Formation and Identification of Bitter Compounds in Cold Pressed Linseed Oil from Single Variety Crops

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Cold pressed linseed oil serves as a traditional food in Germany and contains the highest omega 3 fatty acid content with about more than 50 % linolenic acid compared to other common vegetable oils and fats. Therefore it provides an important contribution to the supply of omega 3 fatty acids in a balanced diet. Freshly pressed linseed oil distinguishes itself by a pleasant nutty, bland roasted aroma and exhibits no bitterness. After only a very short time (about one day) it takes on a bitter taste, which increases during the next weeks more and more until it drowns out any other sensation and renders the product practically inedible.

The main bitter compound has been isolated from linseed oil and identified by chemical and physical methods. It turned out to be a cyclic octapeptide with the following amino acid sequence: phenylalanine, praline, leucine, phenylalanine, isoleucine, methionine (oxidized sulphur group), leucine and valine. All lipophilic parts are directed to outside. The structure has been determined by NMR techniques.

A screening method has been developed in order to determine the amount of bitter compound in linseed oil in an easy and rapid way. By means of an RP-18 solid phase cartridge a methanolic extract containing the bitter compound was obtained from 1 g of oil after elution of lipid matrix for direct injection into an HPLC system equipped with an RP column and detection at 210 nm.

The oil of several varietally pure linseed crops were obtained by pressing fresh and sound seeds from varieties Barbara, Eole, Eurodor, Ingot, Juliete, Lrina, Livia, Mikael, Niagara, Recital, Scorpion, Serenade, Sunrise and Taurus. All varieties were grown in a variety growing trial under comparable conditions to focus on differences due to variety.