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Evaluation of the antibacterial properties and polyphenol content of commercial propolis available in Polish dietary supplements

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Propolis extract has antibacterial, anti-inflammatory, and antioxidant properties, which is mainly attributed to polyphenols (such as ferulic acid, gallic acid, caffeic acid) in its composition. However, its composition varies depending on the geographical location of the raw material. This may be important for patients consuming dietary supplements as interest in natural treatment methods is constantly increasing.

The quality of the raw material used to produce the Polish dietary supplement for the throat available in pharmacies is not controlled with the same level of precision as medicinal products. This raises doubts about the effectiveness of the dietary supplement containing propolis extract. The presented studies were conducted to verify the composition and antibacterial properties of the propolis extract commonly available on the Polish market.

Microbiological examination was performed using the disk diffusion method using a reference bacterial strain Streptococcus salivarius (ATCC 13419) that naturally inhabits the human oral cavity. The composition of the extract was determined using the GC-MS and solid phase microextraction (SPME) methods. The total polyphenol content of both the propolis extract and the dietary supplement was determined using the Folin–Ciocâlteu method. Additionally, the dry propolis extract was analyzed using thermogravimetric analysis (TGA) and scanning electron microscopy (SEM).

No growth inhibition zones were observed for the reference strain in the selected sample containing propolis found in the dietary supplement. The total polyphenol content determined in the propolis studied was significantly lower than the average total polyphenol content in European propolis described in the available scientific literature.

It is suggested that the propolis extract of well-documented composition can be degraded during the production process of dietary supplements or industrial processing of the raw material. First, the inappropriate storage of the propolis extract, both at the stage of transport and technological production can be the most probably reason, requires further investigation.