Investigation of Anticancer and Antimicrobial Activities of Red Onion Skin Extract

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Outline

1. Introduction
2. Spiraeoside extracted from red onion skin ameliorates apoptosis and exerts potent antitumor, antioxidant and enzyme inhibitory effects
3. Evaluation of biological potential of red onion skin extract for anticancer and antimicrobial activities
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Abstract

This study focuses on two bioactive compounds from red onion skin. First, spiraeoside (SPI), a major flavonoid from red onion skin, exhibits strong antioxidant, anti-inflammatory, and enzyme inhibitory activities. Its bioactivity was comparable to standard reference drugs. In HeLa cells, SPI showed dose- and time-dependent cytotoxicity and effectively induced apoptosis. Overall, SPI demonstrated multifunctional bioactivity and represented a promising natural compound with potential anticancer applications. Second, dihydroxy benzoic acid (DHBA), presented at high concentrations in chromatographic red onion skin extracts (CROS), showed both anticancer and antimicrobial activities. *In vitro*, DHBA effectively inhibited Gram-negative bacteria such as *Escherichia coli*, while *in vivo* studies in tumor-bearing mice indicate that DHBA improved physiological parameters, and protected liver and kidney function, in some cases outperforming cisplatin.

Together, SPI and DHBA highlight the multifunctional bioactivity of red onion skin, demonstrating its potential as a natural source of compounds with anticancer, antioxidant, enzyme-inhibitory, and antimicrobial properties. Red onion skin thus represents a promising resource with many untapped potentials for further investigation.

Reference

Nile A., Nile S.H., Cespedes-Acuña C.L., Oh J-W., 2021. Spiraeoside extracted from red onion skin ameliorates apoptosis and exerts potent antitumor, antioxidant and enzyme inhibitory effects. *Food and Chemical Toxicology* 154, 112327.

El Sadda, R.R., El-Shobaky, A.R., El Sharawy, H.O., Moawed, E.A., Gohar, O.H., El-Zahed, M., Elseady, Y.Y., El-tohamy, W.S., 2024. Evaluation of biological potential of red onion skin extract for anticancer and antimicrobial activities. *Process Biochemistry* 139, 1–10.