

Comparison of nutritional properties and in-vitro antioxidant activity of organically grown garlic and its fermented product

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Over the past few years, fermented garlic and its extracts have been increasingly used in cooking and in the daily diet due to their specific taste, nutritional composition and health benefits. The fermentation process is performed by heat treatment of garlic with controlled humidity for a longer period of time. During fermentation, chemical reactions and transformations such as Maillard reactions and caramelization reactions cause the changes in taste, nutritional composition, content of macro- and microelements as well as the content of phenolic compounds and antioxidant activity of garlic. In this paper, samples of garlic and fermented garlic were analyzed and the content of phenolic compounds, antioxidant activity, macro- and microelements as well as nutritional composition were compared. The content of Ca, K, Mg, Na, Mn, Cu, Zn, and W increased, while the content of Fe, Al, Cr, Ni, Mo, Hg and Pb decreased during fermentation. The water content decreased during the fermentation process, while the sugar and carbohydrate content increased significantly as a result of thermal decomposition of the poly- and oligosaccharides (fructan and other complex polysaccharides). Accordingly, the energy value of fermented garlic is higher than that of fresh garlic. The content of total phenolic compounds is higher in the fermented sample compared to fresh one, indicating different chemical transformations of secondary metabolites during the fermentation process. As a measure of antioxidant activity, two assays were performed: DPPH and FIC and both showed higher activity of fermented garlic, which is positively correlated with the higher content of phenolic compounds in the sample.



Fig.1. Appearance and shape of fresh garlic and black garlic bulbs and cloves

Table 1. Comparison of antioxidant activity of garlic and its fermented product

Sample	TPC [mg EKG/g]	DPPH [mmol/L TE/g]	FIC [mmol/L EDTA/g]
Garlic	39 ± 5	0,014 ± 0,007	255 ± 52
Black garlic	904 ± 282	0,324 ± 0,059	365 ± 52

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