I. Jachmanián, Marijana Perifanova-Nemska, Münster, Maria Antonia Grompone, Montevideo/Uruguay, and K. D. Mukherjee, Münster: *Germinating rapeseed as biocatalyst for lipolysis*[*]

Germinating oilseeds are well known sources of lipases (Triacylglycerol acylhydrolases, EC 3.1.1.3). Seedlings of low-erucic 00-rape (*Brassica napus*) at day 3 to day 5 of germination have been homogenized in Tris-HCl buffer and the homogenate used – as such or after defatting with pentane – as biocatalyst for the hydrolysis of fats and oils containing common and unusual fatty acids as constituents of the triacylglycerols.

The rape seedlings were found to be highly active in the hydrolysis of low-erucic rapeseed oil, high-erucic rapeseed oil, linseed oil, castor oil, borage oil, coriander oil, *Hydnocarpus wightiana* oil and hake (*Merluccius hubbsi*) liver oil, but were unable to hydrolyze the wax esters contained in jojoba oil and orange roughy (*Hoplostethus atlanticus*) oil. Using low-erucic rapeseed oil as substrate the optimum rates of hydrolysis were found at day 4 of germination, pH 8.0 and temperature of 30 °C. In the hydrolysis of borage oil, coriander oil, *Hydnocarpus wightiana* oil and hake liver oil the low-erucic rape seedlings were found to discriminate strongly against gamma-linolenoyl, petroselinoyl, gorlioyl and n-3 docosahexaenoyl moieties, respectively.

The above findings show the potentials of germinating rapeseed as a cheap and easy to obtain biocatalyst for complete hydrolysis of oils or for their partial selective hydrolysis for the enrichment of definite fatty acids.

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N. Weber, E. Fehling, K. D. Mukherjee, K. Vosmann and D. Bergenthal, Münster: *Oleochemicals from plant oils – Hydroxylated fatty acids (HOFA)*

Monohydroxy fatty acids occur in appreciable proportions in the seed oils of a few higher plants, for example *Ricinus communis, Lesquerella fendleri*, and *Wrightia* spp. Among the oils from these plants, only castor oil is of commercial interest.

Hydroxy fatty acids with more than one hydroxy group can be obtained by chemical functionalization of vegetable oils, such as rapeseed or soybean oil. Plant oils functionalized in this way are of great current interest. A novel process for the preparation of hydroxylated fatty acids (HOFA) offering economical and environmental advantages has been described in a recent patent[*] which involves epoxidation of unsaturated fatty acids/acyl moieties of plant oils followed by catalytic opening of the oxirane ring in the presence of water. We have analyzed such technical HOFA methyl esters from various plant oils in order to study their possible use for the production of plastics, e.g. polyurethanes and polyesters.

HOFA prepared from various conventional and alternative plant oils were characterized by various chromatographic methods (TLC, HPLC, and GC) and gas chromatography-mass spectrometry (GC-MS) as well as ^{1}H- and ^{13}C-NMR spectroscopy. Hydroxylated fatty acids, obtained from the fatty acids of *Euphorbia lathyris* oil, 00-rapeseed oil, and sunflower oil contain as major constituents *threo*-9,10-dihydroxystearic acid (derived from oleic acid) and/or dihydroxy-tetrahydrofurane octadecanoic acids (derived from linoleic acid). Other constituents detected in the products include saturated fatty acids (not epoxidized), traces of epoxy-hydroxy fatty acids (formed by partial hydrolysis) as well as estolides. The products may find wide application in a variety of technical products.

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K. D. Mukherjee, K.-D. Richter, E. Schulte and N. Weber, Münster: *Dietary petroselinic acid affects desaturation-chain elongation of linoleic acid to arachidonic acid*

Evidence is accumulating on the beneficial effects of dietary oils containing high levels of the monounsaturated oleic acid (*n*-9 18:1) esterified in the triacylglycerols. Little is known so far on the metabolism of dietary petroselinic acid (*n*-12 18:1) – a positional isomer of (*n*-9 18:1), although studies *in vitro* have revealed that triacylglycerols containing petroselinoyl moieties are hydrolyzed by pancreatic lipase at rather low rates. In order to assess the lipolysis and absorption of such unusual triacylglyerols *in vivo* the seed oil triacylglycerols of coriander (*Coriandrum sativum*) containing 80 % *n*-12 18:1 moieties were fed to a group of male weaned Wistar rats *ad libitum* at a level of 120 mg oil/g feed for a period of 10 weeks. For comparison, groups of rats were fed similar isocaloric diets containing plant oil triacylglycerols with various levels of oleoyl (*n*-9 18:1) moieties, e.g. high oleic sunflower oil (75 % *n*-9 18:1), olive oil (66 % *n*-9 18:1), rapeseed oil (54 % *n*-9 18:1) and conventional high-linoleic sunflower oil (25 % *n*-9 18:1). All diets were supplemented with 20 mg/g feed of corn oil.

Judging from the high fat absorption and low fecal lipid levels, the triacylglycerols of coriander oil were obviously hydrolyzed *in vivo* as readily as the other oils. No statistically significant differences were observed between the groups with respect to the organ weights as well as total cholesterol, HDL-cholesterol and triacylglycerols of blood. Histopathological investigations showed somewhat higher fat infiltration in the liver of the animals fed coriander oil as compared to those of the other groups. Ingestion of coriander oil led to extensive incorporation of *n*-12 18:1 in all tissue lipids examined. Consistently lower levels of arachidonic acid in the lipids of heart, liver and blood of the animals fed coriander oil as compared to those of the groups fed high-oleic sunflower oil and olive oil strongly suggest, taking into account the similar levels of dietary linoleic acid in all the three groups, that dietary petroselinic acid partially inhibits the formation of arachidonic acid.

N. Weber, Münster, H. Taraschewski, Karlsruhe, K. Aitzetmüller and K. Vosmann, Münster: *Lipids and lipid metabolism of the fish parasite P. ambiguus*

Paratenuisentis ambiguus (Acanthocephala) is a parasite in the intestine of the American and the European