

EFFECTS OF RADIOFREQUENCY ON CHESTNUT QUALITY

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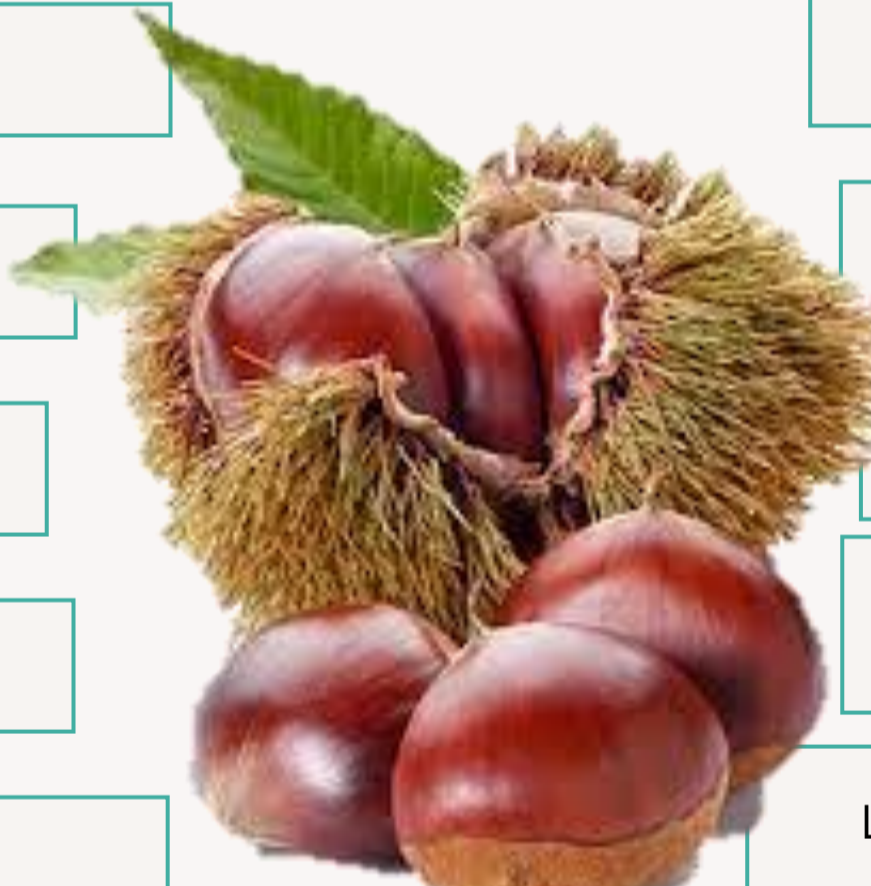
Introduction

The chestnut (*Castanea sativa* Mill.) is a fruit with high nutritional value, but it is highly susceptible to infestation and post-harvest deterioration [1]. Infestations by *Curculio elephas* (Gyll) and *Cydia splendana* (Hübner) pose a significant challenge to the food industry, reducing product quality and causing considerable economic losses [2]. This study assessed the impact of radiofrequency (RF) application on the post-harvest quality of "Judia" chestnuts.

Methodology

Trials were conducted at Sortegel's facilities using an industrial-scale pilot system (40.68 MHz) developed by Perfinox. Optimal operating conditions: 1500 W, 45% conveyor speed (approx. 240 kg/h), and $\Delta T \approx 28$ °C. RF-treated and untreated control samples were compared based on **nutritional composition** (moisture, lipids, proteins, ash, carbohydrates, and energy value) and **physicochemical parameters** (color, pH, water activity, texture, sugars, starch, fatty acids, and oxidative stability).

Results

Larval survival RF-treated: 20%		Shell color (Δ) $\Delta L^* \approx -0.7$; $\Delta a^* \approx -0.4$; $\Delta b^* \approx -0.2$ (minimal change)
Cooking signs RF-treated: 0%		pH & aw pH Control: 6.45 → RF-treated: 6.59 aw Control: 0.99 → RF-treated: 0.98 (no significant differences)
Oxidative induction time Control: 1.55 → RF-treated: 5.25 h		Sugars & Starch Sugars (g/100 g dw) Control: 18.46 → RF-treated: 17.3 Starch (g/100 g fw) Control: 41 → RF-treated: 38 (no significant degradation)
Texture Control: Hardness 2967 g → RF-treated: 2838 g Control: Elasticity 99% → RF-treated: 99%		Fatty acids Oleic (%) Control: 28.60 → RF-treated: 28.06 Linoleic (%) Control: 30.46 → RF-treated: 28.32 (no significant differences)
Moisture Control: 45.0 → RF-treated: 51.0% (within range)		Composition & Energy (dw): Lipids Control: 1.55 → RF-treated: 1.36 Proteins Control: 4.72 → RF-treated: 4.74 Ash Control: 1.94 → RF-treated: 2.4 Carbs Control: 91.8 → RF-treated: 91.5 Energy Control: 399 → RF-treated: 397

Conclusion

RF treatment (1500 W) ensures high phytosanitary efficacy while preserving chestnut quality, significantly increasing oxidative stability (SI = 3.4) and maintaining stable texture (99% springiness).

References

- [1] FAO, FAOSTAT – Statistics Database, Food and Agriculture Organization of the United Nations, Rome, 2021.
 [2] Drăghici, M.-L., Butu, M., Butu, A., & Rodino, S., Foods, 10 (2021) 321.

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