

## Analysis of the production of sliced bread enriched with bioactive compounds present in coffee.

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### Abstract

The present work aims at the elaboration of a final product with functional properties, based on the enrichment of the bread with bioactive compounds present in the coffee. The concentration of the phenolic compounds and antioxidants in the beverage and in the raw and roasted mass of the enriched bread were evaluated in order to identify possible losses in the amount of these compounds due the cooking process. The sensory analysis of the product, shelf life test by the visual presence of molds and yeasts and the analysis of the phenolic compounds and antioxidants were carried out to determine their interactions. The influence of the addition of extract in the shelf life of the product and in the sensorial attributes that directly influence the acceptance and intent to buy the final product by the participants were verified.

### Key words:

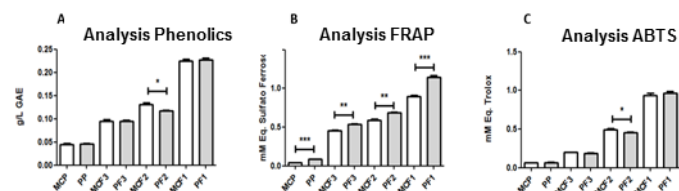
Compounds bioactive, Coffee, Bread.

### Introduction

The study investigated the bioactive compounds present in coffee and used the extract to enrich a bakery product, analyzing the influence of this addition on the preservation of the product<sup>1</sup>. The presence of the phenolic compounds and antioxidants was measured before and after the cooking process of the bread. In the sensorial analysis, the main attributes relevant to the final product were identified by the consumers aiming at commercial viability.

### Results and Discussion

The results obtained suggest that the phenolic compounds are resistant to the cooking process of the bread, considering that there is loss of water during cooking, although the differences were small and the data remained close to those that were originally observed. The incorporation of the coffee extract increased the concentration of phenolic compounds and antioxidants in proportion to their concentration.

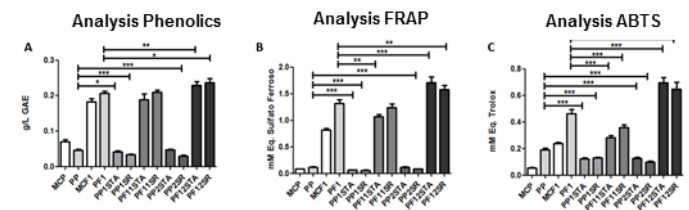


**Figure 1.** Comparison of the concentration of phenolic compounds and antioxidants present in the raw bread dough (MC: raw dough) and on the baked bread (P: baked bread). P: standard formulation; F3: formulation 3 - 25%; F2: formulation 2 - 50%; F1: formulation 1 - 100%. Statistical difference indicated by (\*) for p values <0.05, (\*\*) for p values <0.01 and (\*\*\*) for p values <0.001.

The main compounds present in the sample were gallic acid, caffeine, and chlorogenic acid, identified by high performance liquid chromatography (HPLC).

The visual analysis of the breads for shelf life test of the product showed a difference of 27 days of degradation between the control samples. The addition of the extract along with the chemical analysis demonstrated that the extracts remained stable,

suggesting the increase of the validity of the food due to the addition of the extract.



**Figure 2.** Comparison of the concentration of phenolic compounds and antioxidants present in the raw bread dough (MC: raw dough) and in the baked bread (P: baked bread) in two formulations. P: standard formulation; F3: formulation 3 - 25%; F2: formulation 2 - 50%; F1: formulation 1 - 100%. Statistical difference indicated by (\*) for p values <0.05, (\*\*) for p values <0.01 and (\*\*\*) for p values <0.001.

In relation to the sensorial analysis, we identified the attributes of taste and bitterness as the characteristics that most influenced the sensorial aspects of the product for consumers.

### Conclusions

In summary, the work investigated the use of these substances not only to improve nutritional value, but also as an alternative to the chemical substances commonly added to the food for its conservation, as well as its commercial viability.

### Acknowledgement

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<sup>1</sup>RAHAIE, S. *et al.* Recent Developments on New Formulations Based on Nutrient-Dense Ingredients for the Production of Healthy-Functional Bread: A Review. Journal of Food Science and Technology, V.51 n.11, 2014.