

Publishable Summary

Evaluating physiological and environmental consequences of using organic wastes after technological processing in diets for livestock and humans – SAFEWASTES

The fruit, vegetable and herb processing industry produces millions of tons of organic wastes, by-products and residues year by year. Today's technology for re-using and further processing of these waste materials is limited due to little knowledge on potentially useful primary and secondary plant products still contained in the residues.

Apart from depositing, composting or in some cases using organic wastes as such in animal feeding, some tentative results led to assume that many of these by-products might be valuable starting materials for food and feed additives with significant health benefits for animals and human beings. By the way, some of the disposal and environmental problems could be solved and economic benefits achieved for the respective industries.

The Specific Targeted Research Project SAFEWASTES combines 12 partners from feed and herb industry SMEs, universities and research institutions of 12 European countries with expertise ranging from phytochemistry, microbiology, nutrition and veterinary medicine to food and feed technology, industrial manufacturing and environmental protection. After selecting more than 10 candidate starting materials to be obtained in large amounts every year (among them: Mango peel, Artichoke pomace and Horse chestnut disposal water), the Austrian-led project started by developing innovative biotechnological processes for food and herb wastes from the plant-based industry to recover valuable compounds. The next steps have been phytochemical evaluations and *in-vitro* tests of the fractionated material.

Pre-requisite standard operating procedures (SOP's) have been developed for the process technology (production of extracts out of organic waste material – solvents: water, ethanol, heptane), for the bioassay guided fractionation and for several *in-vitro* tests. *In-vitro* test systems have been developed and validated for

- testing anti-parasitic activity (protozoan parasites Cryptosporidia and Coccidia)
- testing anti-pathogenic activity (efficacy of products against *Histomonas meleagridis*, *Tetratrichomonas gallinarum* and *Blastocystis* spp., a number of pathogens in poultry)
- testing the influence of organic wastes in caecal bacteria growth of pigs with a colon simulation technique
- testing anti-microbial activity, and also anti-oxidative activity

The results of the first year have shown that most of the 'waste material' contains more bioactive substances than expected. A number of fractions is highly antioxidative, many extracts showed very good COX-2 inhibitory activity indicating prevention against inflammations, and some of the fractionated material was very active in preventing the adhesion of pathogenic microorganisms at the gut mucosa (the latter causing e.g. diarrhoea). In the mentioned fields, an exploitation through patents is expected.

The SAFEWASTES project is on the right way to develop organic feed additives to replace in-feed antibiotics, which use has been banned within the EU. SAFEWASTES will help food manufacturers (two agreements have been already signed with companies being not

partners of the project) employ scientific approaches to meet consumer demands for safer, higher quality food. Animal welfare is one of the key issues within the politics of the EU which in addition should lead to better food products. The organic waste material from industry shows already high potentials for the use as new, natural and functional products that will improve the quality of life of animals and also humans.

The first promising results out of the phyto-chemical analysis and the initial *in-vitro* tests are a good basis to prove that compounds in the selected residue material will contribute to anti-microbial activity in the gut through a reduction of pathogenic microflora and stabilisation of physiological microflora. The already tested material show also effects to prevent diarrhoea in animals, but also to reduce methane activity.

The SAFEWASTES project was launched accompanied by an initial PR activity to promote the launch and idea of the project. The press release encountered high interest by journalists in Europe. Several national newspapers and online magazines reported about the SAFEWASTES project and its need and high impact potential. Furthermore, the Co-ordinator was invited to several experts meetings and events to present SAFEWASTES and its first results. The Consortium is very enthusiastic in disseminating and exploiting the gained knowledge and has therefore submitted a Specific Support Action "Feed-SEG" to form expert working groups with scientists and experts from other running European funded feed related projects. This exchange of knowledge should lead into policy recommendations and newly initiated research projects.

List of partners

University of Veterinary Medicine – Austria (Co-ordinator)
Karl-Franzens-Universität Graz - Austria
Institute for Animal Science and Health – The Netherlands
University of Hohenheim – Germany
University of Thessaloniki – Greece
Università degli Studi di Udine – Italy
Università degli Studi di Milano – Italy
Bionorica – Germany
Vitamax, Nutriton Science NV – Belgium
Biomim – Austria
Institute of Soil Science – Poland
RTD- Services - Austria

<http://www.safewastes.info>