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Assessment of gamma radiation effects on antioxidant activity of cork wastewater

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Abstract

Cork cooking wastewater results from the process of boiling cork planks. It is an aqueous and complex dark liquor with high concentration of phenolic compounds such as phenolic acids and tannins [1, 2], which are known for their high antioxidant activity. The aim of this work is to perform a comprehensive assessment of the effects of gamma radiation on the antioxidant activity of cork cooking water. The irradiation experiments were carried out at room temperature in a Co-60 experimental equipment (Precisa 22, Graviner, Lda, UK), with an activity of 140 Tbq (3.77 kCi) and at a dose rate of 1.5 kGy/h, located at the Centro de Ciências e Tecnologias Nucleares (Portugal). Samples of wastewater were irradiated at three distinct doses (10, 20 and 50 kGy) and the antioxidant activity was evaluated by *in vitro* assays based on different mechanisms of action: DPPH radical scavenging activity, reducing power and inhibition of β -carotene bleaching. Antioxidant capacity was compared with the physico-chemical characterization [3] of cork wastewater - Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS) and Total Phenolic Content (TP) - when exposed to gamma radiation. The obtained results point out that gamma radiation induces changes in complex compounds leading to an increase in the antioxidant capacity. These results demonstrate the potential of this technology in order to increase the added value of cork wastewaters.

References

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