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Prebiotic dietary fiber from soybean hulls for gluten-free cookies fortification

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Soybean hull have been shown to contain significant amounts of dietary fibre (DF) including arabinogalactans, arabinoxylans and pectin-related acidic polysaccharides. By means of an acid chemical treatment of the soybean hull, DF with prebiotic properties were isolated, obtaining a yield of 5.7 g/100 g d.m. The physico-chemical characteristics of the obtained DF were: 83% fiber, 10.5% moisture, 3% protein, 0.13% fat, 3% ash.

Gluten-free rice cookies were obtained containing the isolated DF. Rice flour was substituted with 10% DF (10CDF) and 20% DF (20CDF), respectively. The cookie sample (without added fiber) was the control cookie (100% rice flour). Other ingredients used in cookies formulations were: eggs, sugar and butter. Following a dose-effect response, cookies with DF had higher total polyphenols content (47.2 – 69.3 mg GAE/100 g d.m.) and antioxidant capacity (45.7 – 51.3 mg Trolox/100 g d.m.) compared to the control. The cookies' physico-chemical analysis showed that cookies 10CDF represented a "source of dietary fibers" (4.1% fiber content), while cookies 20CDF were "rich in dietary fiber" (7.9% fiber content), according to the nutritional claims from Regulation no. 1924/2006. The energy value of the DF fortified cookies decreased compared to the control by 3.8% (10FCS) and 6.3% (20FCS), respectively. The DF addition led to darker and smaller (in diameter) cookies. Moreover, DF addition produced softer cookies (cookies' hardness was decreased by almost 29% for 10CDF and 14% for 20 CDF). The electronic nose analysis showed that DF cookies had different volatile composition, with a discrimination index of 85 between 10CDF and 20CDF.

The study showed the possibility to create novel gluten-free cookies with improved texture and nutritional quality through the fortification with isolated DF from soybean hull.

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