



PhD student position in natural compound chemistry (part of BioFuture) at the University of Turku:

“Modified tannins to increase the value of bark waste as a source of bioactive feed (ModiFeed)”

Tannins are the secondary metabolites that are increasingly considered responsible for many positive effects related to ruminant nutrition and health: (1) they are natural anthelmintics against gastrointestinal nematodes of ruminants thus enabling us to reduce the use of synthetic drugs, (2) they decrease the massive environmental emissions of ruminants (tens of kg of methane and ammonia per dairy cow in a year), (3) they are able to improve the inefficient use of proteins (degraded unnecessarily in the rumen by methanogens) by ruminants, and (4) increase the milk yields and quality by the more efficient protein utilization (rumen-escape protein). There are many tannin sources available e.g. from the side streams of wood industry, but those tannins do not have optimal structures for the activity and stability. The Natural Chemistry Research Group has good knowledge of active tannin types and their chemical properties. ModiFeed will build on this knowledge and produces several new types of active tannin products from the industry side streams. This will be accompanied by the state-of-the-art chemical analysis, anthelmintic and antimethanogenic assays that are done in Finland, Denmark, France and the Netherlands. The ultimate goal is to reveal the best ways to produce active and stable tannin products for the more efficient commercial utilization of waste materials as sources of bioactive additives in the feeds of the future.

Position

This research entity is part of the BioFuture strategy of the University of Turku. The PhD student will join the Natural Chemistry Research Group (NCRG, <http://naturalchemistry.utu.fi>, Department of Chemistry, Laboratory of Organic Chemistry and Chemical Biology, University of Turku, Finland). NCRG is equipped with the latest high-quality instruments needed for the modern studies of tannin chemistry, including UPLC connected to Waters XEVO TQ triple quadrupole mass spectrometer and to Thermo QExactive Orbitrap that is one of the flagships of high-resolution mass spectrometers. Recently, the group has created several UPLC-MS/MS based methods for the qualitative and quantitative analysis of plant polyphenols. They have found also clear structure-activity relationships between ruminant-related bioactivities and one specific class of tannins, i.e. hydrolysable tannins. They have revealed the first evidence of the possible mode of action of hydrolysable tannins on gastrointestinal nematodes as well. Now all this work needs to be continued with such tannins that are available from renewable sources that are otherwise treated as waste of e.g. wood-processing industry. The PhD student will join the exciting and challenging task of modifying natural tannins to enhance their bioactivity and/or stability, and will have the possibility to gain expertise in e.g. (1) state-of-the-art chemical analysis methods such as UPLC, UV, MS/MS, CD, NMR, (2) innovative bioactivity methods including methanogenic bacteria and nematodes, and (3) isolation and purification of challenging polyphenol molecules. There is also a possibility for international secondments in the collaborative labs of the project either in Denmark, France or the Netherlands.

Requirements

We are seeking a highly motivated, team-oriented PhD student with a strong interest towards natural compound chemistry and development and use of high-quality analytical tools. He/she should have natural motivation to use chemistry to improve both the state of the environment and also animal nutrition and health. Applicants should hold a Master's degree in chemistry (or equivalent). Good knowledge of spoken and written English is required.

Conditions and application deadline

The position will start in April 2017 at the earliest. The position will be for a maximum of four years, with 21 000 € grant per year. More information is available from professor Juha-Pekka Salminen (j-p.salminen@utu.fi). Send your application with CV, motivation letter and copies of the degree certificates to prof. Salminen by email 13.3.2017 at the latest.