

## Development of New Antioxidants from Agroindustrial by Products

Jonas Bauer, Britta Harbaum-Piayda, Heiko Stöckmann, Karin Schwarz

University of Kiel

Corn fiber and wheat bran were used as source for the preparation of antioxidant products, which contain high amounts of bound or free phenolic acids. Different pulping procedures affected the composition of the resulting extracts and hydrolysates. Ferulic acid was the major cell wall bound phenolic acid but lower amounts of p-coumaric acid and dehydrodiferulic acids were identified and quantified. Corn fiber was found to contain more than 3 times higher amounts of phenolic acids. Acid hydrolysis was used to produce ferulated oligosaccharides which were identified as ferulic acid pentoside and ferulic acid dipentoside. Ferulic acid esterases were applied for the release of cell wall bound phenolics. A maximum release of 43-49 % of total alkali extractable ferulic acid content from corn fiber and wheat bran was achieved and used for subsequent extraction. Solvent extraction was carried out for the identification of free phenolic acids and other major compounds. The methanolic corn fiber extract contained only traces of free phenolic acids but high amounts of the polyaminconjugates diferuloylputrescine and p-coumaroyl-feruloylputrescine. The methanolic wheat bran extract contained no free phenolics but high amounts of free L-tryptophan. The antioxidant activity of the obtained extracts and hydrolysates was determined in fish oil containing emulsions and in the *in vitro* DPPH and TEAC assays. Ferulated oligosaccharides were more active against lipid oxidation than monomeric ferulic acid at an equimolar concentration. Ground untreated corn fiber inhibited the formation of lipid oxidation products effectively as bound ferulic acid can act as free radical scavenger. Enzymatic treatment of corn fiber did not enhance the antioxidative protection against lipid oxidation. The methanolic extracts of corn fiber and wheat bran showed strong antioxidant activity *in vitro* and in the emulsion. The antioxidant activity of the methanolic corn fiber extract could be attributed to polyaminconjugates. Free L-tryptophan, present in the methanolic wheat bran extract, showed moderate activity *in vitro* and may contribute to the activity of the extract.