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## Biopolymers and biocomposites as resource for sustainable polymeric materials

**Sigbritt Karlsson**
University of Skövde, Sweden

Recently researcher and manufacturer of polymeric materials (or plastics) seem to have failed to answer to the rising number of questions with respect to, e.g. plastic littering in oceans and on land. In parallel, an increasing worry is correlated with the risk for health effects due to exposure to various additives from polymeric materials. So while the introduction of plastics in the 1930$^{th}$-1940$^{th}$ meant better food hygiene and health aspects among other things, we are now in a situation where a series of problems needs to be addressed in order secure sustainable development with respect to materials. Many of the benefits associated with polymeric materials made from traditional resources (*i.e.* oil) such as inertness and long-term stability are now instead becoming problems with respect to waste and littering. This is one reason for the search for more sustainable resources which has led to an increasing and renewed interest in natural polymers or biopolymers. The potential of using resources from a number of available natural resources is large, but not without problems. For the last 20 years or so there has been a growing number of research results and commercialization targeting renewable monomers and biopolymers e.g. PLA, gluten. A large interest in polymers from forestry has given rise to new routes of applications using cellulose, hemicellulose, lignin, cellulose derivatives alone or inbiocomposites.This presentation will present and discuss routes to design sustainable polymers and biocomposites and compare obtained polymeric properties with degradation. Potential implications to environment will be elaborated. To develop and use sustainable polymeric materials imply closing the plastic loop having awareness on the risk for environmental impact all the way round the cycle from synthesis to plastic waste management, recycling and back to synthesis.

sigbritt.karlsson@his.se
sigbritt@kth.se

## Effect of hydrolysis in respect of processability and performance characteristics of polylactic acid (PLA)

**Simon McGowan, Daniela Jahn, Andrea Siebert-Raths** and **Hans-Josef Endres**
Institute for Bioplastics and Biocomposites, Germany

In order to characterize the degree of hydrolysis of PLA (poly lactic acid) during thermal forming processes. Predefined granulates with different degrees of moisture were used in thermal forming processes as extrusion and injection molding. The resulting mechanical characteristic values from these experiments are tested via standard test bars. To obtain additional information about the hydrolysis during melt injection process further studies were performed on the capillary rheometer. During the tests were also different conditioned PLA granulates on different Test temperatures investigated. The results show that the level of moisture from PLA is of significant importance for the processability as well as performance characteristics. Especially during the injection molding process, the moisture content of the PLA indicates effects on the hydrolysis. In addition to the moisture content also the processing temperature imply a strong influence on the hydrolysis.

Simon.McGowan@hs-hannover.de