of peripheral blood lymphocytes compared with patients treated by this therapy only. Additionally, the original recipes of enrichment of some food products by beta-carotene (the cheese, the cottage cheese, the bread) were elaborated.

*To whom correspondence should be addressed.

Determination of cholesterol oxidation products in four dried seafood products. Lucy Sun Hwang* & Quen-Song Chen.

Graduate Institute of Food Science and Technology, National Taiwan University, Taipei, Taiwan, R.O.C.

The presence of cholesterol oxidation products (COPs) in foods has received growing concern in recent years, due to the reported atherogenic effects of COPs and their ability to inhibit cholesterol biosynthesis *in vitro*. In this study, the analytical method of COPs in dried seafood products was established and the COPs contents of commercial salted mullet roe, dried squid, dried shrimp and dried scallop products were determined.

Capillary gas chromatography (GC) was employed in the analysis of COPs in dried seafood samples after oil extraction and cold saponification. Cholesterol and eight COPs can be analyzed simultaneously including 5-cholesten-3 β, 7 α-diol (7 α-OH), cholestan-5 β, 6 β-epoxy-3 β-ol (β-EP), cholesterol-5 α, 6 α-epoxy-3 β-ol (α-EP), 5-cholesten-3 β, 7 β-diol (7 β-OH), 20 α–hydroxycholesterol (20 α-OH), cholestane-3 β, 5 α, 6 β-triol(Triol), 5-cholesten-3 β-ol-7-one (7-Keto), and 25-hydroxycholesterol (25-OH). The presence of COPs in dried sea foods was confirmed with both GC co-chromatography and SIM (selected ion monitoring) technique of GC/MS.

Ten commercial samples of each kind of seafood product were surveyed. Results showed that the cholesterol content of salted mullet roe was in the range of 8,000 ppm ~12,000 ppm and there were six COPs found in the range of 15 ppb ~2 ppm. In dried shrimp, the cholesterol content was 1,900 ppm ~2,600 ppm, seven COPs were found in the range of 0.18 ppm ~2.5 ppm. In dried squid, the cholesterol content was 4,600 ppm ~6,200 ppm, seven COPs were found in the range of 10 ppb ~4 ppm. In dried scallop, the cholesterol content was 800 ppm ~1,300 ppm, seven COPs were found in the range of 10 ppb ~7 ppm.

*To whom correspondence should be addressed.

Development of pumpkin seed for production of edible oil: distribution of tocopherols in breeding lines. Michael Murkovic,[a]* Andrea Hillebrand[a], Johanna Winkler[b] & Werner Pfannhauser[a].

[a]*Graz University of Technology, Department of Bio- and Food Chemistry, Petersgasse 12/2, A-8010 Graz, Austria.* b*SZG GmbH, Am Tieberhof 33, A-8200 Gleisdorf, Austria.*

Pumpkin (*Cucurbita pepo*) seed oil is a common salad oil which produced in the southern parts of Austria, Slovenia and Hungary. It is dark green and has a high content of free fatty acids. Due to its colour the oil cannot be used for cooking. The content of vitamin E, especially γ-tocopherol, is also very high. The oil content of the pumpkin seed is about 50%. The seed itself can be eaten. Therefore a pumpkin variety with high vitamin E content is desirable. It can serve as a nutriceutical.

The γ-tocopherol, which is about 5–10 times as much as α-tocopherol, varies over a broad range (41–620 mg/kg dry pumpkin seeds). β-, δ-tocopherol and the tocotrienols are found in low levels.

The aim of this work is to find a variety of *Cucurbita pepo* which has a high oil yield and a high vitamin E content. One hundred breeding lines were tested for their tocopherol and tocotrienol content. The tocols are extracted with hexane and analysed by NP-HPLC/FLD with hexane/dioxan (96/4) as eluent with the detection 292/335 nm. The distribution of the dominant tocols is shown.

The broad distribution of the tocopherol shows a good potential for development of varieties with even higher vitamin E content. Future work will show whether the content of vitamin E is a stable phenotypic trait or is strongly influenced by the climate.

*To whom correspondence should be addressed.

Autoxidation of butter and rape seed oil triacylglycerols. Anna-Maija Lampi* & Vieno Piironen.

University of Helsinki, Department of Applied Chemistry and Microbiology, Post Box 27, Viikki-D, FIN-00014 University of Helsinki, Finland.

The purpose of the experiment was to study and characterize the autoxidation of two very different fat models consisting of natural triacylglycerols (TAG).

The TAGs were purified from butter (BO) and rape seed oils (RSO) and they contained less than 1 μg/g of tocopherols. The amounts of unsaturated acyl groups in the fat models were 23% in BO TAGs and 93% in RSO TAGs. The TAGs were autoxidized in closed flasks at 40°C in the dark for 4 weeks. Autoxidation was followed by measuring oxygen consumption, peroxide values, anisidine values and amounts of volatile aldehydes.

RSO TAGs consumed more oxygen and produced higher peroxide and anisidine values than BO TAGs. However, the amounts of volatile aldehydes were greater in BO TAGs than in RSO TAGs. Also, the profiles of volatile aldehydes in the two fat models differed from each other.

Although RSO TAGs are more reactive to oxygen than BO TAGs, the autoxidation of BO TAGs proceeds more quickly from hydroperoxides to secondary breakdown products than in RSO TAGs.

*To whom correspondence should be addressed.