A physiological approach to evaluate the antioxidant capacity of the different matrixes of grapefruit

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It is well known that grapefruit is rich in polyphenols, particularly naringenin, which exhibits antioxidant and antiflammatory properties[1]. This study aimed at evaluating the influence of an enzymatic *in vitro* gastrointestinal digestion (GAR method[2]), followed by fermentation, on the antioxidant capacity of the different matrixes of grapefruit. This is a physiological-resembling approach to extract antioxidants from the following grapefruit parts: zest, rind, pulp, and juice (obtained from red and white grapefruit), including also two commercial juices. The analyses were conducted on the fresh soluble fractions obtained after *in vitro* digestion and fermentation (potentially absorbable fraction), and the lyophilized solid fractions obtained after fermentation (non-absorbable fraction). The antioxidant capacity was evaluated with five different methods: ABTS, Indigo Carmin Hydroxyls and Indigo Carmin AAPH methods for the radical scavenging activity; FRAP and Indigo Carmin reduction methods for the reducing ability.

The results showed that rind possess the highest antioxidant capacity, probably because this part has the highest concentration of naringin, the main polyphenol of grapefruit. Of note is that the soluble fractions derived from digestion possess higher scavenging activity rather than the soluble fraction from fermentation, which on the contrary has a higher reducing ability. The resulting insoluble fractions from fermentation, analysed with the same antioxidant methods, showed no antioxidant activity in any of the assays.

These preliminary data will be corroborated through the analysis of polyphenols and their metabolites by means of mass spectrometry, in both digested and fermented soluble fractions. These results will demonstrate in what way changes the composition due to the *in vitro* gastrointestinal digestion model.

This new *in vitro* model, that mimics the human physiologic digestion and fermentation, allows the determination of both soluble fractions submitted to digestion and fermentation. The data so obtained better reflect how the digestion can modulate the antioxidant capacity of food matrixes.

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2. Pastoriza S, Delgado-Andrade C, Haro A, et al. *Food Chem* 2011; 129: 1926–1932.