

EFFECT OF CAROB ADDITION ON CHEMICAL COMPOSITION AND PHYSICAL QUALITY OF COOKIES

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Carob tree (*Ceratonia siliqua*), which is a plant native to Mediterranean countries, produces a fruit called carob that when milled produces a cocoa-like powder. The carob pulp is rich in sucrose, glucose, fructose, proteins and micronutrients. Besides having no allergenic or stimulating agent, such as cocoa theobromine, it has a high antioxidant potential, contributing to the fight against free radicals and chronic degenerative diseases. Cookies are a product highly consumed worldwide. The objective of this work was to investigate the effect of carob addition on the chemical composition and physical quality of the cookies. Control cookie without carob (with 30% cocoa, to simulate the dark color of the carob) and cookies containing 10, 30 and 50% carob were produced. The wheat flour was obtained from the cultivar BRS Pastoreio (grain hardness index= 39 or medium soft; grain falling number= 431 s; gluten strength= 61×10^{-4} J, elasticity index= 28%, and P/L ratio= 0.6; farinograph stability= 2.4 minutes; gluten index= 76; and, brightness, L*= 96). The ingredients of the basic formulation were: wheat flour, sugar, salt, sodium bicarbonate, hydrogenated vegetable fat, and dextrose solution. Analyses of chemical composition and physical characteristics of the cookies were performed. The data were treated by ANOVA, and the means were compared by the Duncan test ($p \leq 0.05$). The carob added in 10, 30 and 50% levels, changed, proportionally, the composition of cookies: significantly increased ash content, acid and neutral detergent fiber, and total carbohydrates contents; and decreased lipid, protein and sugar contents. The control cookie presented moisture smaller than cookies added with carob, but its chemical composition and water activity results were similar to 10% carob cookie. In relation to physical characteristics, the diameter and expansion factor increased significantly from the control to 50% carob cookie. There was no significant change in cookie specific volume. The cookie color became darker (low L* value) as the percentage of carob increased, and the 10% carob cookie presented a more similar color to the control. The application of carob flour can be an alternative, in spite of its high cost, to produce a functional food, once carob added to cookie formulations causes no detrimental effects in its physical characteristics.

Keywords:

Ceratonia siliqua, cookie evaluation, functional food