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Phenolic profile and antioxidant activity of different pigmented corn (*Zea mays* L.) samples

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ABSTRACT

In recent years, the prevalence of gluten-related disorders (GRDs) has increased. The commonly recognized GRDs are celiac disease, non-celiac gluten sensitivity and wheat allergy. The total exclusion of gluten from diet is the only accepted treatment for patients with GRDs. However, a long-term gluten-free diet (GFD) could cause some nutritional deficiencies and affects significantly the dietary choices and the quality of life of patients.

All these findings highlight the need for an improvement in the nutritional and sensory quality of gluten-free products.

Corn (*Zea mays*) is one of the most common alternatives to gluten-containing grains in the GFD. Among different varieties, pigmented corn contains anthocyanins, carotenoids and phenolic compounds with well-known antioxidant and bioactive properties. Due to its good nutritional profile, pigmented maize could represent an interesting ingredient for the formulation of novel gluten-free products. In addition, the use of hybrid corns could improve the agricultural productivity and increase growth in temperate climate areas.

The aim of this study was the characterization of phenolic profile and the evaluation of antioxidant activity of some maize phenotypes: one purple corn, three yellow corns and three hybrids. Two extraction methods were applied for the profiling of free and bound phenolic compounds. Then, in order to evaluate the antioxidant activity, three *in vitro* assays were optimized and applied: 1) Folin-Cocalteau's assay for the quantification of total polyphenol content; 2) DPPH (1,1,-diphenil-2-picrylhydrazyl) and TEAC (Trolox Equivalent Antioxidant Capacity) assays for the assessment of radical scavenging activity; 3) High Performance Thin Layer Chromatography (HPTLC) for the separation and semi-quantitative characterization of phenolic substances, assessing in parallel the associated antioxidant activity.

In addition, the total anthocyanin content of pigmented varieties was measured spectrophotometrically, while preliminary anthocyanins screening was performed using HPTLC.

All analytical methods presented in this study showed a similar and comparable trend and they supplied a useful approach for the evaluation of antioxidant activity in corn samples. Among samples analysed, hybrid varieties showed an interesting antioxidant profile in terms of free and bound phenolic compounds.