**Impregnaton of nuts with ascorbic acid by supercritical technique**

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Abstract

Nuts, in general, are healthy foods rich in unsaturated fatty acids, protein, fiber, antioxidant minerals, B group vitamins, vitamin E, and other phytochemicals (tocopherol, phenolic compounds). Their consumption has been associated with a reduced risk of cardiovascular disease. Unsaturated fatty acids, such as oleic acid and linoleic acid, play an important role in reducing LDL cholesterol [1]. However, during its fruit processing by roasting, there are losses

in some compounds due to the high temperatures applied, and the lipid oxidation is speed up due to damage to the structure of lipid storage cells. It eases the oxygen attack and chemical reactions, provoking a rapid decrease in the oxidative stability. Lipid oxidation is usually implicated with a decrease in shelf life and generation of undesired flavour. Naturally occurring phytochemicals such as tocopherols and polyphenols play an important role in the protection of nuts against fat deterioration. However, tocopherols are usually degraded during roasting, and the amount of native antioxidants is only temporarily able to slow down or prevent the lipid oxidation during storage [1]. Therefore, new alternatives are required to increase the oxidative stability of nuts. In the present work, it was proposed an innovative method to enhance the stability of nuts based on the impregnation of natural antioxidant compounds. Supercritical impregnation was used to impregnate ascorbic acid into different nuts (almonds and cashews). This green technique employs supercritical CO2 as carrier at high pressure and moderate temperatures which avoid the degradation of active compounds [2,3]. The influence of pressure (100-200 bar) and temperature (35-45ºC) on the supercritical impregnation process of ascorbic acid into nuts was studied. The antioxidant loading, calculated by High Performance Liquid Chromatography (HPLC), and the antioxidant capacity of oil nuts before and after impregnation, determined by DPPH assay, were evaluated. Scanning Electron Microscopy (SEM) was used to verify the impregnation process and structural damages. For almonds, the impregnation process was efficient for all the conditions tested. A substantially increase of antioxidant capacity of nuts impregnated was observed. For cashews, the use of 200 bar and 45 ºC favored the impregnation of ascorbic acid with an increase in the antioxidant capacity of the oil.

**Bbliography**

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