

Development of New Bio-degradable Materials based on waste materials from industrial processing of renewable resources

The interest in production and use of alternative and renewable raw material sources is growing in the last few years. Mainly waste material based on the industrial use of renewable resources is of high interest due to the high volume and low market prices in this area.

Following this development route we choose the residual products from oil extraction of seeds (mainly rape seed) as base material. The grinded, washed, dried, pressed and sometimes also extracted seed leads to a high volume of bio-based powder with a high amount of biological nutrients like proteins, carbohydrates and minerals with a high potential for separate economic exploitation. That's why the material is directly used as animal feed. But toxic side products that protect the living plant reduce the usable amount to about 30% of the whole feed. Those by-products and the high protein content make it also problematic for biogas production and direct thermal energy recovery. That leads to a high volume of residue that cannot be used in the most effective way.

The most interesting and valuable part for technical usage of the powder is the protein content of it (about 33 - 40 wt.%). The strategic alliance (TeFuProt = techno-functional proteins) of 10 industrial partners and 3 academic institutes, sponsored by the German government (BMFT), work together to develop a complete process from protein extraction, separation, cleaning till potential usage in various industrial application areas.

A part of the protein can be directly extracted with water (15 - 30 wt.% dependant on pH, extraction time and temperature), additional portions with the help of enzymes.

Several different extraction and separation processes that lead to different protein extracts, isolates and concentrates have been tested by the partners in different applications.

HPX Polymers GmbH uses protein extracts as additional binder in bio-based polymer materials and the solid "waste" material as natural filler to produce bio-degradable, highly filled thermoplastic compounds.

HPX Polymers GmbH is an innovative service provider for the polymer processing industry and their customers. We provide complete services for process development and optimization, polymer and compound development including small scale-up to standard production of special polymer blends and compounds.

In combination with bio-degradable polymers the extracted and dried residue can be used to produce a totally bio-based version of wood-plastic-compounds (WPC).