Indian Leather

Vol.59 August - 2025 No.06 Annual Subscription Rs.500

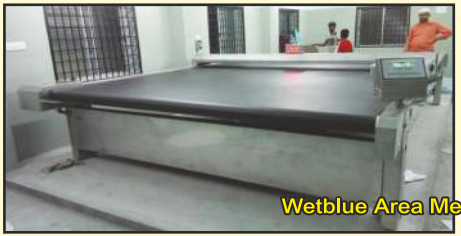
LEATHER FINISHING MACHINES


Conveyor Type


Table Delux Type


Table Type

Auto Spray With Dryer

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59th Year

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US Tariff Crisis

Editorial

The announcement of the US President, Donald Trump, on 27th August, 2025, on the additional tariff of 25% on Indian goods, thereby hiking the total import tariff to 50%, came as a rude shock to the Indian leather exporters. While Bangladesh, through negotiations, managed to reduce US retaliatory tariff on its goods to 20%, India and China, still face higher tariffs-50% and 30% respectively.

This move really threatens the industry, which is heavily reliant on exports of its business. According to some exporters, US buyers are demanding discounts of up to 20% on the existing orders, which they feel, not workable. Many US brands have put their new orders on hold. Some exporters, it is reported, were offering discounts to prevent US consumers from changing over to other suppliers, from countries like, Bangladesh, Vietnam, Pakistan etc.

The Regional Chairman (Central) of Council for Leather Exports (CLE), Mr Asad Kamal Iraqi, has said that India is a huge country with strong manufacturing hub, and to overcome the present crisis, we have to concentrate more on domestic market, There is only 20% consumption of leather products in the country and the rest of the business is completely with overseas countries.

The CLE had held several meetings with the Ministry of Commerce & Industry on this issue. He said with the support of the government, CLE would be organising trade delegations to visit Russia, which has a huge market, and the unexplored African Markets for trade opportunities and also planning to conduct Buyers-Sellers Meet (BSMs) in UAE which is the main business hub of the USA. One hopes the impact of the tariffs would largely be temporary as India would explore alternative markets and strengthen domestic competitiveness. The industry would soon come out of the tariff crisis with the strong support of the government.

All China Leather Exhibition (3-5 September 2025, Shanghai, China)

- **ACLE is a sourcing hub for Chinese tanneries and finished product manufacturers.**

- **China imports most of the raw materials and chemicals required for manufacturing finished leather**

The 25th edition of the All China Leather Exhibition (ALCE), popularly known as Shanghai Fair-the leading leather industry event of China, jointly organised by APLF Ltd. and China Leather Industry Association (CLIA), will be held from 3-5 September, 2025 at the Shanghai New International Expo Centre (SNIEC).

The mega fair occupying seven halls, covering an area of 80,500 sq mtrs, will host over 1000 exhibitors, both from domestic and from 23 overseas countries There will be eight national pavilions put up trade associations from countries: Brazil (ASSINTECAL), Brazil (CICB), Taiwan (TILA), Thailand, Pakistan (PTA), Italy (ASSOMAC), France (FFCP) and Australia.

At ACLE, one can find the whole supply chain for making leather, footwear, garments, leather goods and all types of accessories on display. Add to this components, shoe-making machinery, and the latest developments in chemical product applications are also showcased. Hence, ACLE becomes a one-stop sourcing venue for the entire leather sector.

The event provides ample opportunities to navigate global sourcing trends and connect with top suppliers ALCE is strategically positioned to draw a prestigious selection of buyers, including tanners, buying offices of fashion groups, footwear manufacturers and brands, automotive & furniture manufacturers, thereby establishing a dynamic platform for the industry collaboration.

The last two events held in 2023 and 2024 attracted record numbers of buyers – 28,300 and 31,300 respectively, most of whom came from the main manufacturing provinces of Mainland China.

Chinese Leather Industry

In its latest report on the tanning industry, the China Leather Industry Association (CLIA) has stated that the imports of raw hides and skins are on a growth trend. With raw leather prices hitting at historic lows due to a massive oversupply of hides, China is taking full advantage of purchasing raw materials at rock-bottom prices. In 2024, 1.49 million tons of raw hides and skins were imported, registering an increase of 5.7% valued at US$ 1.34 billion. In 2024, China has imported 6,18,000 tons of finished leather in quantity, valued at US $ 1.03 billion. So, according to CLIA's data, in 2024, China has imported 2,108 million tons of raw hides and semi finished leather, valued at US$ 2.37 billion in total.

The US has traditionally been a key supplier of leather materials-including raw hides, wet salted, and semi-finished leather to Chinese tanneries. However, recent tariff developments have affected the competitiveness of these exports. As a result, Chinese tanneries

may increasingly look to alternative sourcing markets to meet their production needs, creating potential opportunities for other leather-exporting countries. Depending on the import tariff imposed by China on US exports, it appears that US raw materials for production at China's tanneries might have to be replaced from other sources.

A new complimentary trade fair called **Moda China** is being organised concurrently by CLIA where it will serve as a platform for footwear, garment and leather goods manufacturers to interact with the thousands of buyers visiting the fair. Chinese brands will be on show as well as OEM, ODM and OBM manufacturers for sub-contracting the manufacture of finished products. This event will be held in a space of 23,000 sq mtrs of the exhibition area and in total, the two events, ACLE & Moda China will occupy 103,500 sq mtrs space.

Alongside ACLE and Moda China, the annual 22nd UITIC International Technical Footwear Congress will be held at the same time as ACLE in the business district of Pudong, on 31 Aug – 3 Sep 2025. The Congress is being organised by the UITIC (International Union of Shoe Industry Technicians) and CLIA, with ACLE and Moda China 2025 as strategic partners.

Nowadays the supply chain reengineering of the global footwear industry is accelerating and the whole industry is facing multiple challenges. Nevertheless, many new technologies such as AI are speeding up the development of new quality productive forces and reshaping industrial ecology. Hence, the theme of this conference is:

"Footwear Competitiveness and Sustainable Development in the era of AI".

The triple events **ACLE – Moda China – UITIC Congress 2025** will strengthen and complement each other resulting in a synergy that will benefit all three components of the combined events taking place in Pudong from 31st August to 5th September 2025.

SMIT & ZOON

Royal Smit & Zoon will be present at the ACLE

Royal Smit & Zoon will be present at the ACLE in booth C1-E21. The exhibition in Shanghai brings all of the steps involved in leather production together, from the sourcing of hides, to tanning and finishing. We would like to welcome you in our booth, showcasing our Zeology leather, with a colorful display to tickle all of your senses.

Zeology leather. Leather reinvented.

At ACLE, visitors can discover Zeology leather. At the booth, we demonstrate that Zeology leather offers all the best characteristics of leather, while at the same time being completely compostable. This makes Zeology leather a complete reinvention of leather, perfectly suitable for application in footwear, leather goods and automotive.

Zeology leather is tanned with zeolite, an element naturally present in the Earth's crust, and processed sustainably. Meaning you could even put your leather item into the soil, once you are done using it. The grade A compost that will remain after decomposing, even promotes plant growth!

Stahl

Join Stahl at ACLE 2025 in Shanghai!

We are excited to announce our participation in the All China Leather Exhibition (ACLE) 2025.

Visit us at Stand E2-D11.

Under the theme "Innovating Together for a sustainable future", Stahl will showcase our latest innovations in leather finishing and performance coatings.

With a focus on: ★ Fashion ★ Luxury ★ Automotive interiors

Discover how our cutting-edge products and solutions are driving sustainability and performance in the coatings industry. Let's shape the future - together. We look forward to connecting with you at ACLE 2025!

More info: https://okt.to/W6A1xr.

TFL to present latest solutions at ACLE 2025, Shanghai

TFL is pleased to announce its participation in ACLE 2025, which will take place from September 3rd to 5th at the Shanghai New International Expo Centre (Hall E2-E03).

With over 20 years of experience and presence in China, TFL invites industry professionals and valued customers to discover the latest chemical trends, innovations, and technologies.

At ACLE 2025, TFL will present an exclusive collection of high-quality leathers. These have been designed using premium chemicals and expert advice. They are available in the fashion colors predicted for the Autumn/Winter 2026/27 season.

Beyond the traditional uses for shoes and leather goods, TFL will also show how these seasonal colors and materials can be seamlessly integrated into automotive leather interiors, blending style and functionality in this sector.

If you are looking for genuine replacement syntans with extremely low or zero BPS/BPF content that still have the required tanning power, look no further. With our expanded TANIGAN® range, you can stay one step ahead of any legal or brand-specific restrictions and produce leather with a bisphenol content below the detection limit of 10 ppm.

We also focus on lightweight leather, which is in demand because it saves energy in transportation and makes upholstery, shoe uppers and clothing more comfortable. Visit us to find out how careful selection of TFL products and application methods can reduce the weight of leather by around 20%.

For leather finishing, TFL is introducing RODA® Line: a special product range developed for state-of-the-art transfer coating technology. This offers an environmentally conscious alternative to conventional leather finishes, from fashion to high performance articles, with excellent reproducibility.

Please visit us at ACLE to see how these advances meet the highest performance standards, comply with ever-evolving regulations and help you to remain at the forefront of industry trends.

Brazilian participation at the Shanghai fair

China has been the main destination for Brazilian leather exports for decades. Between January and July 2025, the country (together with Hong Kong) accounted for 31.2% of Brazil's total exports, amounting to shipments worth US$ 206.2 million. Of the world's five largest exporters of leather footwear, three are in Asia. The continent alone accounts for 88% of global shoe production (in quantity, across all materials), with China alone responsible for 54.33%.

The growth of finished leather exports, with high added value, is a constant pursuit of Brazil's tanning industry. China, the leading buyer of Brazilian leather in the international market, increased by 10% the value of its imports of this type of leather from Brazil compared to 2024, through July. This is a significant figure, given the atypical scenario in global trade, and it comes on the eve of the All China Leather Exhibition (ACLE), taking place September 3–5. The event will feature 11 Brazilian leather companies with individual booths, supported by Brazilian Leather project – an export promotion project developed by the Centre for the Brazilian Tanning Industry (CICB) in partnership with the Brazilian Trade and Investment Promotion Agency (ApexBrasil).

The supported Brazilian companies are: America Leather, Couros Bom Retiro, Coming, Durlicouros, Euro-América, Fuga Couros, Gobba Leather, Hason International, Liderkoll, Minerva and JBS Couros. In addition to the individual booths, Brazilian Leather will host an institutional space dedicated to promoting the sector, showcasing hides developed for the Preview do Couro exhibition, which features work from tanneries across the country. Planned activities also include engagement with the international press and participation in the fair's seminars, including a presentation at the International Leather Industry Executives Summit, where global perspectives for the sector will be discussed.

ACLE - LOOK OUT FOR OPPORTUNITY

- Vasan Suri

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With the Trump effect of Tariff doing a big round of messages and disappointments, the ACLE attains more significance.

The recent closeness of our Government with China and vice-versa on trade pact, will open up new avenues to make up for the temporarily lost opportunity due the US Tariff.

Statistics reveal that, US commands $1 billion for the last fiscal year. US exports contribute nearly 21.65% of the overall exports of Leather & Leather Products out of India.

The present China & HK business combined is only $170 million in the last fiscal year and down by 20% from the fiscal year 2023-24. This provides an opportunity to scale up at the ACLE by renewing ties with the existing and new customers.

Germany is the second largest export opportunity provider and stands at nearly 52% of exports made to US last fiscal year. This is also another area of opportunity.

The UK-India FTA recently signed, opens up an opportunity to scale up from the last year business of $437.94 million in the last fiscal year and an opportunity to probe for more business.

Whenever there is a setback, the nature offers to open another opportunity. It is Time for us all not to get too worried about the present fiasco and move on with other markets.

Time will find amicable solutions and business will be as usual or the second new normal after Covid. We are all strong enough to fight over all the adversary situations and let us bring our best efforts together.

Innovation and Sustainability

These are the two mantra which need to addressed on a day to day basis and not just for one season or specific exhibitions.

It is the innovation that, will put us on top, above others and sustainable practices which will help in saving natural resources and reduction of waste.

Cost effective products not compromising on quality and coming together of all the sectors to fight out all the odds is important.

Let us use this situation as an expensive learning phase and try to become more self reliant and self sufficient.

This **ACLE** visit should be to probe and find out suppliers of basic products which could be converted in to final products and gradually, find opportunities to create the base product.

Opportunities, sometimes stay invisible and we need to dig it out. Unearthing opportunity should be the target for the next few months, to bring up more business and activity.

Wishing all success and all the best.

Portuguese footwear outperforms competition and strengthens its presence in international markets

The Portuguese footwear industry exported 36 million pairs, valued at €843 million, in the first half of 2025. Compared to the same period last year, there was growth of 5.4% in quantity and 3.7% in value. In 2025, the Portuguese sector has been gaining market share compared to the main international players.

In the first half of the year, China-responsible for approximately 55% of global footwear production-reduced exports by 12.5%. Mexico and Turkey, two key producers, saw international trade declines of 19.3% and 15.3%, respectively. In Europe, Italy and Spain, two of Portugal's major competitors, also saw declines of 2.6% and 2%.

"It's been a very challenging year for the international footwear industry," emphasizes Luís Onofre. "The fact that we export more than 90% of our production to 170 countries allows the Portuguese industry to demonstrate an overall positive performance," adds the President of APICCAPS. Even so, he warns: "We remain highly dependent on the performance of the major economies to maintain this record in the second half of the year and consolidate 2025 as a year of affirmation for Portuguese footwear in foreign markets."

Between January and June, Germany strengthened its status as the main destination for Portuguese footwear, growing 13.1% to €217 million. France also maintained positive growth, with a 1.4% increase to €167 million. Conversely, the greatest source of concern is the Netherlands, where sales fell 5.3% to €94 million.

A PRIORITY CALLED USA

After a start to the year marked by uncertainty and double-digit declines, Portuguese footwear exports to the US began a recovery, reaching €40 million at the end of the first half of the year (down 6.4% compared to the previous year). "The North American market is a priority for Portuguese footwear," emphasizes Luís Onofre.

In a more favorable tariff framework-where countries like Brazil are penalized by 50%, China by 30%, India by 50%, and Mexico by 25%-"this could be an opportunity to strengthen our presence in the US, where demand for premium, sustainable, and historic products is growing." For the President of APICCAPS, "Portugal, taking into account the investments currently underway-more than 100 million euros within the scope of the RRP in the areas of automation, robotics, and sustainability-can establish itself as a solid alternative to mass-produced and environmentally unsustainable products."

Even with an increase in exports to the United States, total shipments drop in July

In the first seven months of 2025, exports remain positive but on a downward trend. During the period, 59.88 million pairs were shipped abroad, generating US$ 574 million

Data compiled by the Brazilian Footwear Industries Association (Abicalçados), based on figures from the Secretariat of Foreign Trade (Secex), show that in July, the sector's exports totaled 7.18 million pairs and US$ 76.74 million, declines of 7.3% and 11.8%, respectively, compared to the same month in 2024. In the first seven months of 2025, exports remain positive but on a downward trend. During the period, 59.88 million pairs were shipped abroad, generating US$ 574 million -growth of 6.6% and 0.7%, respectively, compared to the same period last year.

Abicalçados' Executive President, Haroldo Ferreira, emphasizes that the slowdown in exports is mainly due to heightened international competition, with a greater influx of Asian products-especially from China-being redirected from the United States to other markets, many of which are traditionally served by the Brazilian industry. "Chinese exporters are redirecting their shipments to avoid the surcharge applied in the United States. This has been impacting our performance in key markets in Europe and Latin America," the executive emphasizes.

In the first seven months of the year, the main destination for Brazilian footwear abroad was the United States, which received 6.9 million pairs worth US$ 134.9 million-growth of 15.3% in volume and 7% in revenue compared to the same period last year. In July alone, the United States imported 1 million pairs worth US$ 23.12 million, increases in both volume (+26.2%) and revenue (+6.4%) over July 2024.

Between January and July, Argentina was the second-largest international destination for Brazilian footwear. During the period, the neighboring country imported 7.72 million pairs worth US$ 117.26 million-growth of 32.3% in volume and 4.6% in revenue relative to the same period last year. In July alone, Argentina imported 1.3 million pairs worth US$ 13.34 million, a 6.9% increase in volume but a 32.8% drop in revenue compared to July 2024.

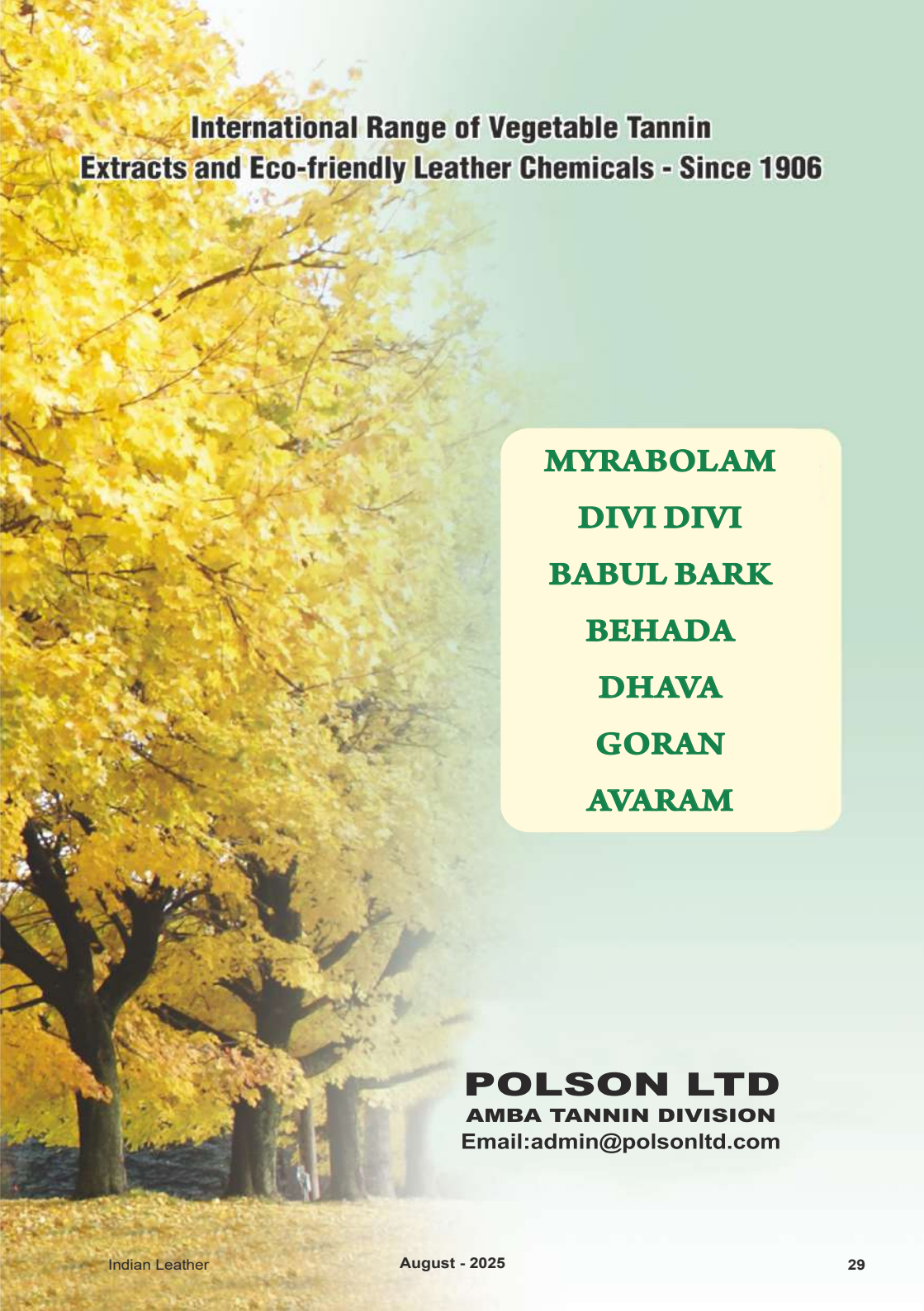
The third-largest destination for Brazilian footwear abroad in the first seven months of 2025 was Paraguay, which imported 5 million pairs worth US$ 23.4 million-an increase of 4.3% in volume and a 5.3% drop in revenue over the same period in 2024. In July, Paraguay purchased 102,000 Brazilian pairs worth US$ 2.2 million, declines of 23.2% and 23%, respectively, versus July 2024.

States

In July, all three of Brazil's main footwear-exporting states recorded negative results. Last month, factories in Rio Grande do Sul shipped 2.6 million pairs worth US$ 40.47 million, declines in both volume (-1.4%) and revenue (-7.5%) compared to July 2024. Year to date, Rio Grande do Sul has exported 18.57 million pairs worth US$ 273.2 million-an increase of 3.6% in volume but a 2% drop in revenue compared to the same period last year.

Ceará, Brazil's second-largest footwear exporter, shipped 2 million pairs worth US$ 13.4 million in July-declines in both volume (-9.4%) and revenue (-14.2%) compared to the same month last year. Year to date, the northeastern state has exported 19.5 million pairs worth US$ 117.68 million, an increase of 11.2% in volume but a 1.1% drop in revenue over the same period in 2024.

The third-largest footwear exporter in Brazil was São Paulo, which shipped 469,740 pairs worth US$ 6.83 million in July-an increase of 17.7% in volume but an 8.8% drop in revenue compared to the same month last year. Year to date, factories in São Paulo have exported 4.12 million pairs worth US$ 59.8 million, with increases of 23.5% in volume and 16.2% in revenue relative to the same period in 2024.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- Production of de-hairing enzyme
- Waterless chrome tanning technology (WCTT)

Leather Chemical Technologies:

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- Chromium free tanning gel
- Emulsifier for w/o and o/w emulsion
- Lignin based re-tanning agent
- Protein-based synthetic tanning agent

Waste Management Technologies:

- Biogas generation from organic wastes
- Co-digestion of tannery solid wastes for biogas generation
- Immobilized oxidation reactors (ior) for wastewater treatment
- Preparation of compost from animal hair waste Sequential Oxic-Anoxic Bioreactor (SOABR) for waste water treatment

Tannery Waste Utilization:

- Keratin hydrolysate from feather
- Preparation of regenerated leather from tannery solid wastes (Geno-corium)
- Utilization of chrome shaving waste in BCS manufacture

Leather like Materials:

- Plant based leather like material
- Preparation of leather like material (Pseudo-corium)

Leather Products :

- Extreme cold weather protection gloves

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SIMAC TANNING TECH 2025
(23-25 September 2025, Fieramilano, Italy)

Simac Tanning Tech-the International Exhibition of Machines and Technologies for footwear, leather goods and tanning industries, organised by Assomac Servizi Srl. will be held from 23-25 September, 2025 in Milan, Italy. Simac Tanning Tech is organised annually with Lineapelle.

Some of the highlights of Simac Tanning Tech

Live machinery demonstration showcasing the latest innovations

Cutting-edge technological solutions from top industry players

- Address visitors' technological demands through **product/project demonstrations** and **machinery showcase.**
- Focus on **key goals** like: product improvement, quality and measurement, process automation, cost containment, energy efficiency, manufacturing agility, technological integrations…

Innovations help drive the future of the industry by improving production processes, ensuring better product quality, and enhancing sustainability efforts.

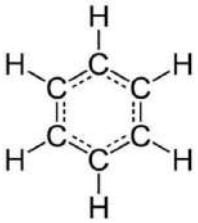
https://simactanningtech.it/

Quantum Mechanical Treatment in Understanding Resonance Stability and Conjugation in Organic Chemistry

Dr. Buddhadeb Chattopadhyay

Basically we know that if an organic molecule exhibits a number of canonical structures, it acquires more stability. The larger the numbers of such canonical structures are, the greater would be the stability. But why does such a mysterious thing happen? If we look into quantum mechanics we can understand the root better. It is also known that if an organic molecule exhibits a large number of conjugation (alternative arrangement of single bond and double bond) it acquires a stability. In today's discussion we shall try at best to get a convincing answer through the basics of quantum mechanics to make more clarity of these facts.

Firstly let us consider the known structure of Benzene (C_6H_6). The classical structure is



But this is not the only structure of Benzene. It has five more canonical structures due to so called mobility of the six π electrons in it, which is like:-

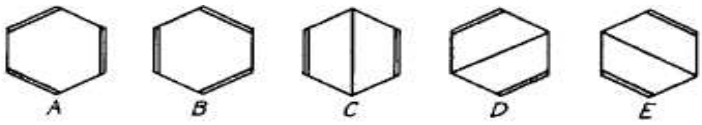


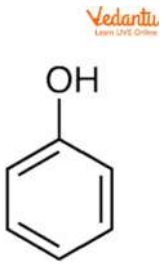
FIG. 1. The five canonical structures contributing to the normal state of the benzene molecule.

Let us assign wave functions of each canonical structures as Ψ_1, Ψ_2, Ψ_3, Ψ_4 and Ψ_5 respectively.

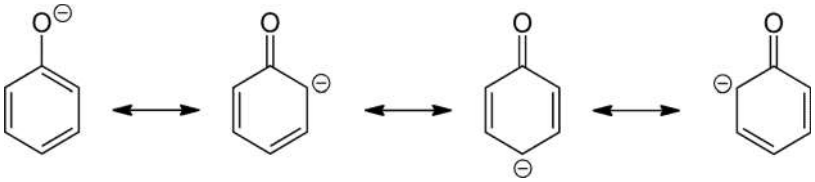
From Schrödinger's equation we know $\hat{H}\Psi = E\Psi$ where $\hat{H}$ = Hamiltonian operator and E is the corresponding energy Eigenvalue. Now since neither of the above five canonical structures describe Benzene structure correctly, therefore, according to quantum mechanics we shall have to resort to Linear Combination of Atomic Orbital (LCAO). Which comes up as follows: -

$\Psi = c_1 \Psi_1 + c_2 \Psi_2 + c_3 \Psi_3 + c_4 \Psi_4 + c_5 \Psi_5$ where c_1 to c_5 are the coefficients as such $c_1^{\,2}$, $c_2^{\,2}$, $c_3^{\,2}$, $c_4^{\,2}$ and $c_5^{\,2}$ represents their contribution to the real Benzene. There is a catch, the coefficients are so chosen that the real Benzene wave function Ψ has a minimum energy eigenvalue ($\hat{H}\Psi = E\Psi$). It automatically implies that E would be less than E_1 to E_5. Therefore, we can easily deduce that the larger the canonical structures of an organic molecule are, the lesser would be the energy of the real structure, this means that higher would be the stability.

Now coming to the acidity of Phenol. Though it has an "Ol" group (OH), yet it is acidic. Let us account for this mysterious behaviour of the dissociation of phenol. We all know that the structure of phenol is



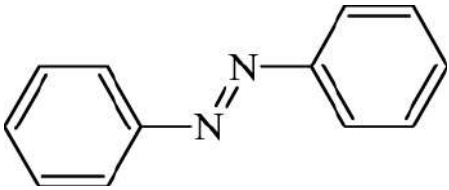
Now when it dissociates it forms H^+ + phenoxy anion. Phenoxy anion has a greater stability due to its canonical structures, which is represented as: -



It is this stability that drives the deprotonation of H very similarly like 'ol'ation of chromium complex. After releasing one proton from the H_2O molecule it acquires OH^- and the metal-ligand stability of Cr (H_2O) is less than Cr (OH^-). We add basic salts to push the chemical equilibrium in favour of the product. As the H^+ is neutralised by the added basic salt more and more OH^- is formed which increases the basicity of the chrome complex. This also favours forming bi, di, tri nuclear Cr complexes through μ bridges in order to coordinate with powerful COO^- groups (than aqua ligand) available at the side chain of D and E amino acids of collagen. This is the very basic of the Cr-tanning mechanism. Though it must be stated that the rate constant of this reaction is lower than the deprotonation reaction of Cr complexes.

Now we are coming to the point: why does an organic molecule's stability increase with the extended conjugation?

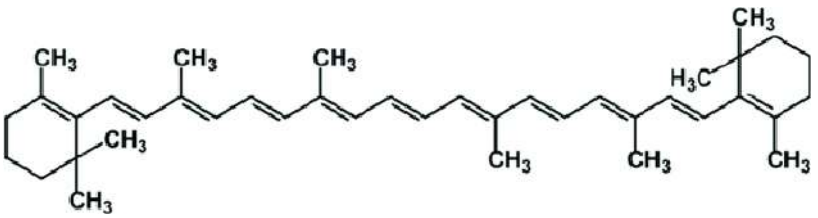
Let's see a simple basic azo dye structure. This is as follows: -



Now we can see the conjugated Benzene ring on the left is joined with another Benzene ring with an azo bridge. Now both the Benzene rings are conjugated having alternate σ and π bonds. The mobile π electrons in both can change positions across six C atoms but can never jump

outside the ring or to the neighbouring Benzene ring. Now the –N=N- bridge that is formed between them are not only themselves conjugated, but they can allow the π electrons from one ring to the another. This increases the width of the well as per quantum mechanics, favouring reducing energy and also can favour absorption of higher λ_{max} of incident electromagnetic radiation which perturbs the molecule first causing transition from one quantum energy level to another. Added to this there are possibilities of n to π* transition because non-bonding n electrons of N atoms are close to π bonds in it. Both σ to σ* and π to π* transitions of Benzene takes place in the Uv region and therefore, it is colourless, but it is not so for Azodyes.

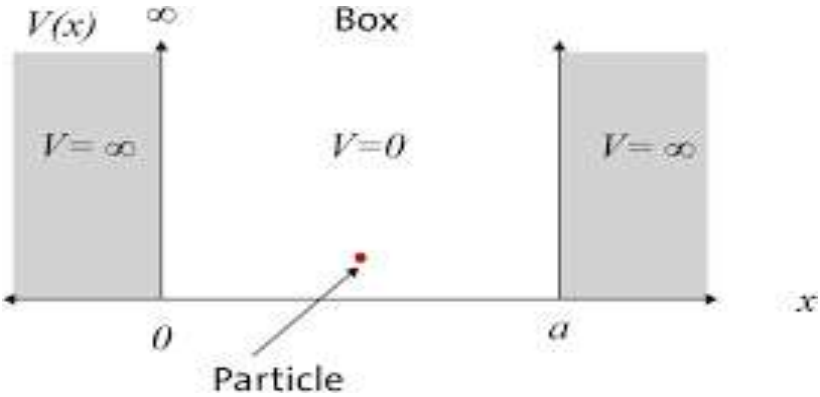
Now we shall take a hydrocarbon, more specifically polyene. One of the famous structures is β-carotene, which makes the carrots intensely reddish yellow. Unlike Benzene it has no scope for n to π* transition. But like Benzene it has only possibilities of σ to σ* and π to π* transitions. In the case of Benzene as we have said, both λ_{max} of both these transitions fall in Uv region, but for β-carotene it is in the visible blue region (blue and yellow are complementary pairs). Why is this anomaly? Before going to this let us carefully examine the structure of β-carotene which is given as under



You can very well notice 1) That it is a hydrocarbon, 2) It has two allycyclic rings having one π bond in each, 3) Two allycyclic rings are bridged by a very large extended conjugated chain having alternate σ and π bonds in continuum. This, according to quantum mechanics,

increases the width of the well thereby reducing E and Δ E considerably. We know if Δ E is reduced the λ_{max} will increase so instead of absorbing in Uv, it absorbs in Vis range of incident electromagnetic radiation falling upon them. There is another thing to note while travelling freely from one end to another no π electron would escape the molecule making β-carotene cationic.

Now we shall account for this through quantum mechanics in order to be able to appreciate it.



Let us consider a one dimensional square box of width "a - 0 = a" the box has two walls having potential energy is infinity vertically across the walls as well as outside the both walls. These boundary conditions are applied in order to prevent the ball which is inside the well, escapes sideways or gets embedded in the wall or jumps from the well. Inside the well the potential energy is zero. We know very well that the necessary and sufficient condition for freedom of a particle is that its potential energy must be zero (i.e.,must not be under the influence of any field).

We shall do too good to consider particle inside the well as electron. Inside the well the particle moves to and fro freely. Now we have to

calculate the energy relationship and the other higher quantum levels. So, the boundary conditions in this model is 1) the probability of finding the particle at x = 0 and at x = a is zero or in terms of quantum mechanics $\psi^2 = 0$ at x = 0 and x = a, therefore ψ also must be 0 under those circumstances. Ψ is also 0 when o > x > a. Therefore, it also can be written in short V(x) = 0 when $0 \leq x \leq a$; otherwise V(x) = infinity.

Outside the well or in the wall of the well (embedding) $\Psi(x) = 0$ (the probability of finding the particle i.e. Ψ^2 is zero). While inside the well where V = 0, the time-independent schrödingger's wave equation is $-\hbar^2/2m\ (d^2\Psi/dx^2) = E\ \Psi$

or, $d^2\Psi/dx^2 = -\ k^2\ \Psi$ [where $k = \sqrt{(2mE/\ \hbar^2)}$]

The general solution to this equation is $\Psi(x) = A\ Sin\ kx + B\ Cos\ kx$ where A and B are arbitrary constant. Now this equation needs to satisfy the boundary conditions as set for the problem: -

Continuity of $\Psi(x)$ requires that $\Psi(0) = 0 = \Psi(a)$

So as to join onto the solution outside the well, what does it tell us about A and B?

Well, $\Psi(0) = A\ Sin\ 0 + B\ Cos\ 0 = B$, so B must be 0. Hence $\Psi(x) = A\ Sin\ kx$.

Then $\Psi(a) = A\ Sin\ ka$, so either A = 0 this makes the solution most ridiculous; or Sin ka = 0

Therefore, $ka = 0, \pm \pi, \pm 2\pi, \pm 3\pi$…….. But k = 0 is not a good solution (again that would imply $\psi\ (x) = 0$, and the negative solutions give nothing new, since $Sin\ (-\theta) = -\ Sin\ (\theta)$, we can absorb minus sign in A.

So, the distinct solution is $k_n = (n\pi)/a$ [where n = 1, 2, 3……]

Curiously, the boundary condition at x = a, does not determine the constant A, but rather the constant k, and hence the possible value of E comes out as $E_n = (\hbar^2 k^2)/2m = (n^2\pi^2\hbar^2)/2ma$.

In radical contrast to the classical case, a quantum particle in the infinite square well cannot have just any energy. The energy must also be quantised. It has to be one of these special (allowed) values. To find A we need to normalise ψ, such that

$\int |A|^2 \sin^2(kx)\, dx = |A|^2\, a/2 = 1$ (by applying normalisation) Or $|A|^2\, a/2 = 1$, so $|A|^2 = 2/a$ or, $A = \sqrt{(2/a)}$

So, $\Psi_n(x) = \sqrt{(2/a)} \sin(n\pi/a)x$

Now recalling, $E_n = (n^2\pi^2\hbar^2)/2ma$ we can well see that n is the principal quantum number so it is constant, rest π is also a constant, ħ is the Dirac's constant, redundant to say 2 is a constant, for electron, m is also a constant and therefore, we can say $E_n \propto 1/a$ (the width of the square well). Nonetheless, such lowering of energy also impacts on the increased stability of the molecules under extended conjugation.

There is little scope to explain here the impact of normalisation on the wave nature of the particle. We shall suffice it to say that as the width of the square well increases, the energy decreases. Therefore the difference of energy (Δ) between two quantum energy levels also decreases. Since $\Delta E = hc/\lambda_{max}$, where λ_{max} is the wavelength of absorption of electromagnetic radiation also increases.

Now let us recall the basic structure of Azo dye. If we assume the width of a single benzene ring is x then before diazotization the width of the well was simply x. Now after insertion of azo bridge let us assume the width of the – N = N- is x', then the net width is increased to 2x + x'

which is more than x. Hence the absorption now takes place at a higher wavelength (λ_{max}).

Similarly for β-carotene consider the width (a) of the square well, so in spite of the absence of n to π* transition, it strongly absorbs the higher wavelength (λ_{max}) in the visible range of the electromagnetic radiation, providing intense colour. It may not be out of point to mention that β-carotene also breaks down to produce much needed Vitamin A.

Note : The figure and the structures were taken from the internet.

Back-to-School Column

Dr. N K Chandra Babu

Microbiology aspects Relevant to Leather industry

To Quote one of my mentors, Dr Ramaswamy (fondly remembered by his students as 'Vaadhyaar'), hides and skins are biological material (prone to microbial degradation) and chemically treated and converted to non-putrescible leathers with desired properties required for different end uses but sold on physical properties. In other words, leather processing involves interplay of many branches of science including biochemistry, microbiology, chemistry, biophysics and engineering. So far in the previous columns, we have dedicated our discussions mostly to biochemistry of skin matrix. In this column, we will deal with another important branch of biology/science, microbiology related to leather processing and leather industry on the whole.

Microorganisms encountered in leather industry

Hides and skins primarily from cattle, buffalo, goat and sheep are the raw materials for the leather industry. Even though these are byproducts from the meat industry, the global trade in leather far exceeds that of meat and hence, and this combined with the high potential for employment and export, the leather industry is considered an important sector especially in many developing countries. Leather processing includes conversion of raw hides/skins to non-putrescible leather.

Microorganisms are omnipresent and hence, the hides and skins, being proteinaceous in nature, readily attract and support the growth of bacteria and fungi.They grow on uncured raw hides because of their ability to hydrolyse the proteins and other

components present resulting in the degradation of the hide substance. Several microbiological defects in hides and skins starting from hair slip and red discoloration to serious conditions such as grain damage subsequently leading to degradation of hide substance are mainly caused by bacteria.

The microorganisms encountered in leather industry have been extensively reviewed by many researchers. In pickled or tanned stage, the pelts/leathers are resistant to bacterial growth but are still susceptible to fungal growth. Hence, the pickled pelt (meant for long storage and trading and transportation) and tanned leather need to be protected since unprotected stock may attract fungal growth under favorable conditions. Even the finished leathers and leather products are prone to fungal attack if not sufficiently protected. The fungal infestation, not only bring economical loss but is also threat to human health and environmental safety.

Bacteria encountered in leather industry

The flayed raw hides and skins are susceptible to bacterial attack if left untreated. The onset of putrefaction begins roughly in four minutes after the slaughter of animal. Various bacteria are known to be involved in skin degradation. Bacteria nurture on raw hides and skins largely because of their ability to hydrolyse the proteins and lipids by a process called proteolysis and lipolysis respectively. The growth of the bacteria is also accelerated by favourable pH, temperature, water/moisture and oxygen.

Bacteria producing collagenolytic enzyme capable of degrading skin at neutral pH was isolated from C*lostridium histolyticum*and *Clostridium capitovale* causing severe hide damage. Collagenase was shown to cleave the native collagen molecule into two fragments at a specific site closer to the C-terminal end in highly specific fashion at a temperature below the denaturation temperature of the substrate.

Studies have been carried out to identify bacteria responsible for the skin degradation and it has been reported that *Bacillus* are the family of dominant bacteria involved in the spoilage. The presence of *B.subtilis, B. megaterium, B. anthracoides* and *B. pumilus*has been reported in the putrefying skin. In addition to *Bacillus, Escherichia, Micrococcus, Proteus, Staphylococcus* and *Psuedomonas* were also reported to be involved in the hide putrefaction.

A concerted effort for isolation and identification of bacteria from raw goat skins was reported by a group of scientists. The occurrence of bacteria based on their dominance as reported by them is illustrated inTable. 1. A parallel study has reported the presence of several Gram-positive bacteria such as *Staphylococcus, Micrococcus, Bacillus and Lactobacillus* species on goat and sheep skins. *Pseudomonas*, yeasts and moulds are usually associated with skin, faecal material and soil as major contamination during slaughtering and dressing process.

Table 1 Occurrence of bacteria in flayed goat skins from slaughterhouse

Source	**Occurrence of Bacteria**
Cultivable Bacteria	71.4%
Bacillus proportion in cultivable bacteria	90.4%
Most dominant Bacillus species	*Bacillus subtilis* (38%) *Bacillus pumilus* *Bacillus sphaericus* *Bacillus firmus*
Other dominant species	*Macrococcus caseolyticus*
Most dominant cultivable bacterium from slaughterhouse	Staphylococci (39.1%)

Curing is done with common salt from marine source to preserve the hides and skins prior to the commencement of leather processing. It controls the growth of microorganisms causing putrefaction, however, on prolonged storage; halophilic bacteria tend to grow on the salted skins causing red patches popularly known as 'red heat'in tanners' parlance.The following figure shows extensive red heat on cured stock.

Soaking is the first unit operation in leather processing during which salt is washed away from the hides and skins. A wide variety of bacteria has been isolated from the soak liquor, including species of *Bacillus, Chromobacter, Pseudomonas, Clostridium, Lactobacillus* and *Serratia marcescescens*. There were also reports about the presence of *Bacillus, Clostridum, Proteus, Chromobacter, Lactobacillus, Micrococcus, Corynebacterium, Pseudomonas, Staphylococcus, Sarcina* and *Serratia* in soak liquors. Soaking is followed by liming and pickling stages where the pH of the liquor is >12.0 and 2.5-3.0 respectively and hence, growth of bacteria is not observed at this stage.

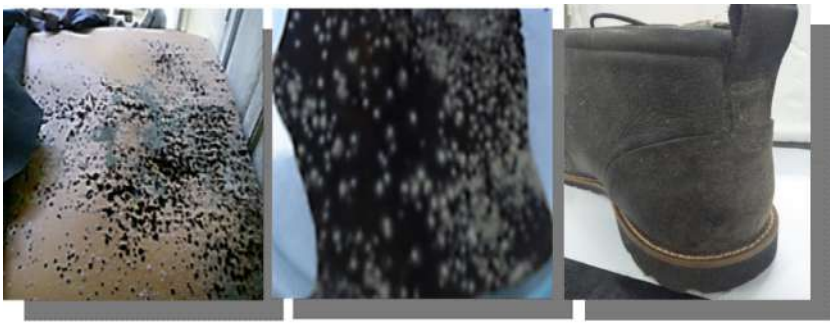
These stages are eventually followed by the tanning step where wet-blue leathers are made, stored, and/or traded and transported. In this stage, the substrate becomes permanently resistant to bacterial degradation but susceptible to fungal growth.

Fungi encountered in leather industry

Fungal species encountered in leather industry have been profiled and the common species identified mostly belong to families of *Aspergillus* and *Penicillium* however, some species of *Trichoderma, Paecilomyces,* and *Cladosporium* are also observed in certain conditions.

On chrome-tanned leather, formation of red spots is a frequent phenomenon. The fungi responsible for the red colour were identified as *Paecilomyces ehrlichii (Penicillium klebanii*), *Penicillium aculeatum, Penicillium purpurogenum* and *Penicillium roseopurpureum*. Fungal infestation on wet-blue leather is shown in the following figure.

During drying of leathers, fungi may also develop, since favourable conditions with respect to humidity and temperature can arise inside the drying chambers. Bio-deterioration becomes visible as spots of various sizes in green, yellow-brown, dark-brown, grey and brown-green shades. Major microbial damage to tanned and finished leathers and products is caused by fungi as shown below.



Many types of fungi encountered in tanneries are believed to be also due to contaminants of the materials and chemicals used in tanneries. Many fungi utilize them for their growth and development. The fungi encountered in leather industry have been summarized in table 2.

Table 2 Fungi species found on leathers at various stages

Stages during leather processing	Fungi encountered
Chrome tanned leather	*Paecilomyces ehrlichii, Penicillium klebanii, P. aculeatum, P. purpurogenum and P. roseopurpureum*
Drying (Substrates with high grease content)	*A. ochraceus, A. wentii, P. rugulosum, P. funiculosum, P. variotii and V. glaucum,*
Finishing	*P. chrysogenum, P. luteum, P. brevicompactum, P. decumbens, P. rugulosum, P. aculeatum, P. funiculosum, A. niger, A. fumigatus, A. ochraceus, A. wentii, A. flavus, A. oryzae*, *Mucormucedo, Rhizopus nigricans, P. variotii, S. brevicaulis, V. glaucum and T. viride*

Biocides used in leather industry

In many manufacturing industries dealing with materials prone to microbial attack, biocides are used for imparting protection during processing as well as increasing the shelf life of the products. Leather industry is one such industry as it deals with skin/hides which are prone to attack by different types of microorganisms during processing as well as during the use of leather products. The flayed hides and skins are prone to bacterial attack and are preserved usually by salting method to enable them to be stored, traded and transported to tanneries. At times, biocides are used along with salt to prevent the growth of halophilic bacteria, especially for hides requiring prolonged storage. Amultidrug resistant *Enterobacteriaceae* was reported to be thrivingin salted cattle hide and sheep skin. Hence, an effective bactericide is essential at the stage of salt curing to prevent such multidrug resistant bacteria.

The common salt, which acts as a dehydrating and bacteriostatic agent, is removed in the soaking process of leather processing, and hence the stock becomes prone to attack by bacteria. During liming operations, the bacterial action is restricted due to high pH; however during deliming and bating, the pelt once again becomes susceptible and hence is quickly subjected to pickling. In this stage, the bacteria become dormant due to low pH and high salt concentration but the material is still prone to fungal growth.

After tanning, the hides and skins become permanently resistant to bacterial degradation but are prone to fungal attack and hence should be treated with suitable biocides with fungicidal efficacy. Pickled pelt and wet blue are internationally traded commodities which require protection against fungi for enabling

longer storage and transportation. Even the finished leather is susceptible to fungal attack and hence treatment with an effective fungicide during wet finishing becomes necessary to impart preservation for continued protection during usage.

Fungal tablets are also used in the packages for protecting the leathers/products during a long transportation/shipping. The fungal resistance imparted during leather processing should be retained in order to give continued protection during the life time of the leather products.

Preservation against fungal attack assumes greater importance for certain types of leather such as lining and watch strap leathers which are in close contact with the users' skin. This could be attributed due to mainly two reasons; one is from hygein and aesthetic point of view and the other is the possibility of exposure of skin to developed fungi posing eventual health hazard.

Some of the biocides used earlier in leather industry includes organo-mercuric compounds like phenyl mercuric acetate (PMA), chlorophenols like phenyl mercuric acetate (PMA), paranitrophenol (PNP), pentachloro or trichlorophenol (PCP), Zinc 2-pyridinethiol-1-oxide (ZNP) have been phased out due to toxicological consideration.

Later, biocides such as 2-(thiocyanomethylthio) benzothiazole (TCMTB), ortho-phenylphenol (OPP) and p-chloro-m-cresol (PCMC) with lesser toxicity and minimum dosage levelscame into use for the prevention of fungal growth on leather and leather products. Currently, newer alternative fungicides like diiodomethyl-*p*-tolylsulfone (DIMPTS) and 3-iodo-2-propynyl-N-butylcarbamate (IPBC) have also been introduced for their use in leather industry.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Shoes & Leather Guangzhou 2025 concluded with good results

The 33rd International Exhibition on Shoes and Leather Industry - Guangzhou took place successfully from 15-17 May 2025 at the China Import and Export Fair Complex, Area D. The event provided attendees with a comprehensive overview of the market, showcasing the latest trends, innovations and business opportunities within the footwear and leather industry.

The 33rd Shoes & Leather - Guangzhou exhibition incorporating the International Footwear Exhibition (IFLE) – Guangzhou successfully brought together 726 exhibitors from 17 countries and regions, which include, China with more number of participants, followed by significant number of participants from countries like, Vietnam, Taiwan, South Africa, Hong Kong, Italy, India. There were also exhibitors from other countries which include: Bangladesh, Ethiopia, Germany, Malaysia, Pakistan, South Korea, Spain, Turkey, Uzbekistan and the United Kingdom. The event occupying a space of 36,712 square meter exhibition area, played a crucial role in connecting businesses across the shoe-making machinery, leather machinery, leather, chemical and shoe materials industries, fostering innovation and industry growth.

The Shoes & Leather - Guangzhou exhibition welcomed 13,565 visitors from 77 countries and regions, highlighting its global reach and industry significance. With dedicated exhibition halls for machinery and materials, the exhibition showcased a wide variety of products, ensuring an engaging and comprehensive experience for both exhibitors and visitors.


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SHOES & LEATHER 2025
VIETNAM

CONCURRENT EVENTS

INTERNATIONAL FOOTWEAR DESIGN COMPETITION (IFDC)

The 14th International Footwear Design Competition (IFDC), organized by the Confederation of International Footwear Conference (CIFA), sponsored and co- organized by Top Repute Co. Ltd., continued its mission of fostering innovation and collaboration in the footwear industry. Since its inception in 2008, the competition has showcased multinational designers' creative concepts while providing young designers with valuable opportunities to connect with manufacturers.

The event emphasized the significance of original product design, high-quality craftsmanship, and brand identity development. This year, it attracted 109 entries from 9 countries and regions, including China, Hong Kong, India, Indonesia, Malaysia, Philippines, Taiwan, Thailand and Vietnam. The winning designs were announced and awarded at the Opening Dinner Banquet, followed by an exhibition display throughout the event.

The competition was judged by a distinguished panel of 10 industry experts, including renowned designers, trend specialists, consultants and association representatives, ensuring a comprehensive evaluation of creativity and technical excellence.

SEMINARS

Industry experts and professionals shared valuable insights through presentations on cutting-edge technological advancements and emerging trends in research and design within the shoes and leather sectors. Their discussions highlighted innovation, sustainability and evolving market demands, providing attendees with a deeper understanding of the industry's future direction.

Themes of Seminars:

"Forum: Global Supply Chains Shift: How Worldwide Respond to U.S. Reciprocal Tariff Policy" by representatives from HDS/L–The Federal Association of the German Footwear and Leather Goods Industry (Germany), Taiwan Footwear Manufacturers Association (Taiwan, China), Council for Leather Exports (India), China Leather

Industry Association (China) and Indonesian Footwear Association - APRISINDO (Indonesia)

- "ZDHC Footwear Engagement Strategy & Work Plan 2025" by Dr. Andy CHEN, ZDHC Footwear Engagement Director

- "How to make your footwear more comfortable and fit?" by Ms. Lily LI, SATRA China Lab Manager and Mr. Hanks LEI,

SATRA China Factory Service Manager

"How Hugo Cross-border Empowers Made-in-China to Upgrade and Go Global" by Mr. Lü Ruochen, YUGUO (Xiamen)

Technology Co., Ltd. Business Director of Hugo Cross-border

"The New Wave of Cross-Border E-Commerce: How SHEIN Drives Brand Globalization" by Daisy, SHEIN Senior Business Development Manager of the Shoe Category Operation Center

"How Amazon Enables Brands and Manufacturers to Go Global" by Emma, Sr.Seller Consultant

"AliExpress's New Fiscal Year Strategy and Merchant Support Policies" by Mr. Zhuang Weizhong - AliExpress Head of Sports Footwear and Apparel Merchant Recruitment

"Competing All Competitors Wisely: How to Create Blockbuster Products in an Overcompetitive Age?" by Mr. Binwen Guo - Founder of Sino West Bridge, an integrated design service platform

DESIGN WALK

DESIGN WALK is a non-profit initiative supported by leading shoe manufacturers, industry federations and international footwear associations. The platform serves as a dynamic space for showcasing fashionable footwear, leather goods and accessories, aiming to inspire creativity and innovation within the industry. By highlighting new design concepts and fresh ideas, DESIGN WALK fosters a positive influence on trends, craftsmanship and brand development.

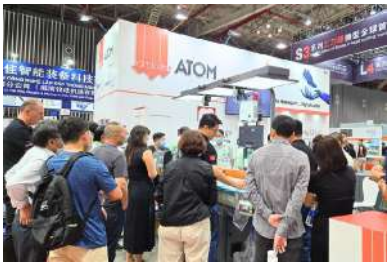
Shoes & Leather Guangzhou 2026 edition will take place from 20-22 May, 2026 at the same venue.

Shoes & Leather-Vietnam incorporating IFLE-Vietnam closed with good results

The 25th International Shoes and Leather Exhibition – Vietnam incorporating the 25th International Footwear & Leather Products Exhibition – Vietnam held at the Saigon Exhibition & Convention Center (SECC), Ho Chi Minh City, Vietgnam, from 9-11 July 2025 ended with good results, offering the attendees a comprehensive platform to witness the latest advancements in footwear and leather industry. The twin events, organised in around 20,000 sq mtrs space hosted, 569 exhibitors from 24 countries and regions, such as China (45.3%), followed by Vietnam (24.5%), Taiwan, Italy, India, Hong Kong, Pakistan and others, who showcased the entire supply chain from materials, machinery, and smart technologies to finished footwear, handbags, and suitcases. It provided a key meeting point for professionals across the global leather and footwear landscape.

The 25th International Footwear & Leather Products Exhibition – Vietnam served as a dedicated commercial platform for professional buyers, facilitating direct contact and procurement opportunities for both domestic and international stakeholders focused on finished product transactions. The event fostered dynamic business exchanges and strengthened the global trade ties within the footwear and leather goods market.

The fairs attracted 11,583 professional visitors from 63 countries and regions. Featuring a wide spectrum of innovative products and solutions, the event provided a comprehensive platform for networking, sourcing, and exchanging industry knowledge, reinforcing its role as a cornerstone gathering for the global footwear and leather community.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CONCURRENT EVENT

As part of the fair activities, many seminars were organised on current topics as under:

SEMINARS

Renowned industry experts and seasoned professionals were invited to deliver insightful presentations, shedding light on cutting-edge technological innovations and emerging trends that are shaping the future of the footwear and leather sectors.

Themes of Seminars:

“Fashion Forecast Spring/Summer 2026” by Dr. Claudia Schulz, MODEUROP

“Innovative Applications and Future Prospects of 3D Printing in the Footwear Industry” by Viktor Taan, FUTURESOLE INSTITUTE

"Smart Footwear Manufacturing Technology Forum - Practical Applications of AI x Experience Sharing on 3D Metal Printing Integration"

"SOLVAY: Alve-One®- Sustainable Foaming Solutions" by Mr. Antoine Vielliard, Head of Global Business Development, Bicarbonate & Derivatives

"ZDHC Programme Implementation - Vietnam Specific"

"Comfort – how can this be measured?" by Michael Bodsworth, Executive Director of SATRA "Business Matching" by LEFASO.

The next edition will be held on 8-10 July, 2026 at the same venue.

2024: FOOTWEAR PRODUCTION REBOUNDS, EXPORTS RISE IN VOLUME BUT NOT IN VALUE.

IN 2024, GLOBAL FOOTWEAR PRODUCTION RECOVERED, INCREASING BY 6.9% AND REGAINING THE 1.5 BILLION PAIRS LOST IN 2023. FOOT WEAR EXPORTS ALSO IMPROVED IN VOLUME, RISING BY 4.6% COMPARED TO THE PREVIOUS YEAR. HOWEVER, THE TOTAL EXPORT VALUE REMAINED NEARLY FLAT, GROWING BY JUST 0.1%

In 2024, footwear production and exports increased by 6.9% and 4.6%, respectively, according to data published in the World Footwear Yearbook 2025, recently released by APICCAPS, the Portuguese Footwear Association. Global footwear production rose to 23.9 billion pairs, increasing 1.5 billion pairs and recovering from a similar decline in 2023. This recovery was driven by stronger consumption in key markets such as the United States (+168 million pairs), China (+469 million pairs), and the European Union (+121 million pairs). Last year, 14.8 billion pairs were exported worldwide, marking a 4.6% increase compared to the previous period. Although the total value of exports remained nearly flat at $170 billion in 2024, this still represented the second-highest level on record.

GLOBAL FOOTWEAR PRODUCTION REBOUNDS

In 2024, global footwear production rose by 6.9% to 23.9 billion pairs, recovering from the decline in the previous year - the lowest point in a decade, excluding the pandemic years of 2020 and 2021.

The footwear industry remains heavily concentrated in Asia, where nearly 9 out of every 10 pairs of shoes are manufactured, accounting for 88% of global production.

China continues to lead as the world's largest footwear producer, manufacturing 13 billion pairs in 2024 and holding just over 54% of the global market share. India further increased its share, now accounting for 12.5% of global production. Vietnam ranks third, with a 6.5% share.

GRADUAL GROWTH IN ASIAN FOOTWEAR CONSUMPTION ENDURES

In 2024, Asia's footwear consumption accounted for more than half of the global total (55.5%), reflecting an increase over the previous year. North America and Europe followed, with shares of 13.6% and 13.5%, respectively.

Per capita footwear consumption varies significantly across regions - from just 1.4 pairs in Africa to 4.8 pairs in North America.

China remains the world's leading consumer of footwear, having strengthened its share to 18.6% of global consumption. India follows with 13.3%, while the United States maintains its position in third place with a stable share of 9.8%.

The European Union, considered as a single region, ranks fourth, with 2 069 million pairs consumed in 2024.

GLOBAL FOOTWEAR EXPORTS INCREASE IN 2024; CHINA CONTINUES TO LOSE SHARE

In 2024, global footwear exports increased by 4.6% in volume compared to the previous year, signalling a steady recovery in international trade. Asia remained the dominant player, accounting

for 85.1% of total exports - slightly above the 84.5% share recorded a decade earlier.

Between 2015 and 2024, global footwear exports grew modestly in volume - up by 1.2% - but surged by 31.4% in value, rising from $129.2 billion to nearly $170 billion.

Asian countries consolidated their dominance in the global footwear trade, with their collective share increasing from 84.6% in 2023 to 85.1% in 2024. Conversely, Europe's share declined slightly to 12.6%.

China remains the leading exporter, accounting for 62.2% of total exports, although its share continues to decline (down from 63.8% in 2023). Vietnam ranks a distant second with 10.7%, followed by Indonesia at 4.1%. Together, these three countries account for more than three-quarters of global footwear exports.

AFTER A DECADE OF STEADY GROWTH, THE AVERAGE EXPORT PRICE OF FOOTWEAR DIPPED TO $11.47

Over the past decade, the average export price of footwear rose significantly - from $8.83 per pair in 2015 to a peak of $11.98 in 2023 - marking a 36% increase. This upward trend reflected rising production costs, a shift toward higher-value products, and inflationary pressures across global supply chains.

However, in 2024, this trend saw its first notable reversal, with the average price dipping to $11.47. This decline may indicate an adjustment in product mix or pricing strategies following two years of sharp value growth.

WORLD FOOTWEAR

APICCAPS, the Portuguese Footwear Association, has now

published the 15th edition of its World Footwear Yearbook, launched in 2011. The Yearbook analyses the most important trends within the worldwide footwear industry. The availability of data for 2024, both in quantity and value, makes it possible to position the main players with regard to production, consumption, exports, and imports. This publication also includes a specific analysis of 84 different markets, as well as addressing the evolution of the sector's leading global players.

The World Footwear Yearbook 2025 is now on sale from

www. worldfootwear.com at 200€ (electronic format) and 250€ (electronic format + hard copy).

EU footwear industry may gain from Trump's tariffs

Countries such as Portugal and Spain could benefit from Trump's latest tariff policies, as the EU is the least penalised region, with tariffs of only 15%, which do not accumulate with historical tariffs

Following President Trump's latest executive order introducing new customs tariffs on all products shipped to the US after the 7th of August, **figures show that the European Union is the region of origin that will be penalised the least**.

Almost all countries will see their exports subject to additional tariffs of between 10% and 30%, on top of the usual tariff. However, the executive order provides a **specific exception for the European Union**: the 15% tariff does not accumulate with historical tariffs.

Only products with tariffs below 15% will be adjusted, **with only the difference being applied**. "For a European Union product with a tariff below 15%, the sum of the current tariff and the new ad valorem rate will be 15%. For products with a tariff equal to or above 15%, no additional tariff will be applied".

For example, a **man leather shoe made in Portugal** and previously subject to a tariff of 8.5% will now be subject to an additional tariff of 6.5%, bringing the total tariff to 15%. Conversely, **sneakers with an existing tariff of 20%** will continue to be taxed at that rate, as it exceeds 15%.

However, **tariffs will be applied differently to other markets**. Footwear exports from some of the main producing countries, including Vietnam, Indonesia, Cambodia, Pakistan, Bangladesh and India, will be subject to additional tariffs of between 19% and 25%. In other words, **the new tariffs will be added to the existing tariffs**:

India: 25%; Vietnam and Bangladesh: 20%; Indonesia, Cambodia and Pakistan: 19%.

Thus, **a pair of shoes exported from Vietnam**, which currently has a tariff of 13.3%, **will incur an additional tariff of 20%**, totalling 28%.

Brazil faces the most severe case, with a base tariff of 10% plus an additional penalty of 40% under the International Emergency Economic Powers Act (IEEPA), totalling a rate of 50%, which must still be added to the historical tariff.

Main Footwear Producing Countries

According to the World Footwear 2025 Yearbook, **China remains the industry leader**, producing over half of the world's footwear (a world share of 54.3%).

India and Vietnam have solidified their positions as the second and third largest producers (with world shares of 12.5% and 6.5% respectively), with **Brazil ranking fourth** and standing out as the highest-placed non-Asian country on the list (with a world share of 3.9%).

It is followed by **Indonesia** (world share: 2.1%), **Pakistan** (world share: 2.6%), **Bangladesh** (world share: 2.1%), **Türkiye** (world share: 1.9%), **Cambodia** (world share: 0.9%) and **Mexico** (world share: 0.9%).

ASSOCALZATURIFICI

ITALIAN FOOTWEAR MANUFACTURER'S ASSOCIATION

ASSOCALZATURIFICI CELEBRATES 80 YEARS OF EXCELLENCE AND LAUNCHES THE 100TH EDITION OF MICAM

The year 2025 marks a milestone for the Italian footwear industry, celebrating three symbolic achievements: the 40th anniversary of CIMAC - the laboratory for testing and CE certification of PPE, which continues to grow with a client base composed 90% of non-member companies, confirming its authority in the sector; the 80th anniversary of Assocalzaturifici; and the 100th edition of MICAM - the leading global event for fashionable, high-quality, innovative, and sustainable footwear, scheduled to take place from September 7 to 9 at fieramilano RHO.

During the celebrations for the Association's 80th anniversary, President Giovanna Ceolini reflected on her first year in office, highlighting the actions taken to protect and promote the sector in a complex economic and geopolitical context.

“In these 80 years, our companies have faced challenges with courage and determination. Our value lies in our people: it is thanks to them that Made in Italy continues to tell stories of beauty, tradition, and innovation,” said the President.

Her first year leading the Association has been marked by significant efforts to address the industry's challenges, especially regarding the issue of tax **credits for research and development.** Assocalzaturifici, through Confindustria Accessori Moda – the new federation uniting the main segments of the leather supply chain (footwear, leather goods, furs, and tanneries) – has given voice to

the sector, advocating for the legitimacy of the investments made by companies.

“This is not just about numbers, but about the survival of hundreds of businesses. We strongly demanded recognition of the credits, denouncing the effects of a retroactive interpretation that risked penalizing those who invested in innovation.”

Among the achievements:

- Approval of the amendment extending income support to companies with fewer than 15 employees, with a total funding increase to **€73.6 million.**
- Signing of a **Memorandum of Understanding** with Minister Tajani to promote Made in Italy and combat counterfeiting.
- Participation in the **parliamentary hearing on DL 25**, presenting concrete proposals on tax credits, moratoriums, and support for trade fair participation.

The founding of **Confindustria Accessori Moda,** led by President Ceolini, has strengthened representation of the leather supply chain, which now includes:

- **10,000 companies**
- **140,000 employees**
- **€30 billion in turnover**
- **€25.1 billion in exports**
- **€13.6 billion in positive trade balance**

Significant attention has also been devoted to **managerial training** and business support on key regulatory and strategic issues:

- Digital Export Academy (in collaboration with ICE)

- Seminars on export, international sanctions, green incentives, emerging markets, and digitalization

Sustainable transition is another core focus: Assocalzaturifici has worked to reposition the **VCS – Verified and Certified Steps project,** launching the **passonetwork.com** website and creating an advisory board involving major brands and member companies.

In September, **MICAM will celebrate its 100th edition**. A historic milestone for the world's leading exhibition of high-quality footwear, which will relaunch with renewed focus on creativity, innovation, and the value of Made in Italy.

Under the leadership of new General Manager **Giorgio Possagno**, a **three- year industrial plan** has been launched to strengthen the international positioning of the fair and open up new business and communication opportunities.

"This first year has taught me that together we are stronger. Every achievement is the result of joint efforts with the companies and my Presidential team," concluded the President, thanking her team and the entire membership base.

General Manager Giorgio Possagno also shared key results and strategic directions from the past year, during his first official participation in the private General Assembly of Assocalzaturifici, emphasizing the importance of a shared, participatory vision to reinforce the Association's role.

Since his appointment in September 2024, the Director has led extensive engagement and coordination efforts across all levels of the Association and administration.

His approach focused on actively listening to members, stakeholders, and institutional players to identify the strategic levers for development.

"We have aimed to reduce the gap between districts, strengthening dialogue with Confindustria Roma, its local offices, and central

institutions, with special attention to Ministries and Regions involved in internationalization projects," added Possagno.

One of the most significant initiatives has been the **strategic repositioning plan for MICAM**, developed through **direct interviews** with exhibitors and companies. This process helped redefine priorities and operational methods, with the goal of enhancing the exhibition's identity and reinforcing its global position.

Simultaneously, an **internal reorganization** process was launched to enhance team competencies and ensure the sustainability and innovation of the fair's offerings.

The **communication** area was also revamped, selecting specialized partners for creative direction, social media, and advertising.

Key priorities identified include:

- Digitalization and operational speed
- New communication strategies
- Strengthening supply chains and selecting quality suppliers
- Support for training and collaboration with specialized schools

"Sharing strategic goals and seeking broad consensus are essential elements for building a unified and lasting vision," continued Possagno. "I thank the President for her trust, the members of the Presidential Council for their energy in tackling every challenge, and the entire ANCI team for their enthusiasm and cooperation that made this journey possible."

On the occasion of **Assocalzaturifici's 80th anniversary,** Possagno concluded by stressing the importance of continuing to **"aim higher, together"** with a forward-looking perspective rooted in determination and teamwork.

9th India International Footwear Fair (IIFF) 2025 highlights export potential of India's footwear industry

The 9th edition of the India International Footwear Fair (IIFF) organised by the India Trade Promotion Organisation (ITPO), in collaboration with the Confederation of Indian Footwear Industry, was held in Bharat Mandapam, New Delhi, from 6th to 8th August, 2025. The event was supported by the Indian Footwear Components Manufacturers'Association (IFCOMA) and Footwear Design & Development Institute (FDDI). India's export prowess in the leather, non-leather and allied industries was featured in the Fair, where over 200 leading companies from India and countries like, Japan and Taiwan presented their latest fashion trends and innovative designs in Footwear & Machinery, Shoe components, synthetic materials such as PVC/PU, EVA, Fabric soles, chemicals & adhesives, leather products, accessories etc.

India is the Second largest footwear producer after China, with annual production of 2.60 billion pairs accounting for 13 per cent of global footwear production of 16 billion pairs. The fair featured a uniqueness of a MSME- intensive Indian shoe industry due to its blend of traditional craftsmanship and modern technology, its significant contribution to global and local economics, and its continuous evolution with trends like sustainability and smart. IIFF 2025 manifested growing consumer awareness which is driving the adoption of sustainable material likes recycled plastics, organic cotton, and vegan leather. Adopting the emerging technologies such as AI and 3D printing, the industry has been catalyzed with interface of e-commerce sector.

The growth and promotion of this industry is an important agenda of the Center/State Governments and accordingly to attract investments, the Government has permitted 100% Foreign Direct Investment in the footwear sector.

IIFF 2025 concluded with a good turnout of business visitors and positive results.

100th MICAM MILANO- International Footwear Fair (Fieramilano Rho, 7-9 September 2025)

MICAM, the world's leading event for fashionable, high-quality, innovative, and sustainable footwear, celebrates 50 years of history with its 100th edition. This event will feature a special exhibition dedicated to its remarkable journey.

MICAM, has become a true point of reference - not only for small and medium-sized Italian companies, which represent the economic and productive backbone of Europe, but also for international brands.

This represents the story of Italian excellence, founded on a unique blend of craftsmanship and authentic passion, driven by constant innovation and an ongoing search for style and trends .Many milestones have marked its path to success. Although its origins trace back to 1931 in Vigevano, the cradle of Italian footwear, it was in 1974 that the event underwent a strategic transformation, when A.N.C.I. – the Italian National Association of Footwear Manufacturers - took over its management and strengthened it over the following years

With the turn of the new millennium, Milan became its permanent home, opening the way to greater international expansion. In 2017, the project grew further with the addition of spaces dedicated to events, education, entertainment, seminars, and special areas. Digitalisation was embraced, and the concept of a marketplace was introduced to offer visitors a memorable experience. Another key milestone came in 2018 with the rebranding of MICAM Milano.

Thanks to an exhibition featuring 1,000 brands from all over the world, the event has become a crossroads of cultures, creativity, and visions, attracting buyers from over 150 countries.

Here, the potential of innovation and technology is explored for both manufacturers and retailers, alongside sustainability and education as key drivers to inspire and guide future generations.

MICAM 100, chaired by Giovanna Ceolini, will be inaugurated in the presence of Minister Urso with the official cancellation of a postage stamp from the thematic series "Excellences of the Production System and Made in Italy", in front of the press and institutional representatives.

The fair will shine a spotlight on the Spring-Summer 2026 collections from top international companies and iconic brands from Italy's manufacturing districts - those who make **Made in Italy** great across the globe.

It will unfold across a packed schedule of events, seminars, and a special exhibition titled **"100 Steps into the Future,"** offering visitors the opportunity to immerse themselves in the history of MICAM and five decades of footwear fashion.

This engaging journey will trace the evolution of taste, style, and technology through iconic images. For each decade, enthusiasts will discover two symbolic shoe models: one lifestyle shoe, expressing everyday trends, and one technical- sports shoe, showcasing innovation and performance.

Returning features include the Trends & Materials area, tied to the Buyer Guide, and the Future of Retail space, which highlights innovative concepts set to transform retail, with companies offering advanced solutions for the footwear sector.

The program will also feature fashion shows, emerging designers, and trend presentations, shining a light on the dynamic and ever-evolving identity of the industry.

MICAM X evolves into MICAM Next: a brand-new format curated by Wired, with a rich seminar schedule entirely focused on innovation. Topics will include:

"**E-commerce, new tech: Omnichannel strategies for footwear"**
"Shoe design: between genius and customization"
"At the feet of AI"
"Sport shoes, tech shoes"

Lastly, 2025 is also a special year for Assocalzaturifici, the national association representing 500 footwear companies, as it celebrates its 80th anniversary - eight decades dedicated to promoting Italian footwear excellence worldwide.

A double milestone that makes this 100th edition of MICAM even more extraordinary and ready to step into a new century.

www.micam.it

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mipel 128.

128th MIPEL-International Leather Goods Fair (07-09 September 2025, Fiera Milano- Rho, Milan, Italy

The 128th edition MIPEL the unmissable international event dedicated to leather goods, organised by Aimpes Servizi Srl., will run concurrently with MICAM, from **07-09 September, 2025** in Halls 1, 2 & 3 at Fiera Milano-Rho, Milan, Italy, where creativity meets craftsmanship and innovation.

Over 200 brands from more than 18 countries will showcase their SS 2026 collections of bags and fashion accessories.

As the leading B2B event for the leather industry, MIPEL is the most important platform where trends are revealed, partnerships are built, and the future of style takes shape.

MOMAD - International Fashion, Footwear & Accessories Trade Show (11-13 September, Madrid, Spain).

MOMAD promotes Spanish fashion on a global stage, making it an essential gathering for those looking to stay ahead in the fashion industry

MOMAD, organised by IFMEA MADRID is scheduled to take place from 11 to 13 September, 2025 at IFMEA MADRID, hosting exhibitors from over 19 countries such as, **Germany, Bangladesh, China, Colombia, Denmark, Spain, France, India, Italy, the Netherlands, Pakistan, Paraguay, Portugal, Singapore, Türkiye**, and **Ukraine.** The diversity of this list is evidence of the international appeal of this fair and its ability to **connect trends, design, and business opportunities** primarily between **Europe** and **Latin America**.

Top international companies have already confirmed their participation in this edition of MOMAD. **Latin America** will be prominent at this edition with proposals from various well-known brands. In this regard, companies from Colombia will be represented by entities such as **Artesanías de Colombia**, as well as the official delegation from **Bogotá Fashion Week**, which is participating for the first time with a carefully selected group of up-and-coming designers. The fair is set to attract around 24,000 visitors, including 1,200 exhibitors from various national and international firms, solidifying its status as a crucial event in the fashion calendar.

Once again, **MOMAD will coincide** with **Bisutex**, the International Fashion Jewellery and Fashion Accessories Show (Hall 8), which will help strengthen the synergies between the two fairs and create new business opportunities for exhibitors and trade visitors.

5th BFSHOW-Biggest Footwear Tradeshow in Latin America, Brazil (10-12 Nov 2025)

With exhibitors from all Footwear Local Productive Arrangements (LPA), of all sizes, segments, and niches of activity already confirmed, the show-which is now open for visitor registration at www.bfshow.com.br-will take place **November 10–12,2025** at the Anhembi District in São Paulo/SP. The promotion is by the Brazilian Footwear Industries Association (Abicalçados) and the organization by NürnbergMesse Brasil.

The Executive President of Abicalçados, Haroldo Ferreira, emphasizes that the event takes place at an important moment for the Brazilian footwear sector, given the challenges for maintaining exports to the United States due to the surtax applied to Brazilian products. According to him, in this context, with its buyer program, the trade show is even more focused on bringing international buyers in order to help the industry find alternatives to sell its footwear. “BFSHOW, as the biggest global showcase of Brazilian footwear, has an even more relevant role at this moment, as it presents us, as the largest player in the West, with the production capacity to serve different markets with quality, design, and sustainability,” he explains.

Capillarity

According to the executive, BFSHOW will be the moment to showcase the strength of Brazilian footwear and its capillarity. “The United States is our largest buyer, and we are seeking ways to maintain exports while also needing to explore more destinations,” said Ferreira. For this edition, importers from countries such as **Germany, Bolivia, Canada, Costa Rica, France, Guatemala, Peru, Portugal, Taiwan, and Zambia** have already confirmed their participation, in addition to the United States, which, despite uncertainties, is willing to negotiate and continue sourcing from Brazil.

The CEO of NürnbergMesse Brasil, João Paulo Picolo, emphasizes that BFSHOW will bring new releases from leading Brazilian brands in an excellent environment for hosting buyers from all over Brazil and much of the world.

Another highlight is the synergy of the organizer with the sustainability principles valued by the sector. “The Brazilian footwear industry is the most sustainable in the world in this segment, and NürnbergMesse Brasil is aligned with this fact.

For more details: www.bfshow.com.br

162nd ILM - International Leather Goods Trade Fair, Offenbach Germany (30 August - 1st September)

ILM #162: International, efficient and trendsetting!

From 30 August to 1 September, Offenbach am Main will once again be in the focus of the international bags, luggage and fashion industry: For the second time this year, the International Leather Goods Trade Fair ILM will be opening its doors for trade visitors, designers, purchasers and media representatives from around the globe. Fashionable bags and accessories will again form the core of the trade fair at this, its 162nd edition. But the Offenbach fair will also be affirming its unique position on the market in the flourishing suitcases and travel baggage segment and in the school products segment. Going beyond finished products, the presentation of new technologies and sustainable material innovations is set to provide new impetus. An extensive supporting programme with talks and panel discussions will cater for the broader view.

MORE THAN 290 BRANDS from 27 countries will be presenting their new collections for the Spring/Summer season 2026 in Offenbach. Besides established brands, young, emerging labels and manufacturers will also be showcasing their products. The interest shown in the fair remains at a constant high amongst exhibitors and visitors alike. “ILM is a stable and dependable feature in the trade fair landscape. It offers the opportunity to experience fresh designs and handicraft quality directly and to establish new contacts. Our longstanding, well- known exhibitors appreciate this, of course, but new brands from at home and abroad are also discovering the fair for themselves,” Arnd Hinrich Kappe, Managing Director of Messe Offenbach, reports. Returning exhibitors such as the French luggage brand Delsey Paris, Dakine, Paul Marius and Fritzi aus Preußen will be flying the flag in Offenbach, as will the newcomers Polestream, Harley Davidson and Sterntaler.

ILM IS A MUST-ATTEND. “Retailers from all over the world get together at ILM to discover trends, innovations and classics – and, very importantly, to place their orders in a pleasant working atmosphere. Our trade fair has evolved into the world’s most important platform for high-class bags, accessories and leather products,” Kappe observes. “Not only classic retailers of leather goods, but more and more shoe and textile retailers and concept stores too are now using ILM as an order platform.”

FUTURE FOCUS. The leather goods fair also consciously addresses the next generation and is delighted at the continuing cooperation with the Accessories Design degree course at Pforzheim University. With her exhibition “GROW – The Future of Leather Goods”, curator Melina Bucher will be presenting a wide range of bio-based, plastic-free materials and encouraging discussion of sustainability in the leather industry.

In addition, many exhibitors will be displaying products made of eco-friendly tanned leathers and vegan alternatives as well as recycling and upcycling designs. Functionality and innovation likewise play a decisive role at ILM: Bags and luggage with integrated charging functions, modular elements or smart closure systems demonstrate how forward-looking the industry is in responding to changed consumer needs.

FORUM FOR INSPIRATION AND EXCHANGE. As usual, ILM will be accompanied by a varied supporting programme with expert talks, networking events and fashion forecasts promoting practical exchange between trade and industry.

The forthcoming edition is no exception, and the much-loved afterwork parties will once again be taking place in the exhibition foyer on Saturday and Sunday evening,” Arnd Hinrich Kappe promises.

Leather Auxiliaries – A Review PART – II

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(Contd. from July issue)

18. Certifications –Trumpler[18]

WE ARE A MEMBER OR PARTNER OF THE FOLLOWING ASSOCIATIONS, INSTITUTES AND WORKING GROUPS. Shaping the future together.

Together we are committed to the sustainable growth of the entire leather industry through a variety of association activities, memberships and individual support of selected institutions. The laws and guidelines developed by these relationships guarantee a substantial improvement in leather production, the environment as well as leather quality and testing standards.

Our technicians support customers and partners through specially designed workshops, the joint exchange of experiences and the sharing of resources in order to maintain a continuous learning curve and initiate the development of new processes and technologies. In this way, new trends and requirements within the industry are also developed and implemented.

We continue to support the training of future generations with scholarships, special support and exchange programs with several educational institutions, as well as our in-house training programs.

TRUMPLER - MEMBER OR PARTNER OF THE FOLLOWING ASSOCIATIONS, INSTITUTES AND WORKING GROUPS FIGURE -18 A

Reference : 18. & Figure 18 A. TRUMPLER GmbH & Co. KG info@trumpler. es

19. DyStar – Collaborations & Memberships

Reference : Integrated Sustainability Report 2020-2021 DyStar

19. 1 Industry Organisations Figure – 19 A

Industry Organizations

- Asia Dyestuff Industry Federation (ADIF)
- American Association of Textile Chemists and Colorists (AATCC)
- Associação Brasileira das Indústrias Químicas (ABIQUIM), Brazilian Chemical Industry Association
- The Association of Thai Textile Bleaching Dyeing Printing and Finishing Industries (ATDP)
- Basic Chemicals, Cosmetic & Dyes Export Promotion Council, India (CHEMEXCIL)
- China Dyestuff Industry Association (CDIA)
- Disaster Prevention & Management Center (DPMC), Ankleshwar
- German Chemicals Industry Association (VCI)
- Gujarat Dyestuffs Manufacturers Association (GDMA)
- Japan Dyestuff & Industrial Chemical Association (JDICA)
- Society of Dyers and Colourists, United Kingdom (SDC)
- Society of Leather Technologists and Chemists (SLTC)
- South African Dyers & Finishers Association (SADFA)
- Sindicato das Indústrias de Produtos Químicos (SINPROQUIM), Brazilian Chemical Industry Association
- Taiwan Dyestuffs & Pigments Industrial Association
- Association of Manufacturers of Process and Performance Chemicals (TEGEWA)

19. 2 Business Associations Figure – 19 B

19. 3Other Standards and Organisations Figure – 19 C

Reference : Figure – 19 A & 19 B & 19 C. Integrated Sustainability Report 2020-2021 DyStar www. dystar. com

20. Greenwashing[20]

Greenwashing is a marketing technique aimed at creating an illusion of ecological responsibility. Green communication doesn't always mean that the company is environmentally responsible. This is why the concept of greenwashing is frequently used by NGOs to denounce companies that claim environmental concerns while their activities and practices prove otherwise. What is greenwashing, what are the main examples of greenwashing by companies and how to spot greenwashing practices?

What is greenwashing? Greenwashing is designed “to make people believe that your company is doing more to protect the environment than it really is.” - Cambridge Dictionary

Greenwashing is the practice of marketing a company or organisation so they appear more environmentally friendly or more ecological (more natural, healthier, free of chemicals, recyclable, less wasteful of natural resources...) when in practice its activities pollute the environment. Greenwashing is therefore considered abusive or misleading because the company improperly positions itself as more green than it actually is.

20. 1 Greenwashing From Wikipedia[20. 1]

Greenwashing (a compound word modelled on "whitewash"), also called "green sheen", is a form of marketing spin in which green PR and green marketing are deceptively used to persuade the public that an organization's products, aims and policies are environmentally friendly.

Critics of the practice suggest the rise of greenwashing, paired with ineffective regulation, contributes to consumer scepticism of all green claims, and diminishes the power of the consumer to drive companies toward greener manufacturing processes and business operations. Many corporations use greenwashing to improve public perception of their brands. Complex corporate structures can further obscure the big picture.

Without external monitoring and verification, greenwashing strategies amount to corporate posturing and deception. When a company decides to behave responsibly and adopts a sustainable development vision, it may have to change its corporate culture deeply, in order to understand and appropriate the concept. It is not enough to integrate sustainable development into communication to persuade the consumer to buy.

While greenwashing is not new, it has increased in recent years to meet consumer demand for environmentally-friendly goods and services. This problem is compounded by lax enforcement by regulatory agencies such as

the Federal Trade Commission in the United States, the Competition Bureau in Canada, and the Committee of Advertising Practice and the Broadcast Committee of Advertising Practice in the United Kingdom. New regulations and laws mean to discourage companies from using greenwashing to deceive consumers.

21. Licence to Greenwash[21]

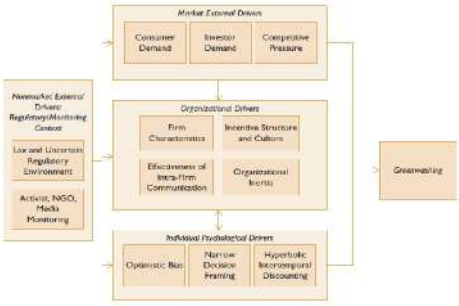
Certification schemes, labels and industry initiatives aimed at steering a greener course for the fashion industry are actually acting as a smokescreen for fashion's continued heavy toll on the planet, according to a new report.

Licence to Greenwash by the Changing Markets Foundation analysed 10 certification labels and industry initiatives used by fashion brands to assess or measure their sustainability, and investigated whether these schemes are fit for purpose in addressing the harms of the modern fashion industry.

The report scrutinised schemes such as the Ellen MacArthur Foundation, The Textile Exchange, WRAP (Waste & Resources Action Programme), Cradle2Cradle and The Higg Index by the Sustainable Apparel Coalition (SAC).

The fashion industry can no longer be left to regulate itself. If we are ever going to see a true systemic shift, regulation and policy must hold brands accountable for their devastating contribution to the global climate, ecological and social crisis and their continued use of fossil fuels. Without this, the industry can never claim to be truly sustainable. [21]

22. Drivers of Greenwashing Figure - 22



Reference : Figure – 22. The Drivers of Greenwashing. Magali A. DelmasVanessa Cuerel Burbano. UNIVERSITY OF CALIFORNIA, BERKELEY VOL. 54, NO. 1 FALL 2011 CMR. BERKELEY. EDU

23. Licence to Greenwash[23]

The fashion sector is awash with certification schemes, sustainability labels and multi-stakeholder initiatives all seeking to steer the industry onto a greener course. As public and political awareness of the high environmental and social toll of the fashion industry has climbed the agenda, and scrutiny on brands has intensified, so has the visibility of certification schemes and voluntary initiatives pitched as holding the solutions.

The existence of such schemes serves a dual purpose for the brands. As the fashion industry is one of the least regulated sectors in the world, these schemes partially exist as a genuine attempt to move towards sustainability in the absence of environmental legislation. But they also enable the proliferation of 'greenwashing' on a remarkable scale. Whether it is the use of certification labels on individual products – assuring customers that they can shop guilt free by putting their money where their values lie – or brands proudly communicating their membership of various fashion-related voluntary initiatives, the existence of these schemes and the inherent lack of accountability within them are a key part of the greenwashing machinery of the modern fashion industry.

Moreover, the level of influence exercised by fashion brands in these initiatives and the lack of any independent oversight, inevitably means that they end up promoting industry interests.

Reading the progress or sustainability reports of the majority of initiatives and brands alone would have you believe that we are just one label or initiative away from the total transformation of the fashion industry into a dreamscape of circularity and eco-design. Yet, beyond the greenwash, the unsustainable trajectory of the modern fashion industry is alarming.

Of more than 100 sustainability certification schemes in use in the textile industry and listed in the Ecolabel

Index, this report by the Changing Markets Foundation provides a qualitative analysis of the best-knowninitiatives, with a focus on those that claim to address issues of circularity, overproduction and the rise of fast fashion, end-of-life management and the elimination of toxic chemicals from production or manufacturing.

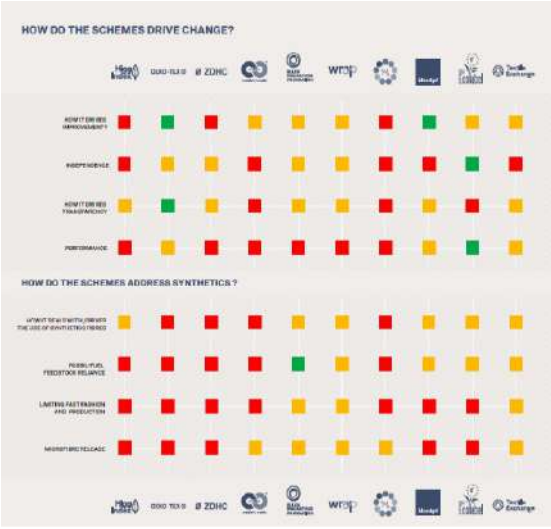
Of the ten initiatives analysed, several are certification labels (**bluesign®**, **Cradle to Cradle** (C2C), **EU Ecolabel**, **OEKO-TEX®** and **Textile Exchange's Global Recycled Standard** and **Recycled Claim Standard**), others are multi-stakeholder initiatives (the **Ellen MacArthur Foundation** (EMF), **The Microfibre Consortium** (TMC) and **ZDHC**) and others provide a

set of self-assessment tools (the **Higg Index** and **WRAP**) for the industry to measure their sustainability.

What these schemes have in common are that they are all voluntary and enjoy high levels of industry buy-in and cross promotion.

23. 1Certification Labels - Sustainability Certification Schemes Figure – 23 A

23. 2 Summary of schemes' assessment. HOW DO THE SCHEMES DRIVE CHANGE? HOW DO THE SCHEMES ADDRESS SYNTHETICS ?



COLOURING CRITERIA:

GREEN - addressed through quantitative measures; ORANGE - addressed through ambitions, recommendations, reports, or not yet implemented measures;RED - not addressed in any meaningful way, NO COLOUR: not applicable/unknown.

Reference : 23. & Figure 23 A & 23 B. Licence to Greenwash by Changing Markets Foundation

24. Innovation

Innovation is essential for business survival in highly competitive markets where it is increasingly difficult to differentiate products and services.

Innovation is defined simply as a "new idea, device, or method. However, innovation is often also viewed as the application of better solutions that meet new requirements, unarticulated needs, or existing market needs. This is accomplished through more-effective products, processes, services, technologies, or business models that are readily available to markets, governments and society

Introducing innovation can help you to improve productivity, reduce costs, be more competitive, build the value of your brand, establish new partnerships and relationships, increase turnover and improve profitability. Why Innovation is Important – Reasons are Growth, Stand Out. Meet the Needs of Customers.

24. 1 Innovation Trends [24]

Innovation Trends Table -24 A
Three powerful innovation trends that will impact the industry in the coming years are
1. Digitization of products, their design, manufacturing, distribution and retail processes, consumer/end-user interaction, factories, workplaces and supply chains.
2. Sustainability, circularity and resource efficiency of materials, processes and overall business operations; this trend requires transparent supply chains meeting the environmental, health and social legislation standards.
3. New business and consumption models based on the sharing of productive resources and final products, servitisation, pay-per-use or subscription models, all moving us towards collaborative or sharing economy.

Reference : 24. & Table - 24 A CIRCULAR ECONOMY - CHALLENGES FOR THE TEXTILE AND CLOTHING INDUSTRY Małgorzata Koszewska Lodz University of Technology, Faculty of Management and Production Engineering, Department of Production Management and Logistics, Wolczanska 215, 90-924 Lodz, Poland malgorzata. koszewska@p. lodz. pl

24. 2 Innovations in Strategy

Strategies - Leading players in the global industry including Leather Industry, have adopted various strategies to achieve additional market share. Key strategies adopted by these players include product launch, joint venture, acquisition, partnership, expansion, and investment.

24. 3Challenges encountered by Leather Industry

Challenges encountered by Leather Industry
• Leather Alternatives – Synthetic Leather & Lesser extent from Recycled Leather, Bio Leather & Bio Fabricated Leather. Harmonious Living of Global Leather Industry
• Environmental and economic issues – Responsible Manufacturing
• Social pressures – Traceability
• Technological changes – Safe Products & Processes
• Challenges to nations with natural abundance of raw materials:
• Factors driving the future of global leather sector
• Macro changes impacting leather sector
• Review of process chemistry and tanning technologies in leather sector: a demand of the hour
• Negative Publicity done about Leather
• Higgs Index & Leather Industry – Leather Industry Calls for Higg Index Review
• What is the future of (chrome) tanning? Leather manufacture in the new millennium.
• Leather Sustainability• Recycling of Leather• Leather 4. 0 and Industry 4.0 to 5.0

25. Innovative Action Plans for reversing the Declining Indian Exports

The root cause analysis of this declining performance and strategy for remedial measures including innovations and action plans in the value chain are the need of the hour for growth and development.

25. 1 INDIA'S EXPORT OF LEATHER & LEATHER PRODUCTS Value in US$ Mn Table – 25A

INDIA'S EXPORT OF LEATHER & LEATHER PRODUCTS Value in US$ Mn Table – 25 A							
Product	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**
Finished Leather	1329.05	1046.45	888.39	874.24	721.73	524.15	378.23
Leather Footwear	2278.18	2147.98	2128.87	2193.86	2195.47	2081.64	1485.55
Footwear Components	361.29	284.34	298.69	335.24	319.1	261.67	197.59
Leather Garments	604.35	553.11	518.96	518.96	468.48	429.11	295.56
Leather Goods	1452.83	1370.04	1365.22	1365.79	1434.24	1340.56	944.31
Saddlery & Harness	162.7	146.38	155.88	155.97	159.35	151.44	186.18
Non-Leather Footwear	306.44	306.74	296.68	296.91	392.63	281.97	194.16
Total	6494.84	5855.06	5646.79	5740.97	5691	5070.55	3681.58
% Growth	9.37%	-9.85%	-3.56%	1.67%	-0.87%	-10.90%	-27.39%

As per officially notified DGCI&S monthly export data, the export of Leather and Leather products for the period April 2020 – March 2021 touched US $ 3681. 58 Mn as against the performance of US $ 5070. 55 Mn in April 2019 – March 2020, recording a decline of 27. 39%.

The root cause analysis of this declining performance and strategy for remedial measures including innovations and action plans in the value chain are the need of the hour for growth and development.

Reference: 25. & Table – 25A. COUNCIL FOR LEATHER EXPORTS (CLE), Highlights of Product Segments of Indian Leather and Footwear Industry https://leatherindia. org/indian-leather-industry/

25. 2 Some action plans suggested for reversing the Declining Exports are presented below.

Some action plans suggested for Reversing the Declining Exports Table – 25B
• Investing in R&D, Building enough scale and skill development of workers.
• Providing value to the product with good branding and differentiator.
• Effective control and implementing action-based strategies for effluent management, non-tariff barriers, quality specifications and cost of compliance to various standards for growth of the Indian leather industry.
• Productive efforts by Industry, Support by Government and Effective Cooperation by related agencies and organizations.

The global leather industry is in the process of shifting its manufacturing base from developed to developing nations. This provides an opportunity for increased flow of foreign direct investment (FDI) into India.

Reference : Table – 25 B. LEATHER INDUSTRY: PROBLEMS & SOLUTIONS, 3RD August, 2020. Email: sanskritiiasedu@gmail.com

26. Product & Process Innovation

New materials, molecules and technologies and the production of innovative leather families, both in relation to the manufacturing processes used and to the ability of simultaneously satisfying a series of innovation and sustainability needs.

26. 1 Some Potential Innovations in Leather

Some Potential Innovations in Leather Table – 26 A
The following is an almost random selection of some more recent ideas and methods at various stages of research and development.
• Application of ultrasound in chrome tanning and retanning
A combination of wringing and ultrasound in a two-step process (penetration and basification tank) is used to accelerate the chrome tanning process based on the mechanical extrusion formation of the micro-vacuum and ultrasonic cavitation effect.

Some Potential Innovations in Leather Table – 26 A

Similarly, the effect of ultrasound (US) has been investigated in improving the penetration and uptake rate of different syntans (phenolic based, melamin resin, acrylic compound) in leather retanning and compared with magnetic stirring (MS). Favourable influence of pre-sonification of both the substrate (leather) and the syntan solution result in a considerable improvement of the diffusion rate, a shorter processing time and better leather quality.

• Inverse chrome tanning with wet-white pretanning

The proposed process sequence is: bating, washing, white pretanning, sammying, shaving, weighing, re-wetting with acidification with formic acid, retanning (synthetic fatliquor/ dispersing syntan/acrylic resin/mimosa, phenolic syntan, melamine resin/formic acid), fatliquoring (synthetic fatliquor, formic acid), drain, followed by the usual chrome tanning with basification (100% fresh float, 14% chrome powder). The main gains should be chrome emissions limited to one process only and reduced by about 50% plus chrome-free shavings. There is no information about other

pollutants (BOD, COD, salts etc.).

• Collagen modification and nano technologies

Some R&D establishments, in particular in Xian, China, have been searching for ways to depart from using traditional, chemical- based leather making methods. Instead, they are looking into various options for modifying collagen fibers by nano-size emulsions, clay minerals, nano silicon dioxide or nano silver and nano technologies in general.

• A fresh attempt with Fe tannage

One among many attempts in searching for alternatives to the prevailing tanning methods is tanning with Fe2+-gluconic acid compound, apparently still at the laboratory scale.

• Elimination of free formaldehyde with essential oil

The conclusion of one study is that the release of free formalaldehyde from tetrakis (hydroxymethyl) phosphonium (THP) salts and various syntan leather products can be supressed by using

Origanum onites essential oil.

Some Potential Innovations in Leather Table – 26 A

• Bio resistance by application of nanosilver

A combination of the colloidal silver solution (CSS) and poly hydroxiurethanes is used to interact with collagen or keratin from medical leather and sheepskins to induce bio resistance properties against fungi as well as a good antibacterial action.

• The ISO 17075 method for Cr6+ detection

The ISO 17075 method for Cr6+ detection (at pH 8) systematically gives false positive values. Moreover, Solid Phase Extraction (SPE) cartridges absorb about 10% of chromate; thus, the calibration curves should be obtained after filtering each standard with the SPE employed.

• Chromogenic leather

There are already reports on tests with chromogenic leather, i. e. , leather that changes colour in response to optical/thermal changes.

• Biochemical degradation and closed cycle dechroming of chrome shavings

There are new investigations into the scope of combined chemical and enzymatic degradation of chrome shavings and protein extraction. Also, Ethylene Diamine Tetraacetic Acid (EDTA) is used

for dechroming chrome shavings during extended processes involving heating, UV light(photocatalysis), chrome precipitation with NaOH and acidification with sulphuric acid. High chrome removal efficiency and preservation of the collagen triple helix are claimed in these mini-lab scale tests.

• Highly biodegradable leather

A success is claimed in developing an aldehyde based tanning system resulting in leather showing biodegradability four times higher than chrome tanned and two times higher than wet-white based leather. Full disintegration of leather under composting conditions according to ISO 20200:2004 was reportedly achieved within 11-14 days as well as of footwear made of biodegradable components and with uppers and linings of leather tanned by the new system within 21 days.

Some Potential Innovations in Leather Table – 26 A
• Composting A new attempt in composting tannery waste at the industrial scale is underway: dewatered sludge with dry matter content of 20-25%, fleshing and grease residues are mixed with shavings from vegetable tanning, grass and green farm residues. From time to time some quantities of cow and horse dung are added. Composting takes place in two-months cycles in windrows in a roofed area. It is reported that the Cr content is about 1500 mg/kg calculated on dry weight, which is, after mixing with other organics, reduced to about 1000 mg/kg to be used as a nutrient and soil conditioning agent. **• Probiotics** Some biotech products, marketed as fully biodegradable and non-hazardous probiotics, claim to offer a viable alternative to and ability of replacing some conventional chemicals for most leather manufacturing stages. At the moment it does not appear to be widely implemented.
• Application of nanotechnology There is apparently no confirmation of successful industrial scale application of nanotechnology that can strengthen sheep skins to be converted into leather for use in shoes and other products reported in 2014 with the potential of applying the same process with deerskins and cattle hides. **• Ionic Liquids as chemicals for leather processing** Ionic liquids (ILs) such as imidazolium, choline and some others have been found to have both stabilising and destabilising effects on collagen - at the molecular level, thermal and dimensional stability at the interfibrillar level and at the fibre structure level. Their properties can be garnered and fine-tuned for various applications in leather processing. ILs, the greener solvent media, are seen as potential advanced “designer” chemicals for making leather processing cleaner and greener
• Analysis of odour compounds in leather by GC-MS and GC-Olfactometry The volatile compounds in leather are extracted using a solid-phase micro extraction fiber and subsequently identified using a gas chromatography-mass spectrometry (GC-MS) and

Some Potential Innovations in Leather Table – 26 A

gas chromatography olfactometry (GC-O), i. e. , human assessors. More than 20 volatile compounds have been identified by GC-MS, the main among them being hexanal, heptanal, octanal, nonanal, heptanol, octanol, 2-ethoxyethanol, and 2-buthoxyethanol. Aldehyde such as octanal and alcohol such as octanol were characterized by GC-O.

• Bio-based polyurethanes for leather finishing

Until recently, coating technology for the finishing step of the leather process has largely been based on petroleum feedstock chemicals, like ethylene and propylene. Recent advances in biotechnology have made it possible to develop an entirely new class of aqueous polyurethanes. This class of polyurethanes are bio-based, derived from renewable raw materials and reportedly show superior film performance. Certain polyols (bio-based polyols), the main building blocks in making polyurethane

finishes, can be made using different plant oils such as canola(rapeseed), soy, palm or linseed. The bio-content level achieved so far can range from 10-35%.

Reference : Table -26 A. The framework for sustainable leather manufacture, Second edition - Jakov Buljan, Ivan Kral' - 2019 the United Nations Industrial Development Organization

(To be Contd.)

LEATHER: Studies for Information and Self-Training

Richard Daniels

(The author – Richard Daniels – has wide technical experience of leather manufacture, other leather-related practices, within formal education and counterpart training. The third study in the series -Leather: the technology of manufacture - is presently undergoing edit)

Two studies are available for download free of any charge from the website www.indianleathermagazine.com

1] Leather: AN INTRODUCTION (Volume 1 of 3)

This has been created for people who need a better general understanding of what leather is, and for those who need a better understanding of how leather is made.

It describes the versatility of this unique material, its natural origins, how it is manufactured, and why its properties are so comprehensive. It enables comparisons with plastics, laminates and conglomerates of binders/natural materials - as long as their origins, composition and environmental profiles are similarly detailed.

2] Leather: AN OVERVIEW OF MANUFACTURE (Volume 2 of 3)

This second study is for people who wish to become leather technicians, and those who need more than the most basic understanding of leather and its manufacture.

It follows the processes and operations used, and their purposes, for making different leathers from bovine hides, sheep and goat skins.

This is a very comprehensive self-learning package in 10-parts. It has been created for ease-of-study, comprises 30,000 words, and supported by 300 technical images and diagrams. It is designed for use by the individual via smart phone, tablet and computer. However, it can be used for support within more formal training and education.

These studies have been subjected to review by leather making professionals. Also, it has been accredited and recommended by the UNIDO, IULTCS, ALCA and SLTC.

This is about making Leather !

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