

September 23rd – September 26th 2010
Ohrid, Republic of Macedonia



CCTM 2010

XXI Congress of Chemists and Technologists of Macedonia

BOOK OF ABSTRACTS



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of Macedonia**
(with international participation)

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Hotel Desaret, Ohrid, Republic of Macedonia

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Edited by:

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**XXI Congress of Chemists and Technologists of Macedonia
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SCIENTIFIC TOPICS

ICT INORGANIC CHEMISTRY AND TECHNOLOGY: INORGANIC MATERIALS
OCBP ORGANIC CHEMISTRY, BIOCHEMISTRY AND PHARMACEUTICAL CHEMISTRY
ACE ANALITICAL CHEMISTRY AND CHEMISTRY OF THE ENVIRONMENT
SSC SPECTROSCOPY AND STRUCTURAL CHEMISTRY
CE CHEMICAL ENGINEERING
PPM POLYMERS AND POLYMER MATERIALS
BFT BIOTECHNOLOGY AND FOOD TECHNOLOGY
ECH ELECTROCHEMISTRY
TXE TEXTILE ENGINEERING
MTL METALURGY

FATTY ACID COMPOSITION OF SOME BROCCOLI (BRASSICA OLERACEA) CULTIVARS IN MACEDONIA

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For a long time it has been considered that the consumption of green vegetables has significant health benefit, mainly due to the presence of vitamins, minerals and phytonutrients. Additionally, green vegetables are known to contain a relatively high portion of omega-3 polyunsaturated fatty acids (PUFAs), primarily in the form of alpha-linolenic acid (18:3n-3). Thus, because of being a good source of omega-3 and omega-6 fatty acids, broccoli acts as an anti-inflammatory agent in the body. So far, to the best of our knowledge, there are no available data on fatty acid composition and concentration, for the commonly consumed broccoli in Macedonia. The present study determined fatty acid content of four freshly harvested broccolis, supplied from different parts of the country and four blanched and freezeed samples purchased from the local stores. Extraction of fat was performed using 25% ammonia, 95% ethyl alcohol and hexane. To minimize oxidative degradation of fatty acids the butylated hydroxytoluene was added as a preservative. Fatty acids were than trans-esterified with BF₃/Methanol into fatty acid methyl esters (FAMES), which were analyzed using a Hewlett Packard 5890 series II gas chromatograph with a flame ionization detector. Reliability and accuracy of the analytical method for the detection of fatty acids were ensured by use of the certified reference matrix that consisted a mixture of 37 FAME standards (Supelco 37 Component FAME mix, Sigma-Aldrich). The amount of each fatty acid was calculated from the areas of the component peak and the internal standard (undecanoic acid). The content of the particular component is expressed as percentage from the sum of all analyzed fatty acids. The total fatty acid concentrations for both analysed types of broccoli (fresh and processed) ranged from 0,032% to 0,22% based on fresh weight. The major fatty acid components of freshly harvested florets and freezeed samples of broccoli were α -linolenic acid (C18:3, $\Delta^9, 12, 15$; ranged from 28,49% to 43,21%, linoleic acid (C18:2, $\Delta^9, 12$; ranged from 12,15% to 18,41%), and palmitic acid (C16:0, which ranged from 15,66% to 24,11%) with small amounts of C16 monounsaturated fatty acids (C16:1), stearate (C18:0), and oleate (C18:1). All analyzed samples contained a high proportion of PUFAs, ranging from 59 to 72% of the total fatty acids content. No differences were observed between the freshly harvested broccolis and blanched - freezeed broccolis in the content of total lipids and sum of individual fatty acids. It was also observed that the proportion of these fatty acids vary among the cultivars and the significant differences were observed in the content of C16:0 and C18:3.

The data obtained in this study could contribute to the consumers of vegetables that even during the winter season or in the absence of fresh broccolis the fatty acid content of frozen broccolis remains constant, and especially the content of omega 3 fatty acids which knows that have important role in the treatment of the various diseases. The study of fatty acid composition in some cultivars of broccoli was undertaken because of intensified interest in the nutritional value and the possible role of the n-3 lipids. Broccoli analysed in this study are good source of nutrients and could be utilized as dietary supplements.

Keywords: Fatty acids; PUFA; GC-FID; Broccoli; Macedonia