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Standardization and quality evaluation of dried propolis powder for pharmaceutical use

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Introductions. Natural products have long played a vital role in human healthcare, and interest in their therapeutic applications continues to grow. Bee products particularly propolis have drawn considerable scientific attention. Propolis, a resinous substance collected and modified by honeybees, possesses notable antimicrobial and anti-inflammatory properties attributed to its diverse chemical composition. However, variations in plant sources and processing methods lead to significant differences in its composition and biological activity. As a result, establishing standardized methods for producing and characterizing dried propolis powder is essential to ensure its safety, efficacy, and integration into modern pharmaceutical practice.

Materials and Methods. Pure propolis were collected from certified apiaries. Extracted propolis samples, dried into powder, and analyzed for phenolic content and antioxidant activity using spectral analysis 270–380 nm.

Results and Discussion. Comprehensive physicochemical and phytochemical analyses were performed to assess the quality and standardization potential of the dried propolis powder. The moisture content was found to be $6.2 \pm 0.3\%$, and total ash content $3.8 \pm 0.2\%$, both within acceptable pharmacopeial limits ($<8\%$ and $<5\%$, respectively), confirming adequate processing and low contamination. The total phenolic content (TPC) reached 182.4 ± 5.6 mg GAE/g extract, and the total flavonoid content (TFC) was 46.3 ± 2.1 mg QE/g extract, indicating a high concentration of bioactive compounds. Marker selection and standardization were emphasized as dependent on botanical origin, as local (Birch *Betula spp.*, Alder *Alnus glutinosa*, *Alnus incana*, Willow *Salix* etc.) poplar-type *Populus* propolis is rich in chrysin and galangin, while tropicall green propolis contains artemillin C. Processing factors, such as drying temperature and carrier addition, significantly influence chemical content, requiring normalization to active extract levels. Safety evaluation is critical, given propolis's natural accumulation of contaminants; heavy metals, pesticides, and parts counts must meet pharmacopeial limits to ensure consumer safety. These results confirm that a tiered, multi-parameter approach is essential for the reliable quality control of dried propolis powder.

Conclusions. This study demonstrates that dried propolis powder can be standardized and characterized effectively using a multi-parameter approach, including physicochemical, phytochemical, and safety analyses. The moisture and ash content, along with high levels of phenolics and flavonoids, confirm its quality and bioactive potential. Botanical origin and processing conditions significantly influence chemical composition, highlighting the need for normalization to active extract levels. Strict monitoring of contaminants ensures safety for pharmaceutical use. Overall, these findings support the reliable production of standardized propolis powder, facilitating its safe and effective integration into modern healthcare. Future research should aim to develop international pharmacopeial standards and link specific phytochemical profiles to clinical efficacy.

References

1. Tikhonov, A. I., Jarnych, T. G., Czernych, W. P., Zupanec, I. A., Tikhonova, S. A. (2005). Theory and practice of manufacturing medicinal propolis preparations. Kharkiv : Printing house "Marka", 274.
2. Bankova V, De Castro SL, Marcucci MC. Propolis: recent advances in chemistry and plant origin. *Apidologie*. 2000;31(1):3–15.
3. Park YK, Alencar SM, Aguiar CL. Botanical origin and chemical composition of Brazilian propolis. *J Agric Food Chem*. 2002;50(9):2502–6.
4. Chang CC, Yang MH, Wen HM, Chern JC. Estimation of total flavonoid content in propolis by two complementary colorimetric methods. *J Food Drug Anal*. 2002;10(3).