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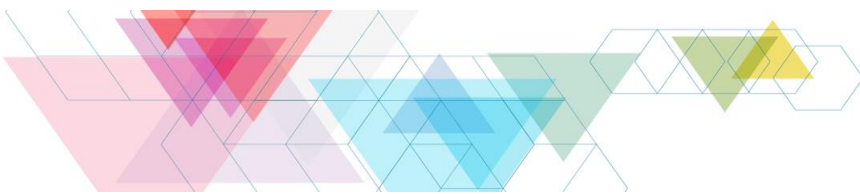
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[S&BE 4]

Potential therapeutic application of chestnut shells in oral mucositis treatment: Green extraction of polyphenols

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Oral mucositis (OM), a common side effect of oncological treatment, is an inflammatory condition characterized by painful ulcerations, difficulty swallowing and speaking, and increased risk of infection, which can compromise the primary treatment outcome [1]. The use of natural antioxidants to inhibit the redox imbalance responsible for OM development has emerged as an interesting approach for OM prevention and treatment. This study aims to explore chestnut (*Castanea sativa*) shells (by-products) as a potential active ingredient against OM [2]. To recover antioxidants using sustainable technology, chestnut shells were extracted using Subcritical Water Extraction (SWE) at different temperatures (110-180 °C). The extracts were evaluated against microorganisms present in the oral cavity as well as in human oral cell lines (TR146 and HSC3). The optimal extraction temperature was 110 °C, exhibiting the highest phenolic content and the best antioxidant/antiradical activities and scavenging efficiencies against HOCl ($IC_{50} = 4.47 \mu\text{g/mL}$) and ROO^{\bullet} ($0.73 \mu\text{mol TE/mg DW}$). High concentrations of phenolic acids (e.g., gallic and protocatechuic acid) and flavanoids (catechin, epicatechin and rutin) characterized the phenolic profile. Antimicrobial activity against several microorganisms present in the oral cavity during OM, such as *Streptococcus*, *Staphylococcus*, *Enterococcus*, and *Escherichia*, was also demonstrated. The effects on HSC3 and TR146 cell lines revealed that the extract prepared at 110 °C showed the lowest IC_{50} (1325.03 and 468.15 $\mu\text{g/mL}$, respectively). Therefore, this extract was selected for encapsulation and incorporation into an oral film as buccal drug delivery system. Methocel 1000 demonstrated ideal physicochemical properties from different set of polymers, such as thickness, mass, content uniformity, dissolution time in artificial saliva, superficial pH, folding, tensile strength, and elongation.

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References:

- [1] Ferreira, A.S.; Macedo, C.; Silva, A.M.; Delerue-Matos, C.; Costa, P.; Rodrigues, F. Natural Products for the Prevention and Treatment of Oral Mucositis-A Review. *Int. J. Mol. Sci.* 2022, 23, 4385. <https://doi.org/10.3390/ijms23084385>.
- [2] Barreira J.C.M. *et al.* (2020) Bioactive Compounds of Chestnut (*Castanea sativa* Mill.). In: Murthy H., Bapat V. (eds) *Bioactive Compounds in Underutilized Fruits and Nuts. Reference Series in Phytochemistry.* Springer, Cham. https://doi.org/10.1007/978-3-030-30182-8_18

