TABLE VIII
Repeatability of chemical physical properties in 2 two-step process using 6% MgO as alkali

Parameter	Run No. 1	Run No. 2	Run No. 3	Run No. 4	Run No. 5	Run No. 6	Aver.	Std. Dev.	Mixture
Gel extraction step									
Ash (MFB)	23.51	20.00	21.12	20.74	20.30	20.10			
Chemical properties									
Total solids	2.71	2.98	2.07	3.12	2.78	2.96	2.87	0.16	2.87
Total ash (MFB)	9.92	9.23	11.88	10.55	10.25	9.48	10.22	0.6	11.18
TKN (AFB)	15.80	15.95	16.60	16.83	17.04	16.79	16.50	0.46	17.11
Chrome (ppm)	8.70	6.25	8.05	8.05	6.10	5.45	7.22	1.33	8.30
Physical properties									
Bloom (g)	129.5	117.7	105.0	8.33	90.3	90.7	103.6	15.5	106.5
Dyn. visc. (cP)	2.7219	2.5679	3.4821	2.99	2.6057	2.2991	2.8261	0.4164	2.5512
Density	1.0080	1.0090	1.0101	10.90	1.0079	1.0051	1.0082	0.6016	1.0040
Hydrolysis step									
Chemical properties									
Total solids	6.07	5.80	5.85	5.70	6.12	5.92	5.91	0.15	5.84
Total ash (MFB)	3.03	3.18	3.09	3.47	3.10	3.27	3.19	0.15	3.42
TKN (AFB)	17.80	18.15	17.90	8.38	17.79	18.34	18.07	0.24	18.50
Chrome (ppm)	0.35	1.05	0.75	0.65	0.80	0.70	0.21	0.21	1.05
Physical properties									
Bloom (g)	—	—	—	—	—	—	—	—	—
Dyn. visc. (cP)	0.9559	0.9220	1.1634	1.0042	0.8605	0.8732	0.9632	0.1018	0.9022
Density	1.0111	1.1064	1.0102	1.0041	1.0059	1.0095	1.0087	0.0019	1.0076

All values expressed as percent.



TABLE IX
Characterization of residue from treatment of chrome cake

Sample	Final pH	%Residue ^a	%Ash ^b
1	1.84	9.13	0.37
2	1.85	6.33	0.18
3	1.84	7.33	0.28
4	1.85	7.46	0.25
5	1.85	10.14	0.23

^a % residue in chrome cake, Moisture-Free Basis (MFB).

^b % insoluble ash in chrome cake (MFB).

profile of these processes, a variety of costs, savings and returns must be considered. The cost estimate will be unique for each potential processor. We would expect the costs of the chemicals and equipment to be similar for all, but energy and labour costs will be specific to each location. Savings will depend on the costs of current tipping fees or other disposal arrangements as well as on the extent to which the recovered products may be used on site. Return on the processes will depend on the quality of products and the development of suitable markets. The cost of the additional separation step to obtain a gelable protein

should be more than balanced by the higher value of this product.

Conclusions

High quality gelable and hydrolyzed protein products can be isolated from chromium containing leather waste. Depending on the choice of alkali and the starting material, the process can be varied to give an end product, with a desirable molecular weight distribution and Bloom value. It has been shown that the choice of alkali for treatment of chromium containing waste influences the chemical composition of the isolated protein products. The chemical composition of the

original chromium waste product also contributes to the chemical makeup of the protein products.

A higher level of the ash is extracted with the gelable protein, and this ash is too high for the desired end product, it can be removed by ion-exchange resins. This study has also shown that a variety of alkali-inducing agents can be used to treat the waste, depending on the desired composition of the end product or compatibility with the chemicals used in chrome recycling in the tannery system. We have demonstrated that the products of these processes are repeatable in their chemical and physical properties and that good and repeatable material balances are obtained. It has also been shown that the chrome cake isolated in these treatments can be chemically treated to remove undissolved protein or the resins used in the high exhaust chrome tannages, so that a product can be recovered that can be recycled. Suggestions for the development of an economic profile are presented and show that a profit can be achieved if the new two-step process is run and the enzyme is re-cycled.



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EXPORTS DECLINE SHARPLY IN OCT; TRADE DEFICIT WIDENS



India's exports entered negative territory after a gap of about two years, declining sharply by 16.65 per cent to \$29.78 billion in October, mainly due to global demand slowdown, even as trade deficit widened to \$26.91 billion, according to data released by the commerce ministry.



Key export sectors, including gems and jewellery, engineering, petroleum products, ready-made garments of all textiles, chemicals, pharma, marine products, and leather, recorded negative growth during October. Imports during the month under review rose by about 6 per cent to \$56.69 billion on account of increase in the inbound shipments of crude oil and certain raw materials such as cotton, fertiliser and machinery.

During April-October 2022, exports recorded a growth of 12.55 per cent to \$263.35 billion. Imports rose 33.12 per cent to \$436.81 billion. The merchandise trade deficit for April-October 2022 was estimated at \$173.46 billion as against \$94.16 billion in April-October 2021, as per the data.

Trade deficit in October 2021 was \$17.91 billion. Last time it was in November 2020, when exports contracted by 8.74 per cent.



Briefing media, commerce secretary Sunil Barthwal said that global headwinds are impacting consumption worldwide and that would have an impact on India's exports as well.

The World Trade Organisation (WTO) has projected that the global trade growth will rise by 3.5 per cent in 2022 but only one per cent in 2023. India's share in global merchandise trade is 1.8 per cent and in global services, it is 4 per cent, and there is a lot of potential to increase this, he said.

"We should not be depressed by the WTO forecast," the secretary said, adding monetary tightening in the US and Europe is impacting demand globally. He also said that a lot of India's exports have imported inputs like in the pharmaceuticals and there are also some seasonal effects on trade.

According to experts, rising domestic consumption along with economic growth is leading to higher imports, particularly of raw material, capital goods and intermediate products.



When asked about the reason for releasing trade data now only once in a month, Barthwal said there were some fluctuations in the data released on first week of a month and then again by middle of that month, and “it was sending very confusing signals to our stake holders, so we decided to release most updated data” once a month.

Export sectors that recorded negative growth included gems and jewellery (21.56 per cent), engineering (21.26 per cent), petroleum products (11.28 per cent), ready-made garments of all textiles (21.16 per cent), chemicals (16.44 per cent), pharma (9.24 per cent), marine products (10.83 per cent), and leather (5.84 per cent). Sectors that recorded positive growth included oil seeds, oil meals, electronic goods, tobacco, tea, and rice in October.

Meanwhile, oil imports rose by 29.1 per cent to \$15.8 billion. Gold imports, however, declined by 27.47 per cent to \$3.7 billion during the month. Federation of Indian Export Organisations (FIEO) said that slowdown in merchandise exports is a reflection of toughening global trade conditions amid demand slowdown on account of high inventories, rising inflation, economies entering recession, high volatility in currencies and geopolitical tensions.

(PTI – 15/11/2022)

GST ANTI-PROFITEERING COMPLAINTS TO BE TAKEN UP BY CCI FROM DEC 1



All GST anti-profiteering complaints would be dealt with by the Competition Commission of India (CCI) from December 1 as the extended tenure of National Anti-profiteering Authority ends this month, an official said on Tuesday.

A notification in this regard is expected to be issued by the finance ministry later this month, the official added. The National Anti-Profiteering Authority (NAA) was set up in November 2017 under Section 171A of Goods and Services Tax (GST) law to check unfair profiteering activities by registered suppliers.

The Authority's core function is to ensure that benefits of reduction in GST rates on goods and services and of the input tax credit are passed on to consumers by way of reduction in prices. Initially, it was set up for two years till 2019, but was later extended till November 2021.

The GST Council, in its 45th meeting in September last year, gave another 1-year extension till November 30, 2022, to NAA and also decided to shift the work to CCI after that. As per the decision by the Council, NAA will cease to exist from December 1.

Henceforth, all investigations, based on complaints filed by consumers, will be done by the Directorate General of Anti-profiteering (DGAP) which will then submit a report to CCI.

The official said a separate wing is likely to be set up in CCI to handle complaints relating to GST profiteering. As per the GST law, a 3-tier structure was set up for investigation and adjudication of the profiteering complaints.

The complaints are required to be first sent to state-level screening and standing committees, which are then forwarded to DGAP for investigation. The investigation report is then submitted to NAA.

The authority thereafter passes an order after hearing both the parties. If NAA finds that a supplier has indulged in profiteering, it has to return the profiteered amount, along with 18 per cent interest, to the consumer. If all the consumers cannot be identified, then the amount is transferred to the consumer welfare fund.

CCI was established to enforce the law under Competition Act, 2002. It consists a chairperson and six members appointed by the central government. The Commission is tasked with the job of eliminating anti-competitive practices, protecting the interest of consumers and ensuring free trade.

(PTI – 15/11/2022)

FDI EQUITY INFLOWS DIP 14% DURING APRIL-SEP TO \$26.9 BILLION



Foreign Direct Investment (FDI) equity inflows into India contracted by 14 per cent to \$26.9 billion during the April-September this fiscal, according to the data of the Department for Promotion of Industry and Internal Trade (DPIIT).

The inflows had stood at \$31.15 billion during the corresponding period of the previous year. The total FDI inflows (which includes equity inflows, re-invested earnings and other capital) too declined to \$39 billion during the first six months of the current fiscal year as against \$42.86 billion in the year-ago period.

During the first half of this fiscal, Singapore emerged as the top investor with \$10 billion FDI. It was followed by Mauritius (\$3.32 billion), UAE (\$2.95 billion), USA (\$2.6 billion), the Netherlands (\$1.76 billion), and Japan (\$1.18 billion), the data showed.

The computer software and hardware sector attracted the highest inflows of \$6.3 billion during the six-month period of this fiscal. It was followed by services (\$4.16 billion), trading (\$3.28 billion), chemicals (\$1.3 billion), automobile industry (\$932 million) and construction (infrastructure) activities (\$990 million).

(OutlookIndia.com – 23/11/2022)

INDIAN ECONOMY TO GROW AT 'MODERATELY BRISK RATE', INFLATION TO EASE: FINANCE MINISTRY

India's wholesale and retail price inflation fell in October after remaining high for most part of the year mainly due to supply chain disruptions following outbreak of the Russia-Ukraine war in February. India is well placed to grow at a "moderately brisk rate" in the coming years on the back of macroeconomic stability,



despite global monetary tightening, a finance ministry report said on Thursday.

It further said inflationary pressures will ease in the coming months with the arrival of kharif crops and at the same time job opportunities will increase with improvement in business prospects. The 'Monthly Economic Review for October 2022' also cautioned that the US monetary tightening is a "future risk" which could lead to dip in stock prices, weaker currencies and higher bond yields, resulting in higher borrowing costs for many governments around the world.

It said a rapid deterioration in global growth prospects, high inflation, and worsening financial conditions have increased fears of an impending global recession. The spill overs of the global slowdown may dampen India's exports businesses outlook. However, resilient domestic demand, a re-invigorated investment cycle along with strengthened financial system and structural reforms will provide impetus to economic growth going forward.

"In a world where monetary tightening has weakened growth prospects, India appears well placed to grow at a moderately brisk rate in the coming years on account of the priority it accorded (to) macroeconomic stability," the report said. The ministry said, so far in current year, India's food security concerns have been addressed and will continue to receive the utmost priority from the government.

"Easing international commodity prices and new kharif arrival are also set to dampen inflationary pressures in the coming months," it said. India's wholesale and retail price inflation fell in October after remaining high for most part of the year mainly due to supply chain disruptions following outbreak of the

Russia-Ukraine war in February. Retail or CPI inflation fell to 3-month low of 6.7 per cent, while wholesale or WPI inflation was at 19-month low of 8.39 per cent.

Russia and Ukraine are among the most important producers of essential agricultural commodities, including wheat, maize, sunflower seeds and inputs like fertilisers. Together with other countries bordering the Black Sea, they constitute the world's breadbasket. Along with an uncertain macroeconomic outlook, the year 2022 also brought to the fore the vulnerability and interconnectedness of the global food system to shocks, the ministry said.

India's grain availability was impacted by the untimely heatwaves and deficiency of the southwest monsoon in the current year. However, export restrictions have ensured that the country's needs are fully met, it added. With regard to job situation, the ministry said in India the recovery in economic activities across sectors has improved the overall employment situation in the country.

Net payroll additions in EPFO have witnessed double-digit growth in September 2022, reflecting improved formalisation of the economy. "Hiring by firms is likely to witness an improvement in upcoming quarters driven by a rebound in new business hiring as firms continue to benefit from the lifting of the COVID-19 restrictions and optimism engendered by the vigorous sales volumes experienced during the festive season," the ministry said.

(OutlookIndia.com – 24/11/2022)

IT WILL GIVE ANOTHER LEVEL OF COMFORT TO MSME LENDERS: EXPERTS ON GST DATA ACCESS VIA ACCOUNT AGGREGATORS



Credit and finance for MSMEs: The Reserve Bank of India's (RBI) decision to include the Goods and Services Tax Network (GSTN) as the latest Financial Information Provider (FIP) under the Account Aggregator (AA) framework has been hailed as a major push to further ease access to bank credit by MSMEs. GSTN is the non-profit and non-government organization that manages the entire IT system of the GST portal.

Account aggregators (AAs) are a new class of non-banking financial companies (NBFCs) that offers account aggregation services — retrieving or collecting information of its customer pertaining to their financial assets or information and consolidating, organizing, presenting it to the customer (for instance a bank) or any other person as per the instructions of the customer — in exchange for a fee.

The consent-based information collected is in respect of MSMEs' bank or NBFC deposits, SIPs, government securities, equity shares, bonds, mutual funds, insurance policies, exchange traded funds (ETFs), debentures, etc. With the latest announcement by RBI, GST Returns, viz. form GSTR-1 and GSTR-3B would also be available as information as GSTN joins the list of existing FIPs such as banks, NBFCs, asset management companies, depositories, insurance companies, pension funds, etc., providing related information to AAs.

"Inclusion of GSTN will give way to the traditional approach of lending based on balance sheet similar to how it is used for registering an MSME on the Udyam portal now. So rather than depending on some projection-based data to lend, of which the veracity cannot be confirmed, cash flow-based data with GST details will bring a great change to MSME lending," a SIDBI official told FE Aspire seeking anonymity.

SIDBI is also into direct lending to MSMEs apart from providing financial support to small financial institutions and banks which in turn lends out money to MSMEs. "It (GSTN inclusion in AA framework) will also benefit SIDBI significantly since we are also into direct lending," the official added.

For NBFCs in India, many of which are into MSME lending, GSTN inclusion will provide the most authentic picture of the borrower to lenders in the credit decisioning process. Raman Aggarwal, Director at Finance Industry Development Council, a representative body of NBFCs in India, told FE Aspire, "GSTN provides another level of comfort because one can fudge his/her financial books but not the GST data. Hence, this will reduce the time to disburse credit by banks.

Particularly for NBFCs, “this is going to have a very positive impact as NBFCs lending to MSMEs don’t expect any collateral. As of now GSTN data has been confidential information but now it will be accessible after required approvals,” Aggarwal noted. Moreover, this will “also nudge MSMEs to comply more with GST regulations,” said Abhishek Basumallick, Chief Equity Advisor at equity research firm Intelsense.

Notably, a challenge assumed in the success of AAs is reluctance from MSMEs to give consent to data sharing. However, a survey of over 1,000 MSMEs by Boston Consulting Group earlier this month noted that around 40 per cent of respondents are willing to share their data provided they get personalised offers from banks such as lower interest rates, discount on processing charges, better customer experience etc.

Currently, CAMSFinServe, Cookiejar Technologies, FinSec AA Solutions, NESL Asset Data, Perfios Account Aggregation Services, and Yodlee Finsoft are among the NBFC AAs in India with an operating license.

(Financial Express – 24/11/2022)

INFLATION DRIVEN BY EXTERNAL FACTORS A BIG CHALLENGE FOR INDIA, US



India and the US on Friday expressed concern over high inflation which is being driven by external factors and has become a challenge for both the nations. Speaking at the US-India Businesses and Investment Opportunities, Finance Minister Nirmala Sitharaman said in India the inflation challenges are prompted more by external factors.

“So while the number today is in a manageable range, the challenges are largely due to the import of crude. “About 85 per

cent of all petro needs that we consume are imported...The external factors causing a stress on inflation is something that we have to be mindful of,” the minister said during a question-answer session at the event.

Sitharaman further said both the Reserve Bank of India and the finance ministry are working together to tackle inflation. Secretary of the Treasury Janet Yellen, who also addressed the forum, said the global economic outlook at present is extremely challenging. High inflation, she said, is a challenge that many advanced and developing countries face in common and central banks are trying to deal with the problems.

“In part this inflation reflects the spillover of Russia’s brutal war in Ukraine, which is boosting energy and food prices and for many emerging markets that have found themselves with high debts and high interest rates, the cost of moving higher energy and food costs are the things that have made debt unsustainable for some of them. “So I think that is something we will have to deal with something going forward,” Yellen said.

Answering a question on investments in India, Sitharaman said the national investment pipeline and the national monetisation pipeline are expected to supplement one another. Stressing that the monetisation activity is going at full speed, the minister said, “investment from our side on Rs 9,000 crore on infra projects is absolutely on course.

“The way we have opened FDIs and FPIs, the ecosystem for investment in India to ensure favourable investment returns is all being worked in consultation with industry.” Sitharaman also invited investments from the US saying labour costs in India are competitive compared to many other countries.

“So this is a time for concrete plans, to have a guidance given to business to come together, to have transfer of certain technologies without hesitation to joint venture partners so that you can do business without any insecurity...,” she added. The roundtable interaction was attended by top business leaders from both the countries.

(Rediff.com – 11/11/2022)

AMID GLOBAL ECONOMIC SLOWDOWN, HOW MSME SECTOR DRIVES INDIA’S GROWTH STORY, KEY CHALLENGES



Micro, small and medium enterprises (MSMEs) are among the most important pillars of India's economy and the government of India is making an all-out effort to make the sector stronger and more developed.

There are 6.3 crore Micro, Small and Medium Enterprises (MSMEs) in the country which are providing 11 crore jobs. Rajiv Talreja, founder of Quantum Leap Learning Solutions Pvt Ltd said, "MSMEs are the highest job creators and the highest taxpayers in the country. They create products and services that add and enhance the value of the everyday lives of people across the country. They are the true heroes of the Indian economy." The goal of Quantum Leap is to help MSME identify their key problem areas and empower them with strategies, systems and skills to accelerate their performance.

Quantum Leap assigns a Business Coach who works with the Entrepreneur of a MSME for a period of 12-months to 24-months hand holding them to implement what they have learnt through the curriculum designed by Quantum Leap and produce Growth results for the business.

MSME Sector - Budget 2023-24 Expectations:

MSMEs contribute around 30 per cent to our GDP and have a share of 50 per cent of the income generated from total exports. Rajiv Talreja expects an easier line of credit which would be one of the biggest requirements of MSMEs where their working capital gets choked because of delayed payments and challenges in the supply chain.

"The only place in the world where things have a positive impact is India. You travel across the world, talk to investors, and business owners and you will see the sentiment is survival. But

in India, the conversation is about growth," Founder of Quantum Leap Rajiv Talreja opined.

MSME Sector - Key challenges:

The government needs to create more access or easier working capital. Banks have to be kinder to MSMEs. A lot of MSMEs are under-marketed and do not use technology to its optimum, so Marketing education and technology education would be a great handholding for MSMEs.

In fact, the Indian government is looking forward to initiatives like revamping of the Credit Guarantee Scheme for Micro and Small Enterprises, full-fledged integration of Udyam, e-Shram, and National Career Service and ASEEM portals. Entrepreneurs are the backbone of the Indian economy. Quantum Leap pivoted to create tangible, measurable and meaningful growth results for the MSMEs. The government has also extended non-tax benefits for 3 years in case of an upgradation in the classification of MSME.

"As I started implementing my lessons in my own business and also helping out other entrepreneurs implement the same, I discovered my calling. I realised I wanted to support MSME entrepreneurs and businesses by hand holding them through 1-to-1 coaching. That's how business coaching happened to me," Talreja noted.

Talreja expects that "soon will come a tipping point where every MSME in the country will look at being coached by Quantum Leap as a basic necessity in their journey of building a business. Quantum Leap has a pivotal part to play in the growth of MSMEs in the country and it's something we are very proud of." The industry and other stakeholders need to work with the government to make India a USD 5 trillion economy along with becoming self-reliant with a vibrant MSME sector.

(Zeebiz.com - 05/12/2022)

WORLD BANK REVISES UPWARDS INDIA'S GDP GROWTH FORECAST TO 6.9% FOR FY23

The World Bank on Tuesday revised upwards its GDP growth forecast for India to 6.9 per cent for 2022-23, saying the economy was showing higher resilience to global shocks. In its India Development Update, the World Bank said the revision was due to higher resilience of the Indian economy to global shocks and better-than-expected second quarter numbers.



India's economy grew at 6.3 per cent in September quarter 2022-23 as compared to 13.5 per cent in the preceding June quarter, mainly on account of contraction in output of manufacturing and mining sectors.

This is the first upgrade of India's growth forecast by any international agency amid the global turmoil. In October, the World Bank had cut India's GDP growth forecast to 6.5 per cent from 7.5 per cent earlier. Now, it has upgraded the projection to 6.9 per cent for 2022-23 (April 2022 -March 2023).

The report titled 'Navigating the Storm', said while the deteriorating external environment will weigh on India's growth prospects, the economy is relatively well positioned to weather global spillovers compared to most other emerging markets. Impact of a tightening global monetary policy cycle, slowing global growth and elevated commodity prices will mean that the Indian economy will experience lower growth in 2022-23 compared to 2021-22 (8.7 per cent), it said.

Despite these challenges, it said, the update expects India to register a strong GDP growth and remain one of the fastest growing major economies in the world, due to a robust domestic demand. "The World Bank has revised its 2022-23 GDP forecast upward to 6.9 per cent from 6.5 per cent (in October 2022), considering a strong outturn in India in second quarter (July-September) of 2022-23 financial year," the India Development Update said.

"India's economy has been remarkably resilient to the deteriorating external environment, and strong macroeconomic fundamentals have placed it in good stead compared to other emerging market economies," World Bank's Country Director in India Augustine Tano Kouame told reporters here.

However, he said, continued vigilance is required as adverse global developments persist.

The report projected that the Indian economy will grow at slightly lower rate of 6.6 per cent in 2023-24. "A challenging external environment will affect India's economic outlook through different channels...rapid monetary policy tightening in advanced economies has already resulted in large portfolio outflows and depreciation of the Indian rupee while high global commodity prices have led to a widening of the current account deficit," it said.

Economy insulated

The report said India's economy is relatively insulated from global spillovers compared to other emerging markets because India has a large domestic market and is relatively less exposed to international trade flows. The country however remains affected by spillovers from the US, Euro area and China.

The report finds that while 1 percentage point decline in growth in the US is associated with a 0.4 percentage point fall in India's growth, the effect is around 1.5 times larger for other emerging economies, it said, adding, analysis for growth spill overs from the European Union (EU) and China also yields similar results.

Improved FDI inflows

India's external position has also improved considerably over the past decade and the current account deficit is adequately financed by improving foreign direct investment inflows and a solid cushion of foreign exchange reserves. It may be noted that India has one of the largest holdings of international reserves in the world.

Reforms

With regard to reforms, the report said, prudent regulatory measures have also played a key role in developing resilience in the economy. Increased reliance on market borrowings has improved the transparency and credibility of fiscal policy and the government has diversified the investor base for government securities, it said.

The introduction of a formal inflation targeting framework during the past decade was an important step in lending credibility to monetary policy decisions, it said. "While there are still some challenges in the financial sector, the adoption of several regulatory and policy measures—including introduction of a new Insolvency and Bankruptcy Code and creation of the new National Reconstruction Company

Limited—facilitated an improvement in financial sector metrics over the past five years,” it said.

The report noted that these policy interventions are also expected to help alleviate pressures related to non-performing loans. The World Bank saw the government meeting the fiscal deficit target of 6.4 per cent of the GDP in 2022-23. “A well-crafted and prudent policy response to global spillovers is helping India navigate global and domestic challenges,” said Dhruv Sharma, Senior Economist, World Bank, and lead author of the report.

Inflation

On inflation, the report said, both levers of macroeconomic policy – fiscal and monetary – have played a role in managing the challenges that have emerged over the past year. The report noted that the RBI withdrew accommodative monetary policy settings in a measured approach as it balanced the need to rein in inflation while continuing to support economic growth.

It expected inflation at 7.1 per cent in current fiscal year and its moderation to 5.2 per cent in 2023-24.

Fiscal policy supported the central bank’s rate actions by cutting excise duty and other taxes on fuel to moderate the impact of higher global oil prices on inflation, it said.

However, the report cautioned that there is a trade-off between trying to limit the adverse impact of global spillovers on India’s growth and available policy space.

(Hindu Business Line – 06/12/2022)

GOVT ENVISIONS DOUBLING MSME SECTOR’S CONTRIBUTION TO INDIA’S ECONOMY: MINISTER



The government envisages doubling the contribution of India’s micro, small and medium enterprises sector to the economy by realising its full potential, Union Minister Bhanu Pratap Singh Verma said on Wednesday.

The Micro, Small and Medium Enterprises (MSME) sector contributes one-third to India’s gross domestic product (GDP). The Minister of State for MSME said the Ministry is working towards this objective by resolving bottlenecks. “Our vision is to double the contribution of MSME sector to India’s economy by realising its full potential. We will resolve internal bottlenecks towards this objective,” Verma said while addressing the Global MSME Summit here.

The Global MSME Summit is being organised by CII in partnership with the Ministry of Micro, Small and Medium Enterprises to promote the visibility of Indian MSMEs and encourage international market linkages.

-: JILTA :-

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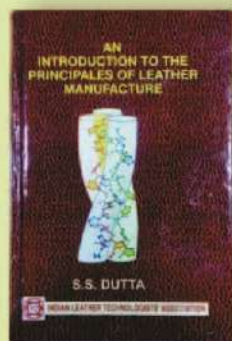
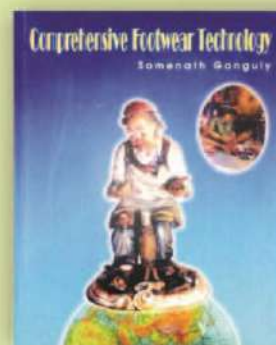
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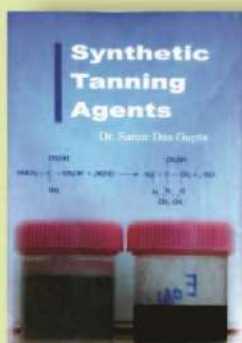
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History and Activities of Indian Leather Technologists' Association

The Indian Leather Technologists' Association (ILTA) was founded by Late Prof. B. M. Das, the originator of Das-Sassanay theory and father of Indian Leather Science on 14th August 1950.

The primary objectives of the oldest Leather Technologists' Association which celebrated its Diamond Jubilee year in the 2010, are :

- ◆ To bring all concerned with the broad spectrum of the leather industry under one umbrella.
- ◆ To organize seminar, symposium, workshop in order to create information, knowledge and latest development for the benefit of all concerned. To offer a common platform for all to interact with each other in order to understand each other's problems and prospects.
- ◆ To publish monthly journal as a supplement to those above objectives. The monthly journal of ILTA is known as journal of Indian Leather Technologists' Association and is the most widely circulated technical journal concerning leather technology.
- ◆ To publish textbooks for the benefit of students at various levels of study, for the researchers and industry.
- ◆ To have interface between urban and rural sector.
- ◆ To assist Planning Commission, various Government Institutions, Ministry and autonomous bodies to formulate appropriate policies acceptable and adoptable to the industry.
- ◆ To organize practical training and to provide skilled manpower and to motivate good students for study.
- ◆ To conduct activities related to the growth of the export of leather and leather goods from India.
- ◆ As the part of many social activities ILTA has donated Rs. 1 lac to Consul General of Nepal towards relief of earthquake affected of Nepal on 15th Sept, 2015.

INTERNATIONAL & NATIONAL SEMINAR

- ◆ ILTA is the Member Society of International Union of Leather Technologists & Chemists Societies (IULTCS), a 115 years old organization and for the first time the IULTCS Congress was organized in January 1999 outside the developed countries in India jointly by ILTA and CLRI.
- ◆ 2017 IULTCS Congress is scheduled to be held in India again.
- ◆ 8th Asian International Conference on Leather Science & Technology (AICLST) was organized by ILTA in 2010 during its Diamond Jubilee Celebration year.

SEMINAR & SYMPOSIUM

ILTA organizes Seminar & Symposiums on regular basis to share information, knowledge & latest development and interactions for the benefit of all concerned. Few are as under :

- ◆ Prof. B. M. Das Memorial Lecture every year during the Foundation Day Celebrations on 14th August every year.
- ◆ Sanjoy Sen Memorial Lecture on 14th January every year, the birthday of our late President for several decades.
- ◆ Prof. Mont Banerjee Memorial Lecture on 15th March every year, the birthday of this iconic personality.
- ◆ Seminar on the occasion of India International Leather Fair (IILF) at Chennai in February every year.

It has also organized :

- ◆ Prof. Y. Nayudamma Memorial Lecture.
- ◆ Series of Lectures during Programmes on Implementing Emerging & Sustainable Technologies (PIESTT).
- ◆ Seminars in occasion of India International Leather Fair, 2014 and 2015 at Chennai etc. Many reputed scientists, industrialists and educationists have delivered these prestigious lectures. Foreign dignitaries during their visits to India have addressed the members of ILTA at various times.

PUBLICATION

ILTA have published the following books :

- ◆ An Introduction to the Principles of Physical Testing of Leather by Prof. B. S. Dutta
- ◆ Practical Aspects of Manufacture of Upper Leather by J. M. Dey
- ◆ An Introduction to the Principles of Leather Manufacture by Prof. B. S. Dutta
- ◆ Analytical Chemistry of Leather Manufacture by P. K. Sarkar
- ◆ Comprehensive Footwear Technology by Mr. Sonu Ganguly
- ◆ Treatise on Fatliquors and Fatliquoring of Leather by Dr. Samir Dasgupta
- ◆ Synthetic Tanning Agents by Dr. Samir Dasgupta
- ◆ Hand Book of Tanning by Prof. B. M. Das

ILTA has a good Library & Archive enriched with a few important Books, Periodicals, Journals etc.



AWARDS OF EXCELLENCE

- ◆ ILTA awards Prof. B. M. Das Memorial, Sanjoy Sen Memorial, J. M. Dey Memorial and Mont Banerjee Memorial Medals to the top rankers at the University / Technical Institute graduate and post graduate levels to encourage the brilliants to evolve with the industry.
- ◆ J. Sinha Roy Memorial Award for the author of the best contribution for the entire year published in the monthly journal of the Indian Leather Technologists' Association (IJLTA).

LEXPOs

To promote and provide marketing facilities, to keep pace with the latest design and technology, to have better interaction with the domestic buyers, ILTA has been organizing LEXPO fairs at Kolkata from 1977, Siliguri from 1982 and Durgapur from 2010. To help the tiny, cottage and small-scale sectors industries in marketing, LEXPO fairs give the exposure for their products. Apart from Kolkata, Siliguri & Durgapur, ILTA has organized LEXPO at Bhubaneswar, Gangtok, Guwahati, Jamshedpur and Ranchi.

MEMBERS

The Association's present (as on 31.03.2018) strength of members is more than 600 from all over India and abroad. Primarily the members are leather technologists passed out from Govt. College of Engineering & Leather Technology, Anna University, Chennai, Harcourt Butler Technological Institute, Kanpur, B. R. Ambedkar National Institute of Technology, Jalandhar and Scientists from Central Leather Research Institute.

ESTABLISHMENTS

In order to strengthen its activities, ILTA have constructed its own six storied building at 44, Shanti Pally, Kestia, Kolkata - 700 107 and have named it "Sanjoy Bhavan".

This Association is managed by an Executive Committee duly elected by the members of the Association. It is absolutely a voluntary organization working for the betterment of the Leather Industry. None of the Executive Committee members gets any remuneration for the services rendered but they get the satisfaction of being a part of this esteemed organization.



ILTA
Since 1950

Indian Leather Technologists' Association

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

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