

## Development of a Dairy Drink Made of Cocoa, Coffee and Orange By-Products with Antioxidant Activity

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**Abstract :** Agro-industries generate large amounts of waste, which are mostly untapped. This research was carried out to use cocoa, coffee and orange industrial by-products to develop a dairy drink. The product was prepared by making a 10% aqueous extract of the mixture of cocoa and coffee beans shells and orange peel. Extreme Vertices Mixture Design was applied to vary the proportions of the ingredients of the aqueous extract, getting 13 formulations. Each formulation was mixed with skim milk and pasteurized. The attributes of taste, smell, color and appearance were evaluated by a semi-trained panel by multiple comparisons test, comparing the formulations against a standard marked as "R", which consisted of a coffee commercial drink. The formulations with the highest scores were selected to maximize the Total Polyphenol Content (TPC) through a process of linear optimization resulting in the formulation 80.5%: 18.37%: 1.13% of cocoa bean shell, coffee bean shell and orange peel, respectively. The Total Polyphenol Content was  $4.99 \pm 0.34$  mg GAE/g of drink, DPPH radical scavenging activity (%) was  $80.14 \pm 0.05$  and caffeine concentration of 114.78 mg / L, while the coffee commercial drink presented  $3.93 \pm 0.84$  mg GAE / g drink,  $55.54 \pm 0.03$  % and 47.44 mg / L of TPC, DPPH radical scavenging activity and caffeine content, respectively. The results show that it is possible to prepare an antioxidant - rich drink with good sensorial attributes made of industrial by-products.

**Keywords :** DPPH, polyphenols, waste, food science

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