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Abstract

Effect of a Beer Bagasse Dehydration Process on the Recovery of Ferulic Acid and Other Phenolic Compounds as an Alternative to Agroindustrial Waste Revalorization †

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Abstract: Beer is one of the oldest drinks consumed by humans. In 2023, a global production of 211.56 billion liters of this beverage was estimated. Beer production generates various wastes, bagasse being the most significant—equivalent to 31% of the raw material. The main waste is spent barley grains, which are used as animal feed or a soil improver or disposed of in landfills. An alternative for its revaluation is the recovery of compounds with biological activity from bagasse, such as ferulic acid; however, this type of compound can be thermolabile, and processes such as dehydration can affect the amount of bioactive compounds. Given the above, this work aims to compare the recovery of total phenolic compounds (TPCs), especially ferulic acid (FA), after applying different dehydration conditions on Stout-type and Session IPA-type brewing bagasse. TPCs and FA were determined via Folin–Ciocalteu and HPLC methods, respectively. Drying by freeze-drying and by a convective process was evaluated. The results show that after increasing the temperature from 60 °C to 80 °C in the convective process, there are no significant differences in the presence of TPCs or AF for the Stout matter, with average values of 967 and 108 mg/100 g, respectively. In the case of the Session IPA bagasse, a decrease in the presence of AF is observed with increasing temperature. On the other hand, when comparing the results with the freeze-drying process, the latter produces raw materials with a lower amount of TPCs, but with higher levels of AF, with values of up to 210 mg/100 g of raw material. The results presented allow us to conclude that the recovery of FA from brewing bagasse is feasible, and that the process variables have an important effect on its recovery.

Keywords: agroindustrial waste valorization; beer bagasse; ferulic acid

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