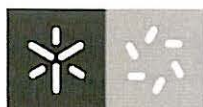
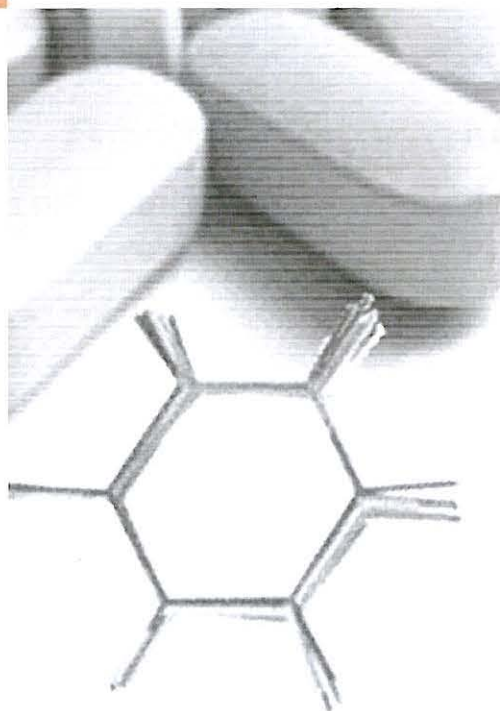


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Antioxidant properties of three different *Castanea sativa* Portuguese varieties submitted to gamma irradiation

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The Northeast of Portugal is responsible for 82% of the nation's total production of chestnuts. Since 2010, European legislation has banned the use of Methyl Bromide in chestnut disinfestation due to environment concerns and health related issues. This fumigant was widely applied over chestnuts and other fruits to kill insects and other contaminating agents, and, although dangerous, it was the most efficient treatment available, since other heat treatments still pose relevant drawbacks. Food irradiation has stepped in as an alternative treatment for food commodities, and our research group has investigated its potential to treat chestnuts [1]. Antioxidants have long been regarded as having beneficial effects in human health by neutralizing free radicals that arise from various metabolic processes. Recent discoveries have proven that the consumption of fruits and vegetables rich in antioxidants is healthier than consuming antioxidant supplements [2]. In this work, we have tested the effects of gamma irradiation at 1 kGy on the antioxidant potential of three different chestnut varieties from Portugal (Judia, Longal and Cota), as a continuing research of previous results with a single variety [1,3]. The antioxidant potential was determined through the DPPH (2,2-diphenyl-1-picrylhydrazyl) scavenging activity, reducing power, lipid peroxidation inhibition by β -carotene bleaching and Thiobarbituric Reactive Species (TBARS) assays and total phenolics by Folin-ciocalteu assay. The variety with the highest quantity of total phenolics was Judia, followed by Longal. The phenolics in Longal and Cota varieties were preserved by radiation. The biggest difference in DPPH radical scavenging was recorded for Judia, since the other two didn't vary significantly. The reducing power didn't seem to be affected by radiation in all the varieties. In terms of β -carotene bleaching inhibition, the irradiated samples displayed lower EC₅₀ values in Longal and Judia, while in Cota the values were very similar. The TBARS assay showed inverse results, with higher EC₅₀ values for the non-irradiated samples. These results showed that chestnuts are a valuable fruit in terms of antioxidants, and that radiation does not induce significant alterations in their antioxidant potential.

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