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The antidiabetic activity of *Vernonia amygdalina* Delile native to Cambodia

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Vernonia amygdalina Delile (Khmer name: *Bramat Khla Khmoum*), belonging to the family Asteraceae, is a shrub or small tree. The leaves are lanceolate to narrowly elliptic, usually about four times as long as wide, glabrous, or with sparse hairs. The capitula form clusters up to 15 cm, creamy white, occasionally tinged with mauve. The small fruits have both small glands and hairs as well as a pappus of bristly hairs (Hyde et al., 2020). *Vernonia amygdalina* Delile has antimalarial, antimicrobial, anti-inflammatory, anti-oxidant, antipyretic, anticancerous, and antidiabetic properties (Kaur et al., 2019); moreover, in some countries, it has been traditionally used in the management of diabetes (Pandey et al., 2014). This ethnopharmacological note aims to record the antidiabetic activity of *Vernonia amygdalina* Delile native to Cambodia. The respondent was a female folk healer named Son But, 62 years of age. The respondent was subjected to the interview about the medicinal use *Vernonia amygdalina* Delile on November 15, 2020. With her traditional healing experience of 34 years, the questions focused on plant part used, preparation method, administration route, and illness treatment of *Vernonia amygdalina* Delile. The cultivated *Vernonia amygdalina* Delile was photographed (Figure 1), and recorded with the GPS coordinates at 11°27'03.2"N 104°47'30.8"E, located in Krom Angk, Sangkat Prateah Lang, Khan Dangkao, Phnom Penh. The plant was authenticated with the voucher specimen (ACETH-120001) of ACET Herbarium. The respondent informed that *Vernonia amygdalina* Delile is traditionally used to cure diabetes in case of mixing with other plants including *Nelumbo nucifera* Gaertn. (Khmer name: *Chhouk*), *Brucea javanica* (L.) Merr. (Khmer name: *Pramat monuhs*), and *Antidesma ghaesembilla* Gaertn. (Khmer name: *Dangkiep kdam*). The fresh leaves of *Vernonia amygdalina* Delile are collected and thoroughly washed with clean water. The leaves aredried in an oven at 30 - 50 ºC, and the dried leaves were subjected to pulverization. The leaf powder of *Vernonia amygdalina* Delile are blended with other plant part powder including petals of *Nelumbo nucifera* Gaertn., stems of *Brucea javanica* (L.) Merr., and bark of *Antidesma ghaesembilla* Gaertn. to enhance the efficacy in the treatment of diabetes. The mixture is compressed into tablet form at 500 mg per tablet. Two tablets are administered orally twice a day in the morning and evening after meal. Diabetes mellitus is a group of physiological dysfunctions characterized by hyperglycemia resulting directly from insulin resistance, inadequate insulin secretion, or excessive glucagon secretion. Type 1 diabetes mellitus (T1DM) is an autoimmune disorder leading to the destruction of pancreatic beta-cells, and type 2 diabetes mellitus (T2DM), which is much more common, is primarily a problem of progressively impaired glucose regulation due to a combination of dysfunctional pancreatic beta cells and insulin resistance (Blair, 2016). The leaves of *Vernonia amygdalina* Delile are composed of some phytoconstituents including flavonoids, tannins, saponins, phenolic compounds and alkaloids, which are found to be of antidiabetic activity (Atangwho et al., 2009). The aqueous extracts from *Vernonia amygdalina* Delile leaves reduces the blood glucose, increased the serum triglyceride levels and serum MDA, increased the LDL-cholesterol, and normalized cholesterol concentrations in streptozocin-induced diabetic rats (Alara

et al., 2017). *Vernonia amygdalina* Delile contains a high concentration of polyphenols having a significant effect on the key enzymes linked to the T2DM thereby inhibiting the activities of α-amylase and α-glucosidase *in vitro* in a dose-dependent manner (Danladi et al., 2018), decreasing the level of blood glucose (Osinubi, 2006). In addition, the *Vernonia amygdalina* Delile was reported its chemical composition containing vernoniosides; vernodalin; vernolide; vernolepin; vernomenin; vernomygdin; vernolic acid; vernodalol; hydroxylvernolide; 11,13-dihydrovernodalin; 11,13-dihydrovernorodeline; 4,15-dihydrovernodalin; 7,24(28)-stigmastadien-3β-ol; and 1,2,3,15,11,13,2',3'-octahydrovernodalin (Yeap et al., 2010). Besides, methanol extract of *Vernonia amygdalina* Delile possesses 6β,10β,14β-Trimethylheptadecan-15α-olyl-15-O-β-D-glucopyranosyl-1,5β-olide (vernoniaolide glucoside) which significantly reduced the blood glucose in the course of treatment compared to standard metformin (Ifedibalu Chukwu et al., 2020). In conclusion, the leaves of *Vernonia amygdalina* Delile contain the vernoniaolide glucoside appearing to achieve its antidiabetic action *via* the inhibition of the activities of α-amylase and α-glucosidase, thereby decreasing the level of blood glucose.

Keywords*: Vernonia amygdalina* Delile, Diabetes mellitus, Antidiabetic activity, Vernoniaolide glucoside

DECLARATION OF CONFLICT OF INTEREST

We have no conflict of interest to declare.

REFERENCES

Alara OR, Abdurahman NH, Mudalip SKA, Olalere OA (2017) Phytochemical and pharmacological properties of *Vernonia amygdalina*: a review. Journal of Chemical Engineering and Industrial Biotechnology, 2: 80-96.

Atangwho IJ, Ebong PE, Eyong EU, Williams IO, Eteng MU, Egbung GE (2009) Comparative chemical composition of leaves of some antidiabetic medicinal plants: *Azadirachta indica*, *Vernonia amygdalina* and *Gongronema latifolium*. African Journal of Biotechnology, 8(18): 4685-4689.

Blair M (2016) Diabetes mellitus review. Urologic nursing, 36(1): 27-36.

Danladi S, Hassan MA, Masa'ud IA, Ibrahim UI (2018) *Vernonia amygdalina* Del: a mini review. Research Journal of Pharmacy and Technology, 11(9): 4187-4190.

Hyde MA, Wursten BT, Ballings P, Coates PM (2020) *Vernonia amygdalina* Delile. Flora of Malawi. Retrieved on November 20, 2020, from https://www.malawiflora.com/speciesdata/species.php? species_id=158120.

IfedibaluChukwu EI, Aparoop D, Kamaruz Z (2020) Antidiabetic, anthelmintic and antioxidation properties of novel and new phytocompounds isolated from the methanolic stem-bark of *Vernonia amygdalina* Delile (Asteraceae). Scientific African, e00578.

Kaur D, Kaur N, Chopra A (2019) A comprehensive review on phytochemistry and pharmacological activities of *Vernonia amygdalina*. Journal of Pharmacognosy and Phytochemistry, 8(3): 2629-2636.

Osinubi AAA (2006) Effects of *Vernonia amygdalina* and chlorpropamide on blood glucose. Medical Journal of Islamic World Academy of Sciences, 16(3): 115-119.

Pandey A, Pradheep K, Sharma N (2014) Potential introduced medicinal plant African bitter leaf (*Vernonia amygdalina* Delile) in India: botany, propagation and uses. Medicinal Plants, 6(4): 272-276.

Yeap SK, Ho WY, Beh BK, Liang WS, Ky H, Yousr AHN, Alitheen NB (2010) *Vernonia amygdalina*, an ethnoveterinary and ethnomedical used green vegetable with multiple bioactivities. Journal of Medicinal Plants Research, 4(25): 2787-2812.

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Figure 1. *Vernonia amygdalina* Delile (Khmer name: *Bramat Khla Khmoum*)