

Isolation and Characterization of Soy Sauce Melanoidin and its Role as Antioxidant

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Abstract

Controlling oxidation in natural and processed foods is a difficult aspect of food preservation, even in low-fat foods. Lipid oxidation not only produces undesirable characteristic such as odors and flavor, but also decreases the nutritional quality and safety of foods by formation of secondary reaction products during cooking and processing. Protection of foods against lipid oxidation usually involves exclusion of oxygen by packing in vacuum or inert gases and/or the addition of antioxidants.

The Maillard reaction is a complex reaction. A variety of by products, intermediates and brown pigments (melanoidins) are produced, which may contribute to the flavor, antioxidative activity and color of food. The oxidative browning of soy sauce is considered to have a different mechanism from those of ascorbic acid, polyphenols and furfural, because the amount of these compounds in soy sauce is very small.

Maillard reaction products of soy sauce were fractionated into high and low molecular weight compounds by ultrafiltration. Oxidative stability was evaluated in refined soybean oil containing compounds in soy sauce and butylated hydroxytoluene (BHT). Oils were oxidized at 110°C and analyzed by the rancimat method and TBA determination. The high molecular compounds (MW >100 kDa) of soy sauce was found to be more inhibitory on the oxidation of soybean oil with protective index being 2.43. Characteristic of the UV-Vis absorption was 360 Å, -∞ 406 nm and the IR spectra indicated the presence of Å, -∞OH...O groups of ?-diketon or combined C=R=R groups.

Key words : Antioxidative activity, fractionation, melanoidin, Maillard reactions