EuroSciCon

10th Edition of International Conference on

Food Safety And Regulatory Measures

May 23-24, 2019
Zurich, Switzerland

J Food Nutr Disor 2019, Volume 8
DOI: 10.4172/2324-9323-C3-030

Comparative study of the effect of different coffee extraction methods in antioxidant capacity and aluminum content

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Background: Coffee is the most consumed non-alcoholic beverage around the world. This beverage is obtained from the infusion of the seed of the coffee fruit. In recent years, coffee consumption has increased significantly, due to the new extraction and consumption methods of this drink, such as espresso coffee capsules. Furthermore, in several studies the consumption of coffee and their beneficial effects on health have been published.

Objective: The objective of this work was to investigate the effect of new coffee extraction and consumption methods on bioactive compounds composition and on antioxidant capacity of this beverage, and also to evaluate the possible migration of aluminum to coffee beverage in the new types of packaging and preparation of coffee.

Methods: In order to reach this objective, the antioxidant capacity was determined, the analysis and quantification of bioactive compounds was carried out, the melanoidin content was determined and the aluminum concentration levels were measured in the different coffee samples obtained.

Results: The main results achieved in this study showed that the coffee beverages made with an espresso capsule machine presented a significant decrease in the antioxidant capacity and in the content of phenolic compounds compared to coffee beverages made with traditional moka or filter coffee machines. The amount of chlorogenic acid, caffeic acid and caffeine were significantly lower in these new coffee brewing formats, and this fact could be related to the lower antioxidant activity perceived in capsules coffee samples. Regarding the aluminum content, it was found that the coffee beverage had lower concentrations of aluminum than tea, and surprisingly, decaffeinated coffees shown a significant increase of the content of this metal.

Conclusion: This study suggests that coffee made by capsule extraction method has fewer antioxidant compounds than coffee made by traditional methods. There is no increase in the concentration of aluminum in the coffee beverage made by the capsule method, but the industrial decaffeination methods of the green coffee bean should be studied deeply, due to the significantly elevated aluminum values of this type of coffee.

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