



X-Biomer: A new way forward in retanning chemistry

Dr. Dietrich Tegtmeier, VP Product Development and Application, Lanxess

Sustainability is no longer an option, and it requires willingness to change and to think in new ways. For this reason traditional operations in the leather industry have to be challenged now, and a holistic perspective helps to direct the leather industry to meet its long term goals and responsibilities.

Continuous improvement and development of processes have been taking place for years, and this means that significant progress has been made. However, the slope of the incremental improvement process can reach an “asymptotic plateau”, that is, the point where despite increasing investment the potential returns are not increasing in a corresponding manner. This situation requires a completely new approach - something radically different.

We have reached such a plateau in the field of retanning chemistry, and it is time to rethink the current range of standard products such as syntans, resins and polymers. A holistic perspective calls for the adoption of new and sustainable standards.

Most synthesised retanning chemicals are based on crude oil derivatives. In addition, some of them contain high amounts of inorganic salts, which finally end up in the effluent. And most traditional organic retanning agents are difficult to biodegrade or

treat in wastewater treatment plants. Furthermore, with syntans and resins based on basic raw materials such as formaldehyde there is always a potential risk for residues in the final leather produced for such restricted substances.

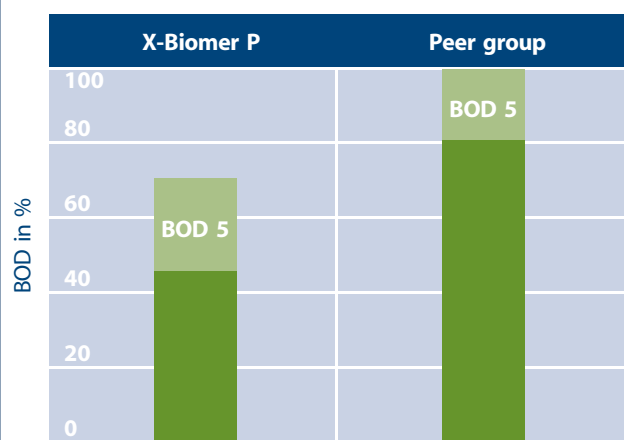
For these reasons, Lanxess has developed the X-Biomer technology. This is a new class of retanning agents that effectively use biopolymers for a more sustainable production of high quality leather. This means that tanners will be able to produce a crust with a complete substitution of traditional resins, most polymers and possibly in the future even complete substitution of standard syntans.

This new product range consist of three products as counterparts to these traditional retanning agents. All are based on renewable raw materials - such as carbohydrates and proteins - and are designed to start a new chapter in retanning chemistry.

All of these products are amphoteric, thus contain both positive and negative charges, and this leads to good fixation and exhaustion. In particular, a comparison between traditional retanning polymers with the respective X-Biomer shows significantly better exhaustion, with a reduction of BOD in the wastewater by up to 30 %, as indicated in *Panel 1*:

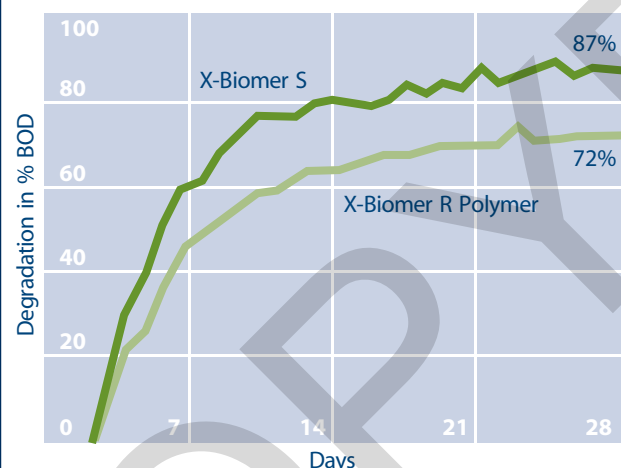


Panel 1: BOD 5-day from retanning: Levotan X-BIOMER P compared to peer group*.



Furthermore, X-Biomer polymers can easily be degraded by microorganisms in effluent treatment, and the improved biodegradability for products is shown in *Panel 2*:

Panel 2: Biodegradation of Levotan X-Biomer S and X-Biomer R

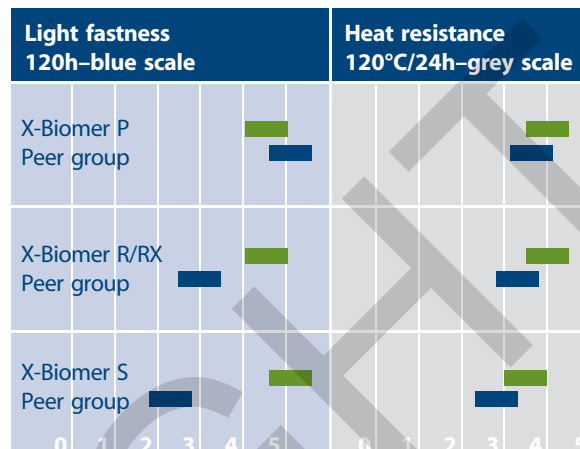


This behaviour has been confirmed by an independent testing laboratory, which even classified these two products as “readily biodegradable” according to the OECD guideline 301F. In addition, X-Biomer P has shown results which are a major step forward over traditional products with 52% being degraded in just 28 days. Tanners, therefore, can improve their sustainability profile but also benefit from reduced wastewater treatment costs.

This patent-filed technology is based on a unique production process where the biopolymer raw material is partly hydrolysed into small oligomers. These intermediates are subsequently converted into polymers with very specific characteristics. The performance properties with respect to dyeability, fullness, tightness and selective filling can be exactly tailored to meet the needs of the retanning applications. This includes heat resistance and light fastness, as indicated in *Panel 3*.

In order to derive maximum benefit from these new chemical products the application techniques need to be taken into close account as the properties - hydrophilicity, fixation, isoelectrical point etc. - are different from their oil based peers.

Panel 3: Heat resistance and light fastness of Levotan X-Biomer products vs. selected peer groups.



These new products offer many advantages, and through recipe adaptations and reformulations new technical opportunities will be achieved. This is perceived as the right direction to take, and the new generation products are at hand. It is time to start the creation of a more sustainable future for the leather industry. 🌱

