

## THE ROLE OF DEPHENOLISATION FOR THE BIOLOGICAL AND TECHNOLOGICAL VALUE OF THE OLD WALNUTS

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The walnut kernel is a natural concentrate of biologically active substances, including polyunsaturated fatty acids, polyphenols and proteins. In addition to the white core rich in lipids and proteins, nut kernels are covered with a polymer pellicle impregnated with phenolic compounds, especially naphthalene- and gallic acid derivatives. It is this pellicle that performs a protective function in relation to the polyunsaturated fatty acids located in the core, since it serves as a barrier to active atmospheric oxygen. It has been shown that there are no significant changes in the fatty acid and protein composition of nuts within three years of proper storage [1]. However, the transformations of juglone, naphthoquinones, phenolic acids and its derivatives, which are just necessary to protect the contents of the kernel, lead to the loss of the marketable appearance and taste of nuts – their oxidative deterioration [2]. In this context, dephenolization seems to be a very efficient method for correcting the taste of two- or three-year-old walnut kernels.

Samples of walnut seeds, harvested in a three-years sequence, were triple extracted with a solution, containing 10...20% ethanol and 0.04...0.08% NaOH. Each extraction was five minutes long. Then all samples were neutralized with 1% citric acid solution and dried on air. After that, dried dephenolized nuts were pressed at 25MPa in order to obtain degreased cake. The oxidative stabilities of the cakes were determined in the Rancimat instrument at 120°C, under a constant air flow of 20L/h). Total phenolic acid content was determined using spectrophotometric method, the results were expressed in Caffeic Acid Equivalent, CAEq, mg/g.

The induction time of oxidation for the dephenolized nuts cake is approximately equal to 9 hours for the cake obtained from kernels stored for a one year, and, respectively, are 8 and 6 hours for two- and three-year-old nuts. The total CAEq in weakly dephenolized samples decreases from 2.5mg/g in the cakes of three-year-old nuts to 1.0mg/g in one-year ones. At the same time, in severely dephenolized samples, there is no obvious dependence of the total phenol content on the age of the nuts. HPLC demonstrates, that hydrolysis of phenolic glycosides takes place.

Antioxidative stability increases significantly from 3-year-old walnuts to 1-year old walnuts. In this case, there is practically no dependence of the oxidation induction time on the degree of the pellicle's dephenolization. The pellicles of two- and three-year old walnuts contain compounds, with low biological activity. So, the dephenolization process does not reduce the biological value of old walnuts, but significantly increases their technological value.

**Keywords:** Caffeic Acid Equivalent, Gallic Acid, Naphthoquinones, Rancimat

### References:

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