

## Stability of Total Phenolic Concentration and Antioxidant Capacity of Extracts from Pomegranate Co-Products Subjected to In vitro Digestion

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**Abstract :** Co-products obtained from pomegranate juice processing contain high levels of polyphenols with potential high added values. From value-addition viewpoint, the aim of this study was to evaluate the stability of polyphenolic concentrations in pomegranate fruit co-products in different solvent extracts and assess the effect on the total antioxidant capacity using the FRAP, DPPH<sup>·</sup> and ABTS<sup>·+</sup> assays during simulated in vitro digestion. Pomegranate juice, marc and peel were extracted in water, 50% ethanol (50%EtOH) and absolute ethanol (100%EtOH) and analysed for total phenolic concentration (TPC), total flavonoids concentration (TFC) and total antioxidant capacity in DPPH<sup>·</sup>, ABST<sup>·+</sup> and FRAP assays before and after in vitro digestion. Total phenolic concentration (TPC) and total flavonoid concentration (TFC) were in the order of peel > marc > juice throughout the in vitro digestion irrespective of the extraction solvents used. However, 50% ethanol extracted 1.1 to 12-fold more polyphenols than water and ethanol solvents depending on co-products. TPC and TFC increased significantly in gastric digests. In contrast, after the duodenal, polyphenolic concentrations decreased significantly ( $p < 0.05$ ) compared to those obtained in gastric digests. Undigested samples and gastric digests showed strong and positive relationships between polyphenols and the antioxidant activities measured in DPPH, ABTS and FRAP assays, with correlation coefficients ( $r^2$ ) ranging between 0.930 - 0.990 whereas, the correlation between polyphenols (TPC and TFC) and radical cation scavenging activity (in ABTS) were moderately positive in duodenal digests. Findings from this study also showed that the concentration of pomegranate polyphenols and antioxidant thereof during in vitro gastro-intestinal digestion may not reflect the pre-digested phenolic concentration. Thus, this study highlights the need to provide biologically relevant information on antioxidants by providing data reflecting their stability and activity after in vitro digestion.

**Keywords :** by-product, DPPH, polyphenols, value addition

**Conference Title :** ICFET 2016 : International Conference on Food Engineering and Technology

**Conference Location :** Miami, United States

**Conference Dates :** December 05-06, 2016