

How biochemicals can replace traditional chemicals in the beamhouse

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Since the introduction of industrial beamhouse processing in leather production, only little innovation has taken place. Certainly in the terms of sustainability. Yet, modern times ask for more sustainable alternatives to traditional beamhouse solutions.

Approximately 70% of the wastewater of the traditional leather production process originates from the beamhouse. Imagine the reduction of wastewater - and thus the lowered environmental footprint - that you would achieve by replacing traditional chemicals with 100% natural products? This is exactly what Proviera® - Probiotics for Leather™ is targeting. This technical article discusses the benefits from different perspectives. First and foremost, Proviera® - Probiotics for Leather™ is biodegradable. This means that raw materials are substituted with natural ingredients from agriculture instead of using other sources such as the oil industry.

Fundamentals

The Proviera leather biochemicals are metabolites derived from a controlled fermentation using a blend of natural ingredients and probiotics (beneficial microorganisms) cultures and natural raw ingredients.



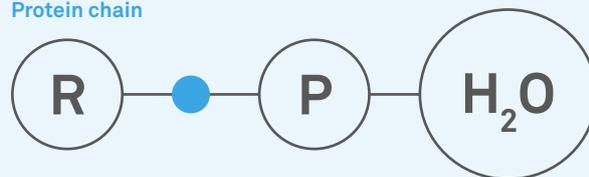
Graph 1: Compared with traditional chemical synthesis, the manufacturing process does not impact carbon footprint and does not give off greenhouse gases, using 100% renewable and sustainable sources.

Characteristics

The metabolites are characterized by a strong polarity and as an active functional radical enabling them to combine the biochemicals to other organic molecules. The metabolites contain carboxyl and hydroxyl groups conferring a high polarity to the molecules, and therefore, high solubility. They also

contain active radicals that can bond the metabolites with other organic molecules.

Protein chain



Graph 2: Probiotic metabolites confer high hydrophilicity to collagen fibers

The metabolites are complex mixtures of organic products which most of the molecule sizes are small enough to penetrate inside the fibers of the hides/skins. When the active radical group combines with collagen, the polar groups help to introduce water molecules and therefore they become more hydrophilic. When they combine with other soluble proteins, they increase their solubility and are easier to be removed.

Distinctiveness in 'consortia'

The processing biochemicals used are fundamentally different from other products because the probiotic strains are grown in 'consortia'. The process of co-growth combines multiple strains during production. Ultimately, through the proprietary consortia culturing processes, the micro-organisms become a small ecosystem in itself - much more resilient and working together synergistically. This methodology is similar to how micro-organisms actually survive in a natural environment. It is, therefore, a completely green and natural process.

Since we are talking biochemical consortia here, they are effective in low concentration. The hydrotropic properties (especially in soaking agents) enable replacing surfactants and enzymes. The probiotic products are able to replace solvents and surfactants. Due to the small molecule size of the biochemical they enable better penetration and dispersion among inner leather fibers. Proviera® - Probiotics for Leather™ products reduce bad odors caused by bacteria enabling to reduce the need of bactericides in the soaking of raw hides and skins.

Application

In the beamhouse all substances from the raw material that cannot be converted into leather are removed. Other auxiliaries will provide the performance properties of the final leather article required.

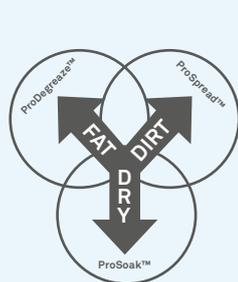
Approximately one ton of raw hides is required to produce \pm 250 kg of leather. On average, the process requires 35 m³ of water. The effluent contains organic matter and chemicals. The effluent should be treated before draining into natural water sources to avoid pollution. Many different chemicals have to be added to process a ton of raw hides. Some auxiliaries react with the collagen protein to avoid putrefaction and produce leather. Others are used to obtain the conditions to remove undesirable substances from hides and skins and to create the best conditions for further leather processing.

Proviera® - Probiotics for Leather™ can be used on any type of hide and skins and are applicable for most leather manufacturing stages:

ProSoak™ is a powerful soaking agent replacing conventional chemicals used during the soaking process. It rapidly and effectively promotes even water uptake into hides and skins, assisting softness and minimizing possible mechanical damages.

ProSpread™ is used as a natural dispersing and cleaning agent, solubilizing and dispersing organic material, thus allowing an easy removal from hides or skins.

ProDegreaze™ is a degreasing auxiliary that enables the effective stripping of natural fat from hides and skins, which are then released into the float. While it is highly effective for removing and dispersing natural grease, ProDegreaze™ helps to achieve a more uniform uptake of tanning, retanning agents, dyes and fatliquors.



Dry

ProSoak™

Effects:

Soaking fresh hides & skins/hydrating
Removal of non-structured proteins

Operations:

Main soaking, esp, fresh hides
Washing wet-blue/wetting back

Fat

ProDegreaze™

Effects:

Strip off fats
Degrease auxiliary

Operations:

Presoaking fatty hides/skins
Degreasing sheepskins

Dirt

ProSpread™

Effects:

Dispersing organic material
Dispersing process chemicals
Cleaning

Operations:

Pre soaking, esp, salted hides
Liming
Retanning, fatliquoring, dyeing

Graph 3: Proviera products can be used for most leather manufacturing stages.

Extensive benefits

The benefits of using Proviera® - Probiotics for Leather™ are substantial. As mentioned before, all products are 100% biodegradable and hazardless resulting in less chemical usage, water usage and waste. Prevention against putrefaction up to 24 hours eliminates the need for bactericides. This reduces costs, improves the effluent treatment plant (ETP) performance as bacteria in ETP are unaffected, and minimizes the risk of skin allergies associated with bactericides for the tanners.

Agreement with Stahl

The worldwide presence and impressive performance was noticed by Stahl, market leader in high-quality specialty chemicals for leather. As the innovation is an excellent addition to Stahl's own sustainable solutions, they signed a distributor agreement with Proviera BioTech to market Proviera® - Probiotics for Leather™.

Stahl's sustainability agenda

Proviera® - Probiotics for Leather™ can also be perfectly combined with **Stahl EasyWhite Tan™**. Our 100% chrome-free tanning system enables tanners to produce all types of metal-free leather to the standard leather product

specifications and beyond. Less salt is needed, while the number of stages in the tanning process is drastically reduced without compromising on leather quality. While Proviera® - Probiotics for Leather™ and Stahl EasyWhite Tan™ are effective in the initial stages of the supply chain, namely beamhouse and tanning, Stahl is actively promoting sustainability throughout the supply chain. On the opposite side of the spectrum, the company recently launched **Stahl Neo**, which is a sustainable leather finish offering ample opportunities for designers around the world, for instance in fashion. This portfolio of sustainable finishes offers products that not only comply with Zero Discharge Hazardous Chemicals (ZDHC) and the Manufacturing Restricted Substances List (MRSL), they even exceed this standard, targeting an even wider range of chemical substances.

For more information about Proviera® - Probiotics for Leather™ or other sustainable Stahl solutions, please contact: joan.castell@stahl.com.

www.stahl.com