

Capsaicinoids content and antioxidant activity in Brazilian *Capsicum* chili peppers.

Stanislaw Bogusz Junior ^{1*} (PQ), Janclei Pereira Coutinho ² (PG), Helena Teixeira Godoy ² (PQ).

¹ Federal University of the Jequitinhonha and Mucuri – UFVJM

² University of Campinas – UNICAMP

* sjbogusz@gmail.com

Palavras Chave: *Capsicum*, Capsaicinoids, Fenolics, FRAP, DPPH.

Introdução

Sweet and hot *Capsicum* peppers are important food ingredients cultivated worldwide. The peppers are used as vegetable foods and as spice due to their typical color, pungency, taste and distinct aroma ¹. Researches have attributed antioxidant activity (AOX) to *Capsicum* peppers mainly because they are good sources of carotenoids, vitamin C, vitamin E, alkaloids, flavonoids and capsaicinoids ^{2, 3}. Considering that little is known about antioxidant activity of Brazilian *Capsicum* peppers, the purpose of this study was to determine capsaicin and dihydrocapsaicin (UPLC), total phenolic content (Folin-Ciocalteu), AOX (ferric reducing antioxidant power (FRAP) and 2,2 -diphenyl-1-picrylhydrazyl radical scavenging (DPPH)) for three varieties of Brazilian *Capsicum* chili peppers: malagueta (*C. frutescens*), murupi (*C. chinense*) and dedo-de-moça (*C. baccatum* var. *pendulum*) at two different maturation stages in two different harvest years.

Resultados e Discussão

Chromatographic method validation was performed in an UPLC Acquity (Waters), using a Hypersil Gold C₁₈ (2.1 x 10 0mm, 1.9 µm), PDA detector at 280 nm; mobile phase A: water (0.01% formic acid) and B: acetonitrile (0.01% formic acid); initial mobile phase with 41.8% of B; 3.96 min of linear gradient time to reach 100% of solvent B; flow rate of 0.679 mL min⁻¹. The parameters of the method validation including: linearity, precision, limits of detection (LOD) and limit of quantification (LOQ), in addition to relative recovery at various levels of fortification. The UPLC method showed good linearity (9.5-95 µg mL⁻¹) and the limits of detection (LOD) and quantification (LOQ) of the targeted capsaicinoids were 0.09 and 0.017 µg mL⁻¹. *C. frutescens* exhibited the highest capsaicin values (25.4 mg g⁻¹) and dihydrocapsaicin (18.2 mg g⁻¹) while *C. baccatum* had the lowest values (2.6 mg g⁻¹ and 1.3 mg g⁻¹). The capsaicinoids presented a tendency of increase their concentrations with the maturation of peppers in the two harvest years. On the other hand, the highest values of total phenolic content in samples were observed to malagueta (2.4 mg g⁻¹) followed by

murupi (2.3 mg g⁻¹) and dedo-de-moça pepper (2.2 mg g⁻¹). In the first harvest year, the increase in total phenolic content was ca. 1.9 fold for the malagueta and murupi peppers, ca. 2.3 fold for dedo-de-moça. In the second year, the increase was ca. 2.0 fold for the three peppers. Our findings demonstrate an increase for total phenolic content during pepper maturation. Moreover, the mature samples in first year of harvest showed the major results for FRAP (1.76 mg g⁻¹ in malagueta, 1.73 mg g⁻¹ in murupi and 1.60 mg g⁻¹ in dedo-de-moça pepper). In the first year, this increase was ca. 1.8 fold for malagueta, 2.0 fold for murupi and 2.1 fold for dedo-de moça pepper. In the second year, this increase was ca. 1.2 fold for the three peppers analyzed. For DPPH, the mature peppers in the first year of harvest presented the lowest IC₅₀ values (0.42 mg g⁻¹ for malagueta; 0.37 mg g⁻¹ for murupi and 0.52 mg g⁻¹ for dedo-de-moça pepper). The results clearly demonstrated an increase in AOX by FRAP with the ripening process in both years of harvest, this results are in accordance with those find by Deepa et al. (2007). We found high positive correlations (p > 0.01) among CFT and FRAP (r = 0.98) and among CFT and IAA (r = 0.83), and negative correlations among total phenolic content and DPPH IC₅₀ (r = -0.71).

Conclusões

Ours findings demonstrated that the three peppers studied differed in capsaicinoids content and AOX, according to their periods of maturation and harvest years. We found significant positive correlations between both AOX methods and total phenolic content. This data may possibly add valuable new information on existing knowledge about Brazilian pepper fruits.

Agradecimentos

¹ Bogusz, S. et al., Anal. Methods, **2014**, 7, 521–529.

² Deepa, N. Kaur, C., George, B., Singh, B., Kapoor, H.C. LWT - Food Sci. Technol., **2007**, 40, 121–129.

³ Hallmann, E. & Rembiałkowska, E. J Sci Food Agric. **2012**, 92, 2409-2415.