Incorporation in muscle tissue of polyunsaturated fatty acid omega-3 and synthesis of their metabolites in mice fed with perilla-enriched feed

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Perilla frutescens is a plant native to Asian countries. The seeds of perilla contained approximately 54-64% of polyunsaturated fatty acids, especially alpha-linolenic acid/omega-3 (LNA,18:3n-3), that is important to human health. The aim of this study was to evaluate the incorporation and synthesis of metabolites of omega-3 fatty acid in muscle tissue of mice fed with a perilla-enriched diet. The animals were fed for eight weeks with a diet supplemented with perilla flour (DPF) and as control was used a commercial diet (CD). The mice were sacrificed at 1st, 4th and 8th weeks and their paw muscle tissues were collected. The FA concentration was analysed by gas chromatography. A total of twenty-five fatty acid were identified in muscle tissue of animals fed with DPF and CD. The levels of alpha-linolenic acid (LNA) and their metabolites, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), were increasing as function of feeding duration in the group that received supplemented diet. LNA contents ranging from 12.81 mg.g$^{-1}$TL (CD) in the 1st week to 85.25 mg.g$^{-1}$TL (DPF) in the 8th week. There was the incorporation of LNA and conversion into very long chain polyunsaturated fatty acids. The muscle tissue of animals fed with DPF presented high sum of n-3 FA and high concentrations of LNA, EPA, and DHA as compared to mice fed CD. Perilla flour as a source of essential fatty acids resulted in the incorporation and synthesis of long chain fatty acids (omega-3), as EPA and DHA, which have important functions in the body.