



QUANTIFICATION OF TOTAL PHENOLICS AND FLAVONOIDS CONTENT IN AGRICULTURAL RESIDUES

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The production of large amounts of residues derived from cultivation and processing of crops in the agricultural industry causes a series of environmental and economic problems if not managed properly. The presence of bioactive natural compounds with antioxidant and/or pharmacological properties in renewable resources is the main focus of many studies worldwide, since it follows the interest of cosmetics, pharmaceutical and food industries in providing a strategy to reduce waste and costs, and even to develop new sources of income. The fact that many plants and herbs have phenolic compounds as common constituents is well known. Phenolic compounds constitute the largest group of plant secondary metabolites, and they are composed mainly of simple phenols, phenolic acids, coumarins, lignin and lignans, tannins and flavonoids, most with antioxidant and antimicrobial properties. Flavonoids are important for the growth, development and defense-system of the plant, they are able to form delocalized unpaired electrons, neutralizing radical forms. Because of that, they are commonly used as natural antioxidants in food preservation, and play a significant role reducing chronic inflammation, cardiovascular disease and risk of cancer. Considering the importance of ensuring the usage of agricultural residues as a source of high value-added products, the aim of this study was to evaluate the general phenolic and flavonoids content in four types of residues extracts: cotton husks, cotton seed hulls, soy husks and green coconut shell. Extracts were prepared from 300 g of each plant material that went through dynamic maceration with ethanol 80% for 72 h. The solvent was removed with rotaevaporizer and the extracts, freeze-dried. Aliquots of each extract were solubilized in ethanol 80% and used in each quantification. The Folin-Ciocalteu colorimetric method was used to quantify the total phenolic content, with 2 h incubation in the dark at 25 °C before the reading at the double-beam UV-Vis spectrophotometer with the absorbance measured at 765 nm. As for the flavonoid content, the aluminum chloride colorimetric method was used, with 30 min incubation in the dark at 25 °C before their reading at 425 nm. A gallic acid and quercetine standard calibration curve were used as a reference, respectively. The cotton seed hulls

extract presented the highest amount of total phenolics ($175.51 \mu\text{g}\cdot\text{mg}^{-1}$ phenolics/solid extract) followed by cotton husks ($161.96 \mu\text{g}\cdot\text{mg}^{-1}$), green coconut shell ($97.39 \mu\text{g}\cdot\text{mg}^{-1}$). Regarding to flavonoids content, there's a high percentage in the cotton husks ($5.18 \mu\text{g}\cdot\text{mg}^{-1}$), but in the others samples, the values detected were low – cotton seed hulls ($1.18 \mu\text{g}\cdot\text{mg}^{-1}$), green coconut shell ($0.46 \mu\text{g}\cdot\text{mg}^{-1}$), which indicates the presence of other phenolic constituents than flavonoids. Soy husks has a low amount of phenols and flavonoids (26.14 and $0.92 \mu\text{g}\cdot\text{mg}^{-1}$ respectively), and for that it doesn't qualify as an interesting source for the purposes of this study. The results of this study indicate that most of the agricultural residues analyzed could have a potential antioxidant activity related to its phenolic constitution, enabling those residues for industrial usage in the cosmetics, pharmaceutical and food industries.

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