***In vivo* antidiabetic and antioxidant activity of Turkish water-based propolis extract**

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| **Abstract**  Diabetes is an ancient disease caused by insulin and/or relative deficiency. It is also one of the leading obesity-related diseases of our time, rapidly increasing in global dominance over the following decades [1]. Diabetic patients increasingly seek elective treatments with anti-hyperglycaemic properties for blood sugar control [2]. Propolis is a healthy drink to prevent chronic diseases such as heart disease, and numerous studies indicate that propolis has also been used as an anti-diabetic[3-4]. For preparing water-based Turkish propolis (WBTP), pulverized propolis (PP) at -80 oC and pulverized propolis (PP-196) at -196 oC were extracted with pure water and then lyophilized at -50 °C. This research was performed on the antihyperglycemic effect of PP-80 and PP-196 extracts on a high-fat diet and streptozotocin-induced type 2 diabetes in rats and administered orally daily for 35 days. Body weight and blood glucose levels were followed by completing blood count, HbA1C, *in vivo* serum biochemistry, and tissue antioxidant enzymes [5]. The diabetic group treated with the WBTP extracts showed significant improvement in body weight, lower blood sugar levels, and decreased HbA1c in the diabetic group. In contrast, white blood cell counts and their types increased slightly. In Diabetic Mellitus (DM) rats treated with WBTP extracts, reductions in hemoglobin, red blood cells, and their types were observed significantly, while hematological parameters increased and reached near-typical values ​​ (P > 0.05). At the same time, the serum levels of TC, TG, and LDL in the diabetes treatment group were lower than those in the DM group, and the HDL level was higher than that in the DM group. Serum biomarkers (urea and creatinine), enzymatic activities (AST, ALT, and ALP), and antioxidant enzymes increased in diabetic rats compared with the control group. This consideration suggests that PP-80 extract is a new supplement for people with diabetes. |
| Keywords: Water-based Turkish propolis, Type 2 diabetes, Antidiabetic, In vivo antioxidant.    **Acknowledgments:**This work has been supported by Ondokuz Mayıs University (BAP) under Project No: PYO.FEN.1901.20.001 |

**References**

1. El Adaouia Taleb, R., Djebli, N., Chenini, H., Sahin, H., & Kolayli, S. (2020). In vivo and in vitro anti‐diabetic activity of ethanolic propolis extract. *Journal of Food Biochemistry*, *44*(7), e13267.
2. Pandey, A., Tripathi, P., Pandey, R., Srivatava, R., & Goswami, S. (2011). Alternative therapies useful in the management of diabetes: A systematic review. *Journal of Pharmacy & Bioallied sciences*, *3*(4), 504.
3. Çetin, E., Kanbur, M., Silici, S., & Eraslan, G. (2010). Propetamphos-induced changes in hematological and biochemical parameters of female rats: protective role of propolis. *Food and chemical toxicology, 48*(7), 1806-1810.
4. El-Sayed, E. S. M., Abo-Salem, O. M., Aly, H. A., & Mansour, A. M. (2009). potentıal antıdıabetıc and hypolıpıdemıc effects of propolıs extract ın streptozotocın-ınduced dıabetıc rats. *Pakistan Journal of Pharmaceutical Sciences, 22*(2), 168-174.

[5] Ozen, T., Yildirim, K., & Toka, M. (2018). The impacts of Elaeagnus umbellata Thunb. leaf and fruit aqueous extracts on mice hepatic, extrahepatic antioxidant and drug-metabolizing enzymes related structures. *Brazilian Journal of Pharmaceutical Sciences*, *53*.