Bangladesh J. Bot. **53**(3): 495-502, 2024 (September) DOI: https://doi.org/10.3329/bjb.v53i3.76262

COMPARISON OF PHENOLICS, FLAVONOIDS AND ANTHOCYANINS IN PIGMENTED AND NON-PIGMENTED MAIZE IN BANGLADESH

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Keywords: Phenolics, Flavonoids, Anthocyanin, Pigmented maize, Non-pigmented maize

Abstract

In the present study the composition of phenolics, flavonoids and anthocyanins in a purple maize (SAU Bhutta 3) variety were determined and compared its phytonutrients with those of other maize varieties cultivated in Bangladesh. The SAU purple maize contained 106.0 ± 8.3 and 165.1 ± 8.0 mg /100 g of methanol soluble and acidic methanol soluble polyphenols, respectively. The SAU Bhutta 3 had the greatest amount of flavonoids (77.0 ± 10.0 mg /100 g) and anthocyanins (69.0 ± 5.0 C3G equv./100 g). Nevertheless, the SAU white maize variety had 31.0 ± 2.0, 47.0 ± 4.4 mg FAE/100 g and 9.0 ± 2.0 mg CE/100 g of free and bound phenolics and total flavonoids, respectively, which were lower than those of the SAU Bhutta 3. Again, the SAU red maize contained the lowest level of total anthocyanins (4.11 ± 1.2 mg C3G/100 g). The SAU Bhutta 3 exhibited higher proportions of insoluble phenolics compared to total phenolics and flavonoids compared to insoluble phenolics. Overall, the SAU Bhutta 3 contained relatively high amounts of phenolics, flavonoids and anthocyanins; thus, this particular maize variety shows significant potential for future utilization.

Introduction

Maize kernels are the largest seed-storage food among cereals. Maize kernels possess both pigmented and non-pigmented pericarps, with pigmentation attributed to a variety of colored phytochemical compounds and secondary metabolites. The primary pigments or compounds found in maize pericarp include various types of phenolics, flavonoids, anthocyanins, carotenoids, and more. Notably, among these color compounds, phenolics are particularly abundant in maize (Adom and Liu 2002, Pandey and Rizvi2009). The primary categories of polyphenols could encompass phenolic acids, flavonoids, anthocyanins, stilbenes, and lignans (Rigacci 2015). Flavonoids exhibit a broad spectrum of colors ranging from light yellow to blue, and they play a key role in determining the color of the pericarp (Santos *et al.* 2017). The major types of flavonoids identified in cereal grains are flavonols, anthocyanins and proanthocyanidins. Anthocyanins are water-soluble phenolics that result in red, purple and blue coloration in cereal grains (Bueno *et al.* 2012). Numerous research findings indicate that incorporating phenolic-rich diets into one's meal plan offers significant health advantages. These diets have been associated with anti-cancer, heart-protective, anti-inflammatory, neuroprotective, cholesterol-lowering, blood sugar-regulating, and lipid-lowering effects. Additionally, they have demonstrated anti-tumor properties and the ability to decrease oxidative stress (Adom and Liu 2002, Wu *et al.* 2016, Leuci *et al.* 2020,). The color of maize also has many industrial uses, for example, for preparing drinks and producing edible colors (Nuss and Tanumihardjo 2010, Colombo *et al.* 2021).

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