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ESTRATÉGIAS PARA A EXCELÊNCIA,

AUTENTICIDADE, SEGURANÇA

E SUSTENTABILIDADE ALIMENTAR

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PC-B30: Nutritional and phytochemical composition of *Carica papaya* L. by-products: new strategies for food security and sustainability

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Carica papaya is a predominant plant in tropical Africa and Central America with high importance for farmer incomes. It is known as "the fruit of angels", due to it nutritional value and low cost. It ranks second as a source of β-carotene, containing also natural sugars, vitamins C and E, B complex vitamins, and minerals, with fair amounts of calcium and phosphorus.[1] Low in calories, this exotic fruit promotes the health of the cardiovascular system and provide protection against colon cancer. In addition, papaya contains papain (digestive enzyme), which is used to treat sports injuries, other causes of trauma, and allergies.[2] Nowadays, papaya is the third most consumed tropical fruit in Europe. Therefore, the fruit processing industries generate a high volume of by-products (seeds and peels). These by-products hold nutrients and phytochemicals that can be used as value added ingredients for food and pharmaceutical applications. Therefore, the objective of the current study was to evaluate the nutritional composition and antioxidants content of seeds and peels of two papaya varieties marketed in Portugal (aliança and formosa). Ash, total fat, protein and dietary fibre, expressed as g/100 g of dry weight, were determined following the AOAC methods[3]. The free sugars were evaluated by chromatographic analysis using an HPLC-ELSD system.[4] Fatty acids methyl esters (FAME) were prepared, in triplicate, according to ISO (12966-2:2011) and their profile determined by GC-FID.[5] Total vitamin E was analysed by HPLC-DAD-FLD.[6] The content of total phenolics, flavonoids and antioxidant activity (DPPH$^{\bullet}$ and FRAP inhibition) were determined by spectrophotometric methods.[7] The seeds of aliança and formosa fruit varieties are a rich source of proteins (29.03% and 27.14%), lipids (25.30%) and inorganic matter (8.62% and 9.50%). Sugars in the free form (glucose and frutose) were detected in low amounts, contrarily to the fibre content. Regarding the fatty acid profile, both seed fruit varieties are rich in oleic acid (18:1) (72.60 and 73.60% for aliança and formosa, respectively), a monounsaturated fatty acid linked to health benefits. Vitamin E (mainly α-tocopherol) ranged between 32.3-37.3 mg/kg for aliança and formosa seeds, respectively. Regarding fruit peels, both varieties also present high content of proteins (26.56% and 19.79%), significantly lower content of total fat (2.8% and 3.4%) but higher mineral content (15.8% and 13.8%, respectively). Formosa peels displays the highest content of free sugars (173.6 mg/g and 151.8 mg/g for frutose and glicose, respectively). Like seeds, the two fruit varieties peels also show considerable fibre content. The fatty acid profile in fruit peels was quite different from that described in seeds, being α-Linolenic acid (C18:3n3) the most representative one (28.1% and 30.3% for aliança and formosa, respectively). Vitamin E was significantly superior in fruit peels (615.9- 939.3 mg/kg, aliança and formosa, respectively). These high values for proximate composition make these by-products rich natural sources of nutrients. Regarding the antioxidant content, total phenolics and flavonoids were higher in the fruit peels, with no significant differences between the two studied varieties ($p>0.05$). Despite the difference in the total content of bioactive compounds, the antioxidant activity was identical in both seeds and peels fruit varieties (~28% for DPPH$^{\bullet}$ and ~78μmol FSE/g of dw). Moreover, the individual profile of bioactive compounds should be considered in a future study, but these results confirm the great potential for industrial recovery and related applications, such as formulation of new food ingredients.

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