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Edited by

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OC3. Propolis: antimicrobial activity, phenolic compounds and role in the inflammation.

Ana Paula Pereira (1); Luís G. Dias (2); João Carlos Silva (2)*; Leticia M. Estevinho (2)

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Propolis is a beehive product prepared by bees of the *Apis mellifera* species, using resinous substances collected from various plants. These substances are mixed with β -glycosidase enzyme of their saliva, partially digested and added to bee wax to form the final product. In the present study, it was evaluated the antimicrobial activity against multi-resistant microorganisms and the anti-inflammatory activity, assessed by the effect on the hyaluronidase enzyme, of propolis samples from Portugal. Simultaneously, it was studied the effect of extraction solvents on this biological activities. It was chosen the hydro-alcoholic extract because this was the most effective for extracting phenolic compounds. The antimicrobial activity was accessed in Gram-positive (*Staphylococcus aureus*) and Gram-negative bacteria (*Pseudomonas aeruginosa*, *Escherichia coli*) and yeasts (*Candida albicans*), isolated from different biological fluids and the results were then compared with the obtained for reference microorganisms. Regarding the pollen profiles, marked differences were found among the samples from the different regions under study. In the propolis from Bragança the dominant pollen was *Erica* sp., whereas the dominant species in Coimbra and Beja were *Populus tremula* and *Eucalyptus* sp., respectively. The propolis from Bragança was the one that possessed the highest polyphenols' content.

It was verified that all the extracts inhibited the hyaluronidase enzyme in a dose-dependent manner. The propolis that showed higher inhibitory activity was the one from Bragança and the product from Beja was the less effective. Despite the differences amongst the polyphenols concentrations, the anti-inflammatory activity of the samples did not differ significantly, suggesting that polyphenols are not the only factor responsible for the bioactive properties of this beehive product. Concerning the antimicrobial activity, *Candida albicans* was the most resistant and *Staphylococcus aureus* the most sensitive. Propolis showed greater activity against Gram-positive bacteria than Gram-negative ones, something that may be explained by structural differences of the cell wall of these two types of bacteria. In addition, the reference microorganisms were more sensitive than the ones isolated from biological fluids. This study suggests that the simultaneous use of propolis and antibiotics may reduce the acquisition of resistances and consequently avoid the use of more powerful therapies, even though further studies are required.

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