# Coffee silverskin as a source of antioxidant dietary fiber in chocolate cakes

S8-P-05

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28th Conference Asic 2021 From 28 June to 1 July 2021




**Introduction.** Coffee silverskin, CS, corresponds to the integument that covers the raw coffee bean, and is a solid residue generated in coffee roasting, where it is detached from the beans, carried away by the heating air and collected from the exhaust gas by cyclone separation. This residue has been reported to present high contents of dietary fiber as well as high antioxidant potential and prebiotic activity, and thus a few recent studies that evaluated its potential as an ingredient in food products such as breads and cakes. In view of the aforementioned, the aim of this study was to confirm the potential of CS as a source of antioxidant dietary fibers in cakes. Previous studies [1] employed water treatment of the fiber in order to decrease bitterness. However, such treatment could hinder its antioxidant potential, so in the present study we decided to employ CS without any treatment in a chocolate-flavored cake, assuming that chocolate should be able to mask some of the bitterness.

**Materials/Methods.** Coffee silverskin (Arabica variety) was donated by a local roaster (Luz, MG, Brazil), ground, sieved (D < 0.5 mm) and used without further processing (CS). Chocolate-flavored cake mixtures were purchased from a local market in Belo Horizonte, MG, Brazil. The cakes were prepared by replacing part of the mixture by CS, resulting in four formulations: F0 (control), F1 (2.6% CS), F2 (3.6% CS) and F3 (4.6% CS). The prepared cakes were evaluated in terms of color, extractable and non-extractable (macroantioxidants) phenolics, ant total antioxidant capacity, according to the methodology described in the literature [2] as well as sensory analysis. The evaluated sensory attributes were color, smell, taste, texture and overall impression, according to a 9-point hedonic scale.

**Results/Discussion.** Addition of CS increased total dietary fiber content from 2.7 (F0) to 6.3g/100g (F3), and FRAP-based antioxidant capacity from 2.8 (F0) to 6.5 mM$FeSO_4$/g (F3). The ammount of macroantioxidants increased from 8.9 (F0) to 16.1 mg/100g (F3). No significant differences were observed in terms of color, texture and aroma of the cakes. The cakes with lower amounts of CS (F1 and F2) presented the same acceptance level. The three-way internal preference map (Fig. 1), indicated that the cake without CS (F0) was preferred among the samples, cakes with 2.6% and 3.6% of CS were similarly appreciated, and the cake with 4.6% of CS was the least accepted. Overall impression and taste were the most important attributes to explain the arrangement of the samples; F1 and F2 did not differ for taste and were preferred for overall impression.

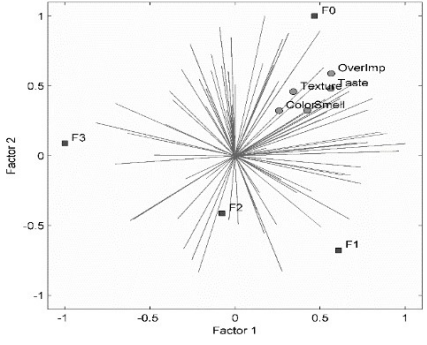


**Figure 1:** Internal preference mapping three-way for color, aroma, taste, texture and overall impression of chocolate cakes.

**Conclusion/Perspectives.** The inclusion of CS increased the total dietary fiber content and the antioxidant capacity of chocolate cakes, regardless of the high temperatures achieved during baking. Sensory analysis showed that the cake formulations did not differ in color and aroma, even with the addition of CS. The three-way internal preference map showed that cakes with 2.6% and 3.6% of CS were equally preferred and these results indicated that addition of CS to chocolate cakes up to 3.6% would provide a significant improvement in terms of functional potential within acceptable sensory parameters.

**References.** [1] *Ates G, Elmaci Y (2018) LWT 90, 519-525.* [2] *Resende LM, Franca AS, Oliveira LS (2019) Food Chem 270: 53-60.*