EFFECT OF GAMMA IRRADIATION ON TRANS FATTY ACID COMPOSITION

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Irradiation of foods can effectively reduce or eliminate pathogens and spoilage microorganisms. On the other hand, irradiation treatment brings about some biochemical changes on the food components. Irradiation of lipid-containing foods induces the production of free radicals, which react with oxygen, leading to the formation of carbonyls, responsible for alteration in food nutritional and sensorial characteristics. The radiolysis of fatty acids leads to the formation of two group long-chain volatile hydrocarbons. The first group comprises hydrocarbons with one carbon less than the original fatty acid and the other group is of 2-alkylcyclobutanones. In addition to these hydrocarbons, trans fatty acids are also formed during irradiation. Trans fatty acid contents of lipid-containing foods increase with applied irradiation doses.

Trans fatty acids are unsaturated fatty acids containing at least a double bond in trans configuration or geometry. Trans fatty acids, due to their chemical and physical characteristics, show more resistance to oxidizing process.

Trans fatty acids, which are formed by various processing methods including irradiation, increase LDL (low density lipoprotein) cholesterol and lower HDL (high density lipoprotein) cholesterol. The adverse effects of trans fatty acids on the ratio of total cholesterol to HDL cholesterol are double that of saturated fatty acids.

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