Fatty acid Profile

Fatty acid profiles are the most important tool for identification of authenticity of vegetable fats and oils. All types of oil have their own specific fatty acid profile which is unique to that product. Fatty acids are typically esterified to a glycerol backbone to form triglycerides (also called fats or oils). Fatty acids are either described as saturated or unsaturated, with saturated fatty acids being solid at room temperature and unsaturated fatty acids being liquid at room temperature. Unsaturated fatty acids are further subdivided into mono-unsaturated (one double bond in the carbon chain) or poly-unsaturated (more than one double bond in the carbon chain). The unique fatty acid profile of each product/crop is a combination of saturated, mono-unsaturated and poly-unsaturated oils and is specific to that type of oil.

Fatty acid profiles of every crop, however, are subject to variation. The variation or typical pattern of fatty acids in a specific oil not only influences the stability and physical properties of the oil but also aids in distinguishing one type of oil from another. Variation of fatty acids within the same product depend on climate, latitude, soil type, cultivar, rainfall as well as seasonal variation. These variations should be included when ranges for identification of authenticity are determined.

It is imperative to include ranges wherein fatty acids vary, in order to successfully validate the authenticity of a specific vegetable oil. Building of a database requires gathering of information over different seasons, areas and cultivars in order to give a true reflection of the ranges wherein fatty acids can differ. Currently, no national updated database for fatty acid composition of soybean oil is available.

It is important that South Africa, as a soybean producing country, develop and maintain a national fatty acid profile database to the benefit of the Oil Seed Industry. Annual analysis of crop and cultivar samples will ensure that the natural variation caused by different cultivars as well as the influence of climate and locality are included in the database values. Seasonal variations will also be addressed. Recording all variation applicable to the crops in the database will enable the annual review of the specified ranges.

Precision Oil Laboratories was subcontracted for the third consecutive season to perform fatty acid profile analyses on 20 composite crop samples representing different production regions as well as 18 cultivar samples from different localities. Please refer to Tables 7, 8 and 9 on pages 33 to 36 for the results.

The following fatty acid were included in the profile analysis:

C14:0	Myristic acid	C18:3n3	n3 Linolenic acid
C16:0	Palmitic acid	C20:0	Arachidic acid
C16:1	Palmitoleic acid	C20:1	Eicosenoic acid
C17:0	Margaric acid	C20:2	Eicosadienoic acid
C17:1	Glinkgolic acid	C21:0	Heneicosanoic acid
C18:0	Stearic acid	C22:0	Behenic acid
C18:1 c	cis Oleic acid	C22:1	Erucic acid
C18:2 c	cis Linoleic acid	C24:0	Lignoceric acid
C18:3n6	n6 Linolenic acid	C24:1	Nervonic acid

References:

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The Fatty acid Profile information was supplied by Dr. Mathilda Mostert from Precision Oil Laboratories.