

eel. The parasites attach themselves at the wall of the intestine where they cause inflammatory reactions. This inflammation together with the high worm burdens is harmful to the eel leading to retarded growth of this commercially important fish. The growing interest in fish parasitology resulting from the expanding commercial aquaculture for edible fishes and from substantial financial losses by pathogenic effects of parasitic worms prompted us to study the lipids of *P. ambiguus* in comparison with infected tissue of eel intestine. Differences between lipid metabolism of parasite and host might be utilized as a useful approach for the control of acanthocephalans in fish and of endoparasites in general.

Analysis of various neutral and ionic lipid classes, e.g. triacylglycerols, sterols, and phosphatidyl-cholines, of *P. ambiguus* and of infected intestinal tissue of eel show considerable differences in the fatty acid composition of both neutral and ionic lipid fractions from the endoparasite compared to the host tissue. The enrichment of individual fatty acids, in particular eicosapentaenoic acid (20:5 n-3) as well as long-chain and very long-chain saturated fatty acids, in various lipid fractions of the parasites indicates that in *P. ambiguus* species-specific mechanisms exist for the regulation of fatty acid composition by biosynthetic reactions or absorptive and excretory processes. The sterols of *P. ambiguus* contain high proportions (> 20 %) of minor sterols which were identified by gaschromatography-mass spectrometry as campesterol and various dehydrosterols, e.g. 7-dehydrocholesterol and cholesta-5,22(E)-dienol. Moreover, an active enzyme system for fatty acid chain elongation exists in *P. ambiguus* which elongates [1-<sup>14</sup>C]palmitic acid consecutively to stearic and arachidic acids. Highest proportions of radioactive elongation products were detected in phosphatidylethanolamines. In contrast, incubation of *P. ambiguus* with [1-<sup>14</sup>C]oleic acid under similar conditions led to only small proportions of labelled eicosenoic acid.

T. C. Christensen, A.-M. Haahr and Gunhild Hølmer, Lyngby/DK: *Volatile aroma components from autoxidized butter and a spread made of butter and vegetable oil*

The sensory quality of products containing fat is highly dependent on the presence of volatile lipid oxidation products. The process of lipid oxidation typically leads to the formation of a wide range of secondary oxidation products, some of which are potent odorants contributing to a pleasant taste and smell. These volatiles may however sooner or later lead to deterioration.

The oxidation processes are still to-day often followed by simple empirical methods, which are inadequate to characterize the great variety of products formed. The determination of the flavor impact of individual components is very difficult due to the large number of products formed and their different flavor threshold values. Therefore new methods of detection are needed.

In an attempt to correlate different methods for oxidative characterization we examined techniques as GC/MS, GC combined with "sniffing" and conventional analysis as the peroxide and anisidine values.

Butter and the spread were stored under various

conditions at three different temperatures for four weeks to determine flavor stability. These fats were chosen because of the difference in their fatty acid composition and their commercial importance. The volatiles were collected for 30 minutes on an adsorbent trap (Tenax/GR) in a dynamic system operating at 60°C with N<sub>2</sub> as purging gas.

After thermal desorption the volatiles were separated by GC and identified by mass spectrometry and GC with FID by comparison of retention times for available standards. A further characterization was performed by "sniffing" analysis on a GC equipped with an olfactory outlet.

From both the butter and the spread more than 100 compounds could be identified by GC/MS. An increasing total amount of volatiles was formed during storage. The "sniffing" analysis indicated that the following components were important to the sensory quality: Diacetyl, heptanal, 2-heptanone, D-limonene, 1-octene-3-one and 2-nonenane.

A correlation could be seen between the fatty acid composition of the fats and the volatiles expected from simple cleavage of the hydroperoxides formed by oxidation of the unsaturated fatty acids present. The development of different volatiles during the storage was shown to correlate with results obtained by the Totox and the anisidine values.

The methods presented has thus proven to be powerful tools in the characterization of oxidative changes in stored milkfat.

S. Warwel, Barbara Kaiser and W. Kaiser, Münster: *Continuous metathesis of unsaturated fatty acid methylesters with ethylene in a miniplant*

A continuously working miniplant for the metathesis of unsaturated fatty acid methylesters with ethylene was developed. The reaction takes place under pressure of 25 bar ethylene at room temperature in a loop reactor using the tin alkyl activated catalyst Re<sub>2</sub>O<sub>7</sub>/B<sub>2</sub>O<sub>3</sub>-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> in suspension.

Starting with fatty acid methylesters from high-oleic sunflower oil, normal and high-erucic rapeseed oil as well as from linseed oil conversion rates of 60–70% of the unsaturated esters are achieved at an average retention time of 45 minutes yielding  $\omega$ -unsaturated esters and  $\alpha$ -olefins.

N. Tsevegsüren, K. Aitzetmüller, Gisela Werner and T. Otgonbajar, Münster: *Analytical investigation on some seed lipids from Mongolia*

A large number seed fats of flowering plants contain palmitic, oleic, linoleic and  $\alpha$ -linolenic acids in varying proportions as the major components. But many wild species of high plants are capable of synthesizing unusual and technical interesting fatty acids. Recently, there has been much interest in natural source of  $\gamma$ -linolenic and stearidonic acids due to claims of their involvement in