Antidiabetic potential of Ptilostemon casabonae (L.) Greuter, a little-known Mediterranean plant

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Diabetes mellitus is a wide-spread metabolic disease. The most common is type 2 diabetes (T2D), primarily characterized by insulin resistance or β-cell dysfunction, which represents one of the most prevalent health problems with a high rate of incidence and mortality [1]. T2D is associated with postprandial hyperglycemia occurring because of the high level of blood glucose after consuming a meal. Therefore, one of the therapeutic approaches to treat diabetes is to decrease postprandial hyperglycemia by the inhibition of carbohydrate hydrolyzing enzymes like *α*-amylase and *α*-glucosidase that break down starch and disaccharides to glucose. The synthetic enzyme inhibitors currently in use, such as acarbose and voglibose, are known to produce side effects, due to an abnormal bacterial fermentation of undigested carbohydrates in the colon [2]. Thus, there is a need for research novel α-glucosidase and α-amylase inhibitors without side effects.

In this work, aimed at identifying natural products endowed with antidiabetic potential, we focused on *Ptilostemon casabonae* (L.) Greuter, a little-known endemic species of Sardinia (Italy), Corse and Hyères islands (France), belonging to Asteraceae family. The aerial parts of this species are traditionally used in Sardinia as intestinal antispasmodic. Additionally, the boiled sprouts and immature flower heads are considered edible [3]. We evaluated *in vitro* the *α*-glucosidase inhibitory activity of the hydroalcoholic extract obtained from its leaves. Moreover, since it has been widely documented that antioxidant compounds reduce the occurrence of several diseases, such as diabetes [4], the radical scavenging activity and total phenolic and flavonoid contents of the extract were also determined.

Our preliminary results highlighted a marked *α*-glucosidase inhibitory activity of the extract, being more effective if compared with the standard inhibitor (acarbose). Indeed, *α*-glucosidase was totally inhibited (98 % inhibition) at the extract concentration of 90 μg/mL, which correspond to the IC_{50} value of acarbose. The ABTS test revealed a good antioxidant capacity, which could be related to the presence of a high content of phenolics and flavonoids detected in the extract. Our phytochemical analysis, carried out by HPLC-PDA-MS/MS, revealed, according to a previous study [5], a remarkable abundance of flavonoids and phenolic acid derivatives: quercetin, luteolin, kaempferol, apigenin and diosmetin *O*-glycosides, and caffeoylquinic acid derivatives were found as main components.

Further studies are ongoing in order to evaluate the *α*-glucosidase inhibitory activity of the identified metabolites. In conclusion, this preliminary study contributes to improving the knowledge of this understudied species and, importantly, may pave the way for further investigations addressed to understand the mechanisms underlying the antidiabetic activity of *P. casabonae* and its phytochemical constituents.

[1] Wild S., Roglic G., Green A., Sicree R., King H. 2004. Diabetes Care 2004, 27: 1047–1053.

[2] Van de Laar F.A., Lucassen P.L., Akkermans R.P., van de Lisdonk E.H., Rutten G.E., van Weel C. 2005. Diabetes Care, 28: 154–163.

[3] Atzei A.D., 2003. Le Piante Nella Tradizione Popolare Della Sardegna. In: Delfino, Carlo (Ed.).

[4] Neha K., Haider M.R., Pathak A., Yar M.S. 2019. Eur. J. Med. Chem., 178: 687–704.

[5] Marengo A., Maxia A., Sanna C., Mandrone M., Bertea C., Bicchi C., Sgorbini B., Cagliero C., Rubiolo P. 2019. Phytochemistry, 161: 21-27