

Analysis of the effects of propolis extracts on DNA damage

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Keywords: Propolis; DNA topology assay; Reducing power assay, DPPH scavenging activity

Propolis is a natural wax-like resinous product produced by bees from tree buds and exudates being found in beehives. Among the various biologically active compounds that make up propolis, flavonoids are some of the more important ones. Flavonoids have been valued by their antigenotoxic effect, which is a direct consequence of their antioxidant properties, as they are reactive oxygen species (ROS) scavengers. ROS are small molecules/free radicals which are associated with various degenerative diseases. Extracts rich in flavonoids have been widely used in food, drug and cosmetic industries. Although worldwide propolis has already been intensively studied, studies with Portuguese propolis are currently scarce. The aim of this study is to elucidate the influence of propolis from a Portuguese apiary (Pereiro) on DNA damage and recovery. Different cytotoxicity was observed in the spot assay according to the year of harvest. However, DNA repair pathways are not the target in this propolis-induced toxicity as mutants affected in DNA-repair mechanisms display similar viability as the wild type strain when treated with propolis ethanol extracts. As expected, it was shown, with the DNA topology assay, that the tested extracts have DNA-preventive activity against Fe²⁺-induced damage, which correlates with their antioxidant effects shown in the DPPH radical scavenging activity and in reducing power assays. Other possibilities such as a mechanisms related to apoptosis can be hypothesized regarding propolis-induced toxicity.