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Zealand  
Leather  
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Association

## Decorated medieval leather found in Northern England



A piece of leather thought to date from the medieval period was unearthed during work to replace a high-voltage cable near the centre of the city of York. Toby Kendall of the York Archaeological Trust said the piece of leather, which is decorated with an image of a dragon or another sort of mythical beast with wings, horns, and a tail, was found in waterlogged soil that was disturbed when sewers were installed more than 100 years ago.

From *The York Press*

## Leather Naturally achieves 100 members milestone

After successfully raising over US\$1.5 million to fund a global campaign to promote leather, the Leather Naturally initiative has announced it now has over 100 members.

New members include LASRA, as well as other national leather organisations, leather traders, chemical suppliers, machinery manufacturers and leading tanneries such as Gruppo Mastrotto, Meihua, Tong Hong, Simona and CPL Thailand. Leather Naturally said it has doubled its membership since the start of 2019 and plans further growth through 2020.

"This demonstrates the growing willingness of our industry to work together to promote the benefits of leather," said Egbert Dikkers, Chairman, Leather Naturally. "In a world that is ever-more focussed on the use of recycled and sustainable materials, it is important that we are sending the right messages to support the use of leather.

From *leathernaturally.org*

## Australian farmers could lose US\$22 million

Meat and Livestock Australia (MLA) said that Australian farmers could lose up to AUD3.2 billion (US\$2.32 billion) by 2030 if the livestock sector does not adapt to meet changing consumer attitudes to animal welfare.

An independent economic study is reported to have predicted that Australia's AUD15 billion (US\$10.4 billion) meat and livestock industry could face losses of up to AUD3.8 billion (US\$2.65 billion) by 2030, of which Meat and Livestock Australia (MLA) said that 84% could be attributed to animal welfare concerns. Speaking at the Victorian Farmers Federation meeting held at the end of May in Darnum, Australia, Jacqueline Baptista from the MLA said that the recent farm raids carried out by animal welfare activists have contributed to farmers' growing concern about the safety of themselves, their livestock and the future of their industry.

"We can't change what people choose to eat, whether they choose to eat vegetables, not vegetables, red meat or not red meat — that's someone's individual choice and we completely respect that", said Baptista. "We do actually though, have a problem with activists' activities. Farm raids are obviously a big problem for us", she added. However, Baptista said that the industry needs to acknowledge the fact that these issues will not just disappear. "We've spent decades thinking this threat would go away, or it would change, or it was just some sort of activist left-wing group that would magically disappear and we've dealt with it a couple of different ways," she said, while encouraging farmers to "talk honestly, proudly and transparently" about their businesses with consumers.

Recognising the increasing awareness of ethical issues in animal farming, Baptista said the vegan movement will no doubt continue to grow and that the industry needs to find "the delivery method people want" for their red meat. During her presentation, she gave examples of MLA's collaboration with large catering organisations to keep beef and lamb on menus and teaching organisations, such as mining companies, how to cook cheaper cuts of meat to maintain red meat consumption.

From *ABC*

## **TFL launches blog “Main Reaction”**

The Swiss chemical specialist is launching a blog called “Main Reaction” on tfl.com. The platform aims to spread expert knowledge and opinion in the form of stories, tips and facts around the topics of leather, chemistry, fashion, sustainability and ecology.

TFL has gathered an editorial team of experienced tanners, scientists, market experts as well as fashion and communication specialists, who will provide input on a regular basis. The content is said to be less technical and more suitable to a wider readership. TFL says that in the current difficult climate the industry is facing, it wants to bring leather to the forefront of peoples’ minds and trigger a “main reaction”.

From *ILM*

## **New ISA TanTec tannery in Vietnam**

Leather manufacturing group ISA TanTec has announced that preparatory work at the site for its second tannery in Vietnam is complete and that construction of the new facility can now begin. ISA Tan Tec confirmed that it expects the production project to be complete before the end of 2019.

The site, in Tay Ninh province in the south of Vietnam, close to the business hub of Ho Chi Minh City and to the group’s existing Vietnamese tannery in Binh Duong province, covers 61,500 square-metres. In a first construction phase, ISA TanTec will erect manufacturing facilities, a wastewater treatment plant, a workers’ dormitory, a canteen and parking spaces. This initial construction project will cover 28,500 square-metres, leaving plenty of room for further expansion at the site.

On making the announcement, ISA TanTec’s chief operating officer in Asia, Tiago Horn, said: “The floor layout of the new tannery is set up by following lean principles, based on a study led by Porsche Consulting and ISA. Supervisory Control and Data Acquisition (SCADA) will be implemented from the beginning to collect smart data, which will lay the foundation for an Industry 4.0 approach.”

From *aplif.com*

## **Radiofrequency drying from Cartigliano**

Italian tannery drying equipment maker Cartigliano introduced the latest versions of its radiofrequency, or RF dryers, at the Simac Tanning Tech fair in Milan last February. The latest models follow 30 years of research and development in the technology.

The company has invested €5 million in the development of two new versions for the leather industry, known as RF Crust and RF Finishing. Suitable for all types of hides and skins for all applications, the RF dryers are a more efficient method of drying the leather as they focus their energy output solely on the moisture inside the leather, rather than wasting energy heating up the inside of the drying tunnel or the conveyor. Water contained inside the leather is dielectric, therefore, the RF technology acts on the water molecules by changing their polarity 27 million times a second according to Cartigliano. This transforms the water into steam, which is then driven out of the leather, opening up the interfibrillar spaces, making the leather more open. The final humidity is uniform throughout the leather structure.

Located after vacuum drying for crust leather, the final moisture content in the leather is controlled for the subsequent mechanical steps such as staking and finishing. For finished leather, the RF Finishing drying line operates at low temperatures between 30-35°C to avoid shrinkage (up to 2-5% area yield is lost in drying ovens) or damage to the leather caused by rapid heating of the base or top coats. In other words, no water from the rollercoater or spray finish line is dried inside the tunnel and only a few grams of water inside the leather finish is heated. The leathers themselves remain cool during RF drying.

Cartigliano says there is no loss in area yield and the dried leathers retain good fullness, handle and roundness. For instance, a 15-metre-long drying line will typically have nine metres dedicated for the drying chamber (some lines can be as long as 18m). The RF Drying line can be connected to a manual or automated loading/unloading system.

From *ILM*

## Changing the industry through Kind Leather

In his talk “Kind Leather – A New Approach to Leather Processing”, presented at the 4th ILM Automotive Leather Supply Chain Conference in Europe on May 21 in Munich, Fernando Bellese, Marketing and Sustainability Manager at JBS Couros, introduced the Company’s recently launched eponymous concept and the significant environmental, economic and social gains this innovative process brings about.

### Responsible Sourcing

Bellese continued by giving an overview of JBS’ social and environmental monitoring programme whereby more than 80,000 farms and an area spanning 590,000 km<sup>2</sup> are being monitored using satellite images as well as government data. JBS has also developed clear criteria and indicators that define animal welfare and provides training and guidance to all of its employees. “Animal welfare is a matter of doing good business. If animals are not treated well, you don’t get good beef, you don’t get good prices for the beef, so it’s as clear as that; more so than doing the right thing, treating animals well is good business”, said Bellese. He added that having these clear criteria in place helps inform and drive new projects, as well as facilitate engagement with other industry stakeholders. “Not only are we controlling what we are doing, but we are also promoting best practice,” he said, further detailing the Company’s practices around traceability, with detailed sourcing and production history, product safety and continuous improvement key.

### Eco-Efficiency

“We all know our industry is resource-intensive, so we need to continuously work to be sure that we are becoming more and more efficient as an industry”, said Bellese. In order to avoid waste, a unique shape was developed that is used for leather processing, while the rest of the raw material is being sold to other industries. Key advantages of this method include less trimmings/waste, less chemicals in the process and reduced carbon footprint due to savings in transportation, as well as water and electricity reduction. In addition, Bellese outlined a number of wider economic benefits from this new approach. “If you have a smaller hide, a more standardised shape, you can feed more hides to your machinery, they are lighter, you can move them in a faster way, so you gain productivity, you gain in cutting yield because we are removing the areas that normally have more defects. All those things you are sending to other industries, and you end up with a better-quality leather”, he said. “Because we think this is an important mindset change in the way we process leather, we decided to name it. We call it Kind Leather”, he added.



After a two-year development process, Kind Leather was officially launched in January 2019, with the company working to further develop the concept. JBS says it has already seen significant improvements and savings in the reduction of CO2 emission in the transportation of wet-blue (-65%), water consumption at beamhouse processes (-46%), chemical consumption (wet-blue -42%), power consumption (-20%), as well as in the reduction of chemical consumption in finishing (-28%), and of trimmings considering the whole production chain (- 51%). "It's more profit, it's better business", concluded Bellese.

From *ILM*

## Cold and smooth leather milling



In the 2018 edition of Simac Tanning Tech, Italy based tannery equipment maker Erretre presented to the market its Cold Milling technology, an innovation that keeps the leather cooler and the air humidity optimal, using patented technology allowing the production of very tight-grained articles. The technology was once again promoted at the fair in Milan this year.

Many leather applications currently require soft, tight-grained leathers, especially from organic tannages. As many of these tannages are particularly heat sensitive, the control capabilities in most leather machinery needs to be improved, milling is no exception. Cold Milling is now available on all Erretre drums, from lab scale to large production.

The temperature and humidity are carefully controlled, as not to affect the sensitive leathers. It has many other crust and finishing benefits as a result of several technological breakthroughs. Black Line and Cold Milling drums are equipped with new innovative user-friendly touch screen controls.

From *ILM*

## How bootmakers are leading the way to sustainability



Sustainability has become an increasingly important conversation within the footwear and fashion industries, as environmentalists continue to sound the alarm about the human impact on the planet. For rainboot makers, the need for action is particularly important because the materials they use have a particularly long shelf life: According to estimates from the Mote Marine Lab in Sarasota, Fla., a rubber shoe heel takes 50 to 80 years to decompose in nature, and items made from plastic, such as drink bottles, can take as many 450 years to degrade

### **Jose Pinto, CEO of Lemon Jelly**

“As an injection company, we realized our electrical energy footprint was five times that of a normal shoe company, so one important measure we took was to install more than 900 solar panels on our rooftop, followed by a contract with an electric energy company guaranteeing that we are purchasing electricity only from renewable sources. We also realized that there is a considerable amount of waste [in our production]. So we decided to launch our Wasteless Act range: shoes made from our production scraps, which allowed us to make a shoe with incredibly low CO2 emissions. Our commitment is to reach 0% waste in our factories by 2022.”

### **Alasdhair Willis, Creative director, Hunter Boots**

“Sourcing sustainable materials is a priority for Hunter across our product offer. The boots produced in collaboration with Stella McCartney, available from September, have been an important step forward. They are crafted from a natural rubber procured from certified sustainable forests and Yulex, a plant-based neoprene that generates 80% less climate-altering carbon dioxide. End-of-product life cycle is also incredibly important. This summer, Hunter will introduce an in-store and online recycling service. In partnership with First Mile, customers in the U.K. can drop off their old Hunter boots at our Regent Street flagship.”

**Dustin Combs, President of Bogs Footwear**

"Sustainability is a priority throughout our supply chain. Our rubber factories have long minimized waste by using as much as 40% postindustrial recycled material. Plus we use water-based adhesives and are transitioning to Bloom plant-based foam, from EVA. Also, this fall, select styles are launching with Yulex, a plant-based natural rubber that is FSC-certified and sustainably sourced. And our boxes are all transitioning to a 'ship in own container' construction that helps minimize packaging."

**Ilse Jacobsen, Designer**

"We are in the process of updating our code of conduct to meet the new standards [from the United Nations and the Organisation for Economic Cooperation & Development]. Keeping up to date on sustainable developments within materials and manufacturing is a part of our business strategy. We cooperate with high-quality suppliers for fabrics, trims and fabrication. We make our rubber boots out of single-estate 100% natural rubber from sustainable harvests. It is mixed with our own secret recipe, making the fundamental composition 80% natural rubber and 20% secret recipe. Entirely PVC-free, our boots contain no animal byproducts."

**Joe BichaiVP of manufacturing at Kamik**

"We started addressing sustainability 25 years ago — before the word even existed. Back then, we were only able to reuse 25% of recycled material without affecting performance, so we worked to find a better solution. As a result, we developed a unique compound for our rainboots, allowing us to recycle 100% of our material wastes without sacrificing any of the quality. Kamik also implemented greener manufacturing initiatives including a low-consumption process in our plants, thanks to hydroelectricity and water reuse. And [our products are] made in North America, enabling us to reduce freight emissions." (pictured, Kamik's lightweight Jessie rainboot for women)

From *footwearnews.com*

**Uzbekistan and Turkey launch joint leather production cluster**

The Uzbek-Turkish cluster for the production of shoes and leather is scheduled to be launched in by the end of this year. The head of the economic planning department of the Uzcharmsanoat Association, Dilobar Zufarova, said that the project to create the cluster is in the active stage of its development. "The company has already received the necessary loans, and construction is now under way. By the end of 2019, leather production will be launched with shoe production to be adjusted afterwards. The plan is to master the production of leather goods once those stages are complete," Zufarova said.

The investment cooperation agreement was signed in Istanbul in 2017 by representatives of the Turkish Leather Industrialists Association and the Uzbekcharympoyabzali Association of Leather and Shoe Enterprises. Within the cluster, the plans are to set up three industrial complexes including factories for leather processing, shoe manufacturing, and leather goods. This will create a complete chain, from the processing of raw materials to the sending of finished products to customers. A significant part of the goods produced will be exported to the CIS countries and Europe.

From *leathermag.com*

## Guerrilla Group's latest release spotlights Apparition® Transparent leather



Looking to push the boundaries of techwear, [Guerrilla Group](#)'s latest series of carrying options is centered around transparent leather.

Utilizing the unique APPARITION® cowhide developed by [ECCO Leather](#), the Translucent Leather Bag is framed by contrasting red stitching and outfitted with water repellent zippers. Adding to the functionality of the piece, the compartments are water-resistant and sectioned for ease of use. Finally, a removable and adjustable strap outfitted with quick access hardware rounds up the design of the bag.

Priced at \$380 USD, Guerrilla Group's Translucent Leather Bag is available now at [LUISAVIAROMA](#).

From [hypebeast.com](#)

## Burberry insists on tannery certification

Burberry has been working with partner tanneries in Italy to push for internationally recognised 'environmental, traceability and social certifications' with the goal of all its leather being from 'certified' tanneries next year. The current figure is 49% - this is a big increase from 1% in 2017/2018, suggesting its partners applied for certification during this time.

Last September, Burberry paid £14.5 million for Burberry Manifattura, a Florence-based luxury leather handbags and accessories manufacturer that employs 1,000 "highly skilled craftsmen and women". In its annual report, Burberry also said that 3.7 tonnes of leather offcuts had been turned into accessories by UK brand Elvis & Kresse since 2017. However, elsewhere in the report, Elvis & Kresse put the figure at 120 tonnes.

Burberry chairman Gerry Murphy said: "It has been an exciting year for Burberry with the brand relaunch



and our new chief creative officer Riccardo Tisci's debut collections both landing well with consumers, influencers and our wholesale partners. We have also made significant progress on the evolution of our distribution channels, our operational excellence programme and ensuring we have the talent to deliver our strategy. "We recognise that our strategy is all-absorbing and has had a huge impact on all parts of the business. We are currently at the apex of our creative transition and our CEO Marco Gobbetti and our management team are managing the business dynamically through this exciting but challenging transformation."

From *leatherbiz.com*

## Everlane aim for world's most sustainable sneaker



American fashion brand Everlane has launched sneakers made from leather, recycled rubber and plastic bottles that it claims are completely carbon neutral. The unisex trainers, called Tread by Everlane, feature soles made of a mixture of natural and recycled rubber, while the uppers are made of leather from "the world's cleanest tannery". The laces and lining are made from recycled plastic bottles. "We're starting with a leather trainer that's the lowest impact of its kind," said Michael Preysman, Everlane founder and CEO, adding that the shoes are "made with less waste and almost no virgin plastic".

Everlane previously stated it would never make trainers, claiming they are "a disaster for the planet". "Of everything we wear, sneakers have one of the heaviest footprints," the brand said. "They require a ton of energy to produce, are made largely from virgin plastic, and never break down."

Everlane sourced the leather for the uppers from a tannery in southern Vietnam, [ISA TanTec](#), which it describes as the world's "cleanest tannery". It claims to use 42 per cent less electricity and 56 per cent less water than other facilities, and to emit 35 per cent fewer greenhouse gases. Rather than using virgin plastic for the soles, Everlane developed a composite of recycled and natural rubber. "We've diverted nearly 18,000 pounds of discarded rubber from landfills," said Everlane. "That's enough to make 1.3

million latex gloves." The laces, lining and internal support are made from recycled plastic, with each pair incorporating 9.5 bottles, according to the brand.

The brand carried out a life-cycle assessment to establish the amount of carbon each pair of its trainers generates, including the impact of raising the cattle the leather comes from. It calculated the figure at 51.5kg CO<sub>2</sub>e or carbon dioxide equivalent, which is the standard way of measuring carbon emissions. It then partnered with carbon-offsetting provider [NativeEnergy](#) to offset the carbon, for example by investing in projects that improve cattle ranching on American grasslands. "Healthy grasslands pull an enormous amount of carbon from the air, so this type of initiative could one day lead to carbon-negative leather," the brand said.

From [www.dezeen.com](http://www.dezeen.com)

## **Lanxess claims confirmation as supplier of sustainable leather chemicals**

Leather chemicals manufacturer Lanxess has completed Zero Discharge for Hazardous Chemicals (ZDHC) certification for all organic leather chemicals. It said on making the announcement that this development confirms the company's status as "a supplier of sustainable leather chemicals".

It says it is the first chemicals manufacturer to complete level-three compliance in the ZDHC Gateway, which it says is the largest online catalogue for sustainable chemicals in the textile and apparel industry. Lanxess's portfolio in the ZDHC Gateway now contains close to 500 products, covering what the company calls "every step of leather manufacturing".

The ZDHC Foundation, which was established in 2011, has set itself the goal of improving sustainability and chemicals management. Its Roadmap to Zero programme aims to encourage manufacturers to reduce the use of hazardous substances in the global leather, footwear and textile value chain.

From [leatherbiz.com](http://leatherbiz.com)

## **LVMH joins the ZDHC community**

Luxury group LVMH is among the latest companies to sign up as contributors to the Zero Discharge of Hazardous Chemicals (ZDHC) Foundation. It joins in the 'signatory brand' category. Another new addition to the contributor base is Italian leather chemicals manufacturer Samia. It joins in the 'value chain affiliate' category. The total number of ZDHC contributors is now nearly 150.

From [aplf.com](http://aplf.com)

## **Nike, Adidas call Trump's tariffs 'catastrophic'**

Nike Inc., Adidas AG and other footwear giants urged President Donald Trump to reconsider his tariffs on shoes made in China, saying the policy would be "catastrophic for our consumers, our companies and the American economy as a whole." In all, 173 companies signed an open letter to the president, dated Monday and posted on the industry trade association's website. It was also sent to Treasury Secretary Steve Mnuchin, Commerce Secretary Wilbur Ross and National Economic Council director Larry Kudlow. "On behalf of our hundreds of millions of footwear consumers and hundreds of thousands of employees, we ask that you immediately stop this action to increase their tax burden," the group said.

"Your proposal to add tariffs on all imports from China is asking the American consumer to foot the bill. It is time to bring this trade war to an end."

The ongoing trade tension between the U.S. and China has escalated as Trump threatens to impose tariffs as high as 25% on Chinese goods. Last week, the U.S. Trade Representative's office released a list of about \$300 billion worth of products that could see higher import duties, including all types of footwear, from sneakers to sandals. Trump will discuss the tariffs with Chinese President Xi Jinping next month.

Watch a short video from CBS news [here](#) on what the tariff will mean to footwear price hikes.

From *aplf.com*

## R M Williams up for sale



Iconic Australian bootmaker R M Williams has been put up for sale, with the private equity firm backed by the owners of Louis Vuitton looking to offload the company for as much as A\$500 million (\$527m). The Singapore-based L Catterton Asia has brought in investment bank Goldman Sachs to look for buyers and run an auction for the Adelaide-based company later this year, sources confirmed.

R M Williams has been a mainstay of rural fashion since its foundation in 1932, and in recent years has been positioning itself as a luxury shoe brand for "townies" in Australia and New Zealand and further afield. R M Williams sales have been growing thanks to that global push, coming in at A\$142 million last financial year. That was up from A\$126 million in 2017, A\$119 million in 2016 and A\$124 million in 2015, documents filed with the corporate regulator show. The company has about 50 retail shopfronts, including outlets in New York, London, New Zealand and Scandinavia, and its boots are stocked in about



500 department stores.

The company's owners are looking to fetch between A\$400 million and A\$500 million for the company, sources said.

L Catterton is a consumer-brand focused private equity investor backed by LVMH Moët Hennessy - the French luxury goods conglomerate that owns the brands Louis Vuitton, Christian Dior, Givenchy, and the famous Moët Hennessy Champagne house.

L Catterton bought a 49.9 per cent stake in R M Williams from then-owner, former News Corp Australia boss Ken Cowley, in 2013.

From *stuff.co.nz*

## **Ecco works with BASF on 3D printing solutions for footwear**

BASF 3D Printing Solutions, a subsidiary of the German chemicals manufacturer, has announced it is collaborating with shoe group Ecco to develop what it calls “a wholly new approach to footwear production”.

The third party in this endeavour is Origin, an open-platform additive manufacturing printer provider. The project involves this company's platform and BASF's Ultracur3D photopolymer materials. Trials, which took place at Ecco's research and development centre in Denmark, have shown “outstanding detail accuracy and mechanical stability”, according to BASF.

The declared goal of this project is to establish additive manufacturing as a viable solution for mass production of footwear. By tuning Origin's printing system to BASF's Ultracur3D materials, the partners have managed to achieve high processing speeds and good surface stability.

From *sportstextiles.com*

## **What's new June 2019: papers added to the LASRA Library**

### **Country-level Life Cycle Assessment of Carbon Footprint in Processing of Bovine Upper Leather**

*by Mianhong Chen, Youdan Duan, Liming Dong, Min Chen and Haiming Cheng*

Leather-making processes have achieved great improvements in reducing environmental pollution all over the world. In this study, we collected the data from the tanneries in five countries on the material flow to quantify and analyze the carbon footprint of leather-making process, based on the Life Cycle Assessment with two impact assessment methods that characterize the impact of climate change (IPCC 2013 GWP 100 years and GHG Protocol). To process 1000 kg of raw hides, tanneries in Chile, China, India, Italy, and Spain emitted 882, 1180, 1608, 1198, and 755 kg of carbon dioxide equivalent (CO<sub>2</sub>Eq), respectively. The carbon footprint of 1 kg of finished leather for shoe upper in five countries ranges from 3.41 to 6.30 kg CO<sub>2</sub>Eq. The average power consumption was the largest factor causing carbon emissions, followed by the consumption of acrylic resin, and chromium tanning agent. Carbon footprint analysis suggested that enzyme-assisted beamhouse and recycling of the liming float and the tanning float can effectively reduce carbon emissions during the leather-making process. This study will lay the



foundation for the carbon footprint research of the downstream products of leather (shoes, apparel industry, etc.).

JALCA June 2019

## **Synthesis and Leather Application Properties of a Carboxylated Graphene Oxide Modified Waterborne Polyacrylate Leather Finishing Agent**

*by Shuangquan Lai, Yong Jin, Liangjie Shi and Weining Du*

Carboxylated graphene oxide (GO-COOH), prepared by the reaction of bromoacetic acid with the hydroxyl and epoxy groups on the graphene oxide (GO) layers, was blended into a poly(ethyl acrylate) (PEA) emulsion and a PEA emulsion based polyacrylate leather finishing agent respectively, to prepare PEA/GO-COOH composite emulsions and GO-COOH modified waterborne polyacrylate leather finishing agents. The consequence of the amount of GO-COOH on the properties of the PEA film and related leather coatings were systematically investigated. The results indicate that stable GO-COOH dispersed composite emulsions were generated leading to homogeneously dispersed composite films. With an increase in the GO-COOH amount from 0 wt% to 0.5 wt%, the tensile strength increased by 106.2%. Additionally, TGA results demonstrated an improvement of the thermal stability of PEA film after modified with GO-COOH. Most importantly, the folding resistance and rubbing fastness properties of leather finished with GO-COOH modified polyacrylate leather finishing agents were improved proportionate to the GO-COOH amount. Therefore, the GO-COOH modified waterborne polyacrylate leather finishing agent possesses improved performances and likely offers beneficial leather finishing application properties.

JALCA June 2019

## **Graphene Oxide Grafted Maleic Anhydride Vinyl Acetate Co-polymer and its Enhancement of Flame Retardant and UV-resistance of Retanned Leather**

*by Yazhou He, Zhenyu Zhang, Haojun Fan, Yi Chen and Jun Yan*

Maleic anhydride grafted graphene oxide (GOMA) monomer was prepared by modifying the graphene oxide (GO) with hexachlorocyclotriphosphazene (HCCP), ethylenediamine (ETA) and maleic anhydride (MA). Then a polymeric retanning agent, abbreviated as poly(GOMA-MA-VA) was synthesized from GOMA, MA and vinyl acetate (VA) by free radical polymerization. The structures of GOMA and poly(GOMA-MA-VA) were characterized by Fourier transform infrared (FTIR) spectroscopy, Raman and X-ray photoelectron spectroscopy (XPS), simultaneously, the flammability, UV-resistance as well as the thermal stability and mechanical properties of re-tanned leathers were also investigated. Results show that GO grafted by polymer presents well dispersing stability and can penetrate into collagen fibers to form strong combination with fibers. Furthermore, this novel multifunctional retanning agent can efficiently improve the flame retardance, ultraviolet (UV) resistance, thermal stability and mechanical properties of resultant leather.

JALCA June 2019

## **Investigation of the Synthesis of a Novel Glycidyl Ether-amine Epoxy Tanning Agents and their Tanning Performance**

*by Xiaoyan Pang, Zhiwen Ding, Wei Ding, Xiao Xiao, Xuepin Liao and Bi Shi*

Isophorone diamine (IPDA) and epichlorohydrin (ECH) were used to fabricate the epoxy tanning agents, and polyalcohol compounds (glycerol, polyethylene glycol, ethylene glycol) were employed to introduce the ether bonds into the epoxy tanning agents to improve their compatibility with water. The prepared epoxy tanning agents were named IGE, IPE and IEE for the introduction of glycerol, polyethylene glycol and ethylene glycol, respectively. FT-IR and  $^1\text{H}$  NMR analysis indicated that epoxy groups, ether bonds and hexatomic rings were successfully introduced into IGE, IPE and IEE. The tanning performances of the epoxy tanning agents were further evaluated in water, ethanol-50 (50% of ethanol in water) and ethanol-95 (95% of ethanol in water) medium, which suggested that ethanol-50 was the most favorable one for the epoxy tanning agents. The IGE tanned leather exhibited the highest shrinkage temperature of 83°C in ethanol-50 due to its low viscosity, high epoxy value and wide molecular dispersion. Morphology observation indicated that the IGE tanned leather exhibited better dispersion of fiber network than that of IPE and IEE tanned leathers. These results illustrated that IGE was an appropriate tanning agent in water-ethanol medium, which could be considered as a candidate for the organic tanning agents.

JALCA June 2019

## **Feasibility study of a functional modification for porcine acellular dermal matrix**

*by Chen Yining; Dan Nianhua; Zheng Xin; Huang Yanping; Dan Weihua*

In this paper, the porcine acellular dermal matrix (pADM) was used as a mimetic of collagen fibres, and chemical modification by an epoxy silicone modifier (3-(2,3 epoxypropoxy)propyltrimethylsilane, E3) was carried out to improve its physicochemical properties. The modification interaction between pADM and E3 was investigated, and the various properties of the pADM after modification by E3 (E3- pADM) were further evaluated. Fourier transform infrared (FTIR) spectroscopy indicated that E3 was successfully introduced into pADM. After the E3 treatment, X-ray diffraction (XRD) and FTIR analysis showed that the micro-structural integrity of pADM was still maintained and scanning electronic microscopy (SEM) observation showed that the surface topography and pore structure were maintained. The differential scanning calorimetry measurement (DSC) demonstrated that the thermal stability was enhanced due to the improved structural stability after modification. Further, E3-pADM was functionalized with hydrophobic properties compared with native pADM due to the silane sidechain. Enzymatic degradation study indicated that the resistance to enzymatic degradation of E3- pADM increased, which may benefit from hydrophobic chemical modification. In addition, the MTT assay and SEM observation illustrated that E3-pADM was favorable for the cells adhesion, growth and proliferation. Taken as a whole, the results demonstrated that E3 could serve as a functional modifier for the chemical modification of pADM to improve the physicochemical and functional properties. Therefore, the prospect of E3 in the preparation of hydrophobic leather and acellular dermal matrix in future production and practice is brilliant.

JSLTC May/June 2019

## **Structural and performance characteristics of pigskin leather with different tanning methods**

*by Pervaia, Nataliia*

This article studies the influence of mineral and organic tanning methods on a set of physicochemical, thermophysical and hygienic properties of pigskin. The dialdehyde method of tanning

with subsequent anionic polymer filling provides the formation of a homogeneous porous structure of leather in various topographical areas with the necessary set of structural and performance characteristics. The described tanning technologies provide the formation of leather with appropriate hydrothermal resistance and adequate elastic-plastic properties. It meets the standard requirements for garment leather DSTU 3115-95. The resulting leather can be recommended for the manufacture of wide range goods, including chrome tanned for spring-summer goods and the dialdehyde tanned for autumn-winter goods.

*JSLTC May/June 2019*

## **Evaluation of collagen hydrolysate on the performance properties of different wet-white tanned leathers**

*by Dilek, Yusef; Basaran, Bahri; Sancakli, Aykut; Bitlisli, Behzat Oral; Yorgancioglu, Ali*

Tanning with basic chromium sulphate is the most commercially favoured process in the manufacture of a variety of high quality leathers. Environmental restrictions to the disposal of chromium containing solids and effluents, as well as speculations concerning the presence of toxic and carcinogenic chromium(VI) traces in leather products, have already directed the industry towards using alternatives. Wet-white tannages which consist of zirconium (IV) and aluminium (III) salts with high durability and resistance and organic alternatives which use phosphonium, aldehydes and some syntans both types with more eco friendly and biodegradable characteristics seem to be the main options for industry. However, properties like high hydrothermal stability, tensile strength, and thickness cannot be achieved by any alternative single tanning method. In this study, collagen hydrolysates derived from gelatin manufacture were used to improve wet-white leather performance properties through combination with tanning agents comprising zirconium and aluminium salts, phosphonium salts and aldehydes. The result shows that the apparent density, shrinkage temperature, denaturation temperature and strength properties of differently tanned leathers increased with the addition of collagen hydrolysates. SEM analyses show that collagen fibres are dispersed after tanning. Besides, collagen hydrolysates make the fibres loosen and the fullness of leather is increased.

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## **Synthesis, characterisation and application of novel valonia tannin based waterborne polyurethane with natural colour**

*by Yang Liu; Haihang Luo; Benyapathitwong Ruj; Tao You; Youjie He*

A novel natural coloured waterborne polyurethane (PU) based on valonia tannin was successfully synthesised and characterised. A structural study of the polymer by Fourier Transform Infra Red (FTIR) spectroscopy confirmed the incorporation of valonia tannin into the backbone of the PU. The dispersion of valonia tannin and homogeneity of surface of the PU samples were confirmed by scanning electron microscopic (SEM) analysis. Chromaticity and colour difference further verified the colour depth and uniformity of the cured films. Thermogravimetric analysis (TGA) results indicated that the synthesised PU samples exhibited an improved thermal decomposition temperature. Particle size analysis, mechanical testing and water absorption of the synthesised PU samples further showed the effect of the cross-linked structure in the molecular chain segment. Moreover, the colour fastness and folding [flexing] resistance of the leather coating finished with synthesised PU was better than that of valonia tannin blending.

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## **Synthesis of orthanilic acid modified glyoxylated melamine resin with improved retanning and thermal properties**

*by Ashraf, Muhammad Naveed; Khan, Shahzad Mehmood; Munir, Shahid; Saleem, Rashid*

Amino resins have found important uses in leather manufacturing due to their selective filling properties. Conventional amino resins are produced from formaldehyde and result in an increase of formaldehyde content in finished leather greater than the permitted limits. Due to strict legislations and restrictions regarding formaldehyde contents in leather goods there is a growing demand to produce formaldehyde-free leather. In this study formaldehyde-free resins with improved thermal stabilities were prepared using glyoxal as condensing agent and orthanilic acid (o amino-benzene sulphonic acid) as a sulfonating agent. The glyoxal to melamine ratio (G/M) was varied from 2-6 and orthanilic acid to melamine ratio (ONA/M) was varied from 0.5-3 to produce aqueous solutions of the melamine resins. The viscosity trend in the series of resins was observed by varying the degree of sulfonation and varying the glyoxal/melamine ratio. Progress of reaction was monitored by FTIR spectrum through functional group region. Newly synthesised melamine resins (MGONA) were comparatively applied on leather as a retanning agent against a conventional melamine-formaldehyde resin and further evaluated for tear strength, tensile strength and elongation at break. The leather retanned with the optimal resin was further assessed for organoleptic properties and SEM analysis. The thermal stability of the optimised resin was also evaluated comparatively against a conventional resin. The optimised polymeric resin was free from formaldehyde plus having better retanning properties and improved thermal stability.

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## **Acquisition and observation methods of three dimensional leather structure based on micro-CT**

*by Huayong Zhang; Tianduo Li; Yuling Wei; Jinyong Cheng*

Components and working principle, parameters and data acquisition steps of micro-CT are introduced in detail. Taking the chrome-tanned leather for example, the images of each stage of the experiment are presented and the 3D digital models of leather structure with 1.5 $\mu$ m resolution have been obtained by micro-CT. It lays a good foundation for the study of leather structure by micro-CT.

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## **Physical gelation of gelatin solutions: Effect of gelatin concentration, pH, ionic strength and solvents**

*by Guangfeng Feng; Congde Qiao; Jianlong Zhang; Xianguang Ma*

The effect of gelation conditions on the gelation of gelatin solutions was studied by rheological measurements. It showed that the gelling temperature (T<sub>gel</sub>) increased with the increasing of gelatin concentration. T<sub>gel</sub> was also enhanced by the deviation of solution pH from the isoelectric point (IEP) of gelatin. On the contrary, T<sub>gel</sub> was reduced by the increasing of ionic strength. In addition, the solvent has a notable influence on the gelation of gelatin. Unlike in urea solution where the formation of



hydrogen bonds between gelatin chains was hindered, thereby leading to a decrease of Tgel, in methanol solution the hydrophobicity decreased, and the gelation was facilitated with a high Tgel. Our results demonstrate that polymer gelation depends on gelation conditions and it provides structural insight to improve the design of biopolymer-based gels.

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## **Extraction of oil from tannery fleshings for chamois leather tanning**

*by Wainaina, Peris N.; Tanui, Paul; Ongaroa, Benson*

The process of leather manufacturing produces vast amounts of solid waste annually (8.5 million tons worldwide), and most of the solid waste (80%) is produced in pre-tanning operations. The fleshing operation to remove flesh, subcutaneous tissue and natural fat from the flesh side of hide/skin (fleshings) accounts for 50-60% of total solid waste. Attempts to extract oil from the fleshings have been made, however, the application of the oils from fleshings in tanning has not been explored. The oil tanning process takes about 12 days (compared to chrome tanning which takes approximately 6 hours), and this explains why the technology is not commonly used. The objective of the research was to discover whether the fleshing oil could be used for chamois leather tanning. The oil was extracted from goat fleshings and characterised using Soxhlet extraction and chemical methods. The fat content, iodine value, acid value, percentage free fatty acid and saponification value of green fleshings were  $27.56 \pm 0.40\%$ ,  $73.79 \pm 0.34$ ,  $7.38 \pm 0.13\text{mg/g}$ ,  $3.71 \pm 0.06$  and  $187.08 \pm 0.22 \text{ mg/g}$  respectively while that of limed fleshings was  $17.48 \pm 0.55\%$ ,  $67.40 \pm 0.35$ ,  $6.08 \pm 0.02\text{mg/g}$ ,  $3.06 \pm 0.06$  and  $184.66 \pm 0.33\text{mg/g}$  respectively. The results of the study show that the physical and organoleptic properties of fleshing oil-tanned leather were similar to those of cod oil-tanned leather. Tensile strength, elongation, tear strength and water absorption of the chamois leather were  $27.88 \pm 0.07\text{N/mm}^2$ ,  $55.75 \pm 0.17\%$ ,  $56.64 \pm 0.29\text{N/mm}$ ,  $211\%$  respectively. The physical and organoleptic properties of the leathers resulting from this study suited the requirements for chamois leather.

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## **Recovery and utilization of collagen protein powder extracted from chromium leather scrap waste**

*by Dang, X., Yang, M., Zhang, B. et al.*

In this work, we investigate collagen protein powder (CPP) extracted from chromium leather scrap waste (CLSW). The composition and molecular weight distribution of CPP were determined by elemental analysis and sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE), respectively. The microstructure and size distribution of CPP were then characterized by scanning electron microscopy (SEM) and nanometer analyzer instrument. Finally, CPP was treated with corn starch (CS), and the swelling behavior of the resulting CPP-CS blend was investigated in order to determine its range of applications. The experimental data showed that CPP contains 13 different amino-acids. CPP also displayed low mineral salt levels and a nitrogen content of 43.84%, indicating its potential use as an organic fertilizer. The molecular weight range of CPP is 6.5 to ~ 26.6 kDa. After the obtained CPP was blended with CS, the CPP-CS blend is endowed with optimal swelling properties and is able to overcome the solubility drawbacks of CPP alone. In addition, when the CPP was used as a natural fertilizer, the germination rate and height of kidney beans obviously increased.

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## **Taking tanning to the next level with an improved pickle product**

*by Rabe, Volker; Aertse, Maurice; Schneider, Thomas*

The dominant chrome tanning process currently used at present time is simple, fast, reliable and highly efficient. Over past decades there have been countless initiatives to find alternatives, however chrome tanning remains the primary method for over 85% of the leather produced today. This long and continuing success is due to many reasons, not only those mentioned above but also its high adaptability. Over time, the focus has been developed and enlarged significantly. Starting from a focus on producing the optimum quality of leather, it became more and more a holistic view, including the environmental aspects of production. Although state-of-the-art chrome tanning is already at a very high level of performance in this respect, research at Lanxess is being continued in order to further optimise it, which will make this tanning method attractive and reliable in the foreseeable future and beyond.

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## **Tannins: a sustainable solution**

In the first of two articles, Italian chemicals manufacturer Silvateam offers insight into sources of sustainable tannins from areas of Italy and South America. The second article will contain information about its use of quebracho from Argentina and tara from Peru. This paper focuses on its efforts to source chestnut tannins from Italy in a manner that respects the environment while also supporting the economic growth.

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## **Style file: Barack Obama wears leather to the NBA finals**

