5th BCNP Brazilian Conference on Natural Products
XXXI RESEM
Atibaia – SP – Brazil
ISBN: 978-85-66836-10-3
Oct. 26–29th 2015

BIOACCESSIBILITY AND CHANGES IN CAROTENOID PROFILE FROM MANGO (*Mangifera indica* L.) AFTER SIMULATED *IN VITRO* DIGESTION

Ana Augusta O. Xavier, Lilian B. Mariutti, Daniele B. Rodrigues, Adriana Z. Mercadante

Department of Food Science, Faculty of Food Engineering, University of Campinas, Campinas-SP, Brazil; anaaugustax@gmail.com

Carotenoids are natural pigments synthesized by higher plants, algae and bacteria, whose coloration varies from yellow to red. In mammals, the main biological function of some carotenoids is their role as precursors of vitamin A, an important vitamin to vision, growth, cell differentiation and other physiological processes. The structural requirement for a carotenoid to exhibit provitamin A activity is the presence of at least one β-ring attached to a polyenic chain of 11 carbon atoms. Thus, among 700 carotenoids described in nature, only about 10% present provitamin A activity. Mango (*Mangifera indica* L.) is a great contributor to the provitamin A carotenoids intake in the Brazilian diet. However, these compounds must be bioaccessible to exert their biological functions. In the present study, we determined the *in vitro* bioaccessibility of carotenoids from mango (*cv.* Tommy) and the changes in the carotenoid profile, by HPLC-DAD-MS/MS, after *in vitro* digestion. The *in vitro* digestion was performed according to Minekus et al. [1] and the micellar fraction was isolated by centrifugation (20,000 *g*, 10 min, 4 ºC) and filtration through a membrane (0.20 µm). Total carotenoid content of fresh fruits was 31.3 ± 2.5 µg/g, being all-*trans*-β-carotene (17%), all-*trans*-violaxanthin (14%), 9-*cis*-violaxanthin (13%) and all-*trans*-luteoxanthin (2%) the major carotenoids (Figure 1). Carotenoid esters were also found, mainly violaxanthin mono and diesters. Similar carotenoid profiles were previously reported for *Kensington Pride*, *Haden*, *Ataulfo* and *Manila* mango varieties [2, 3]. Carotenoid bioaccessibility after *in vitro* digestion was 27.4%. This value is in the range of the bioaccessibility of carotenoids from fruits and vegetables, which usually varies from 5 to 100% depending on the matrix [4]. The major free carotenoid in the micellar fractionwas also all-*trans*-β-carotene (27%). Nevertheless, other qualitative and quantitative changes were noticed in the carotenoid composition after the digestion process. The most noteworthy was the reduction of 90% of the diester fraction. Further studies are being carried out to identify the carotenoid mono and diesters.

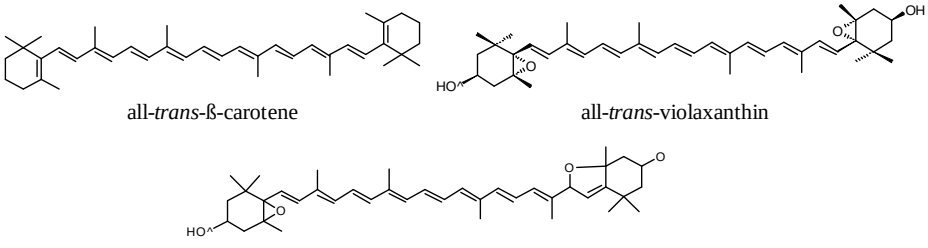

Figure 1. Chemical structures of major carotenoids found in mango (*cv.* Tommy).

[1] Minekus, M. et al. 2014. A standardized static *in vitro* digestion method suitable for food – an international consensus. *Food Funct.* 5:1113:1124.
[2] Low, D.Y., D'Arcy, B. and Gidely, M.J. 2015. Mastication effects on carotenoid bioaccessibility from mango tissues. *Food Res. Int.* 67:238-246.
[3] Ornelas-Paz, J.J., Yahia, E.M. and Gardea-Bejar, A. 2008. Identification and quantification of xanthophyll esters, carotenes, and tocopherols in the fruit of seven Mexican mango cultivars by liquid chromatography - atmospheric pressure chemical ionization – time-of-flight mass spectrometry [LC-(APcI$^+$)-MS]. *J. Agric. Food Chem.* 55:6628-6635.
[4] Gõni, I., Serrano, J. and Saura-Calixto, F. 2006. Bioaccessibility of β-carotene, lutein, and lycopene from fruits and vegetables. *J. Agric. Food. Chem.* 54:5382-5387.