PL2. A REVIEW OF ALKALOIDS IN AFRICAN PLANTS, WITH EMPHASIS ON CAPE LEGUMES

Ben-Erik VAN WYK*

South African National Research Chair in Indigenous Plant Use, Department of Botany and Plant Biotechnology, Faculty of Science, University of Johannesburg, South Africa
*Corresponding Author. E-mail: bevanwyk@uj.ac.za

The purpose of this review is to explore the medicinal, toxicological and chemophenetic importance of alkaloid-bearing African plant species. More than 20 000 alkaloids have been described in plants, and many of them contribute to the biological and therapeutic activity of important African traditional medicines and stimulants, such as *Catha edulis*, *Catharanthus roseus*, *Coffea arabica*, *Mesembryanthum tortuosum*, *Pausinystalia johimbe*, *Physostigma venenosum* and *Voacanga africana*. From a global selection of 817 of the most relevant medicinal plant species, 174 (21%) accumulate alkaloids and 33 (4%) of them are of African origin. The top five families amongst medicinal plants globally are the Fabaceae (15 spp.), Solanaceae (13), Apocynaceae (10), Rutaceae (9) and Papaveraceae (8). In Africa, the largest numbers of species are from the Fabaceae (5), Apocynaceae (4), Amaryllidaceae (3), Asteraceae (2), Rubiaceae (2) and Solanaceae (2). The alkaloid classes with the highest frequency among medicinal species globally are indole (27), isoquinoline (27) amine (13) and pyrrolizidine (11) derivatives, while in Africa indole (7), isoquinoline (5), amine (2) and purine (2) derivates are the most common. Macrocyclic pyrrolizidine alkaloids of the genus *Senecio* are of toxicological importance due to fatal liver poisoning in humans and animals, as well as contamination of commercial herbal products. Although unrelated plant species often produce the same compounds, alkaloids have been useful as chemophenetic and chemosystematic markers. Quinolizidine alkaloids have been particularly helpful in unravelling generic delimitations in Cape genistoid legumes, with unusual esters and both qualitative and quantitative discontinuities between genera and species.

Keywords: Alkaloids, African medicinal plants, chemophenetics, *Senecio* alkaloids toxicology.

Acknowledgements: Funding from the National Research Foundation of SouthAfrica (grant number 84442) is gratefully acknowledged.

REFERENCES

[1] Van Wyk B-E, Stander M, Long HS. *Senecio angustifolius* as the major source of pyrrolizidine alkaloid contamination of rooibos tea (*Aspalathus linearis*). S African J Bot. 2017; 110: 124. https://doi.org/10.1016/j.sajb.2017.01.013

[2] Van Wyk B-E, Wink M, Medicinal Plants of the World, second ed., CABI, Boston, MA, USA 2018.

[3] Van Wyk B-E, A family-level floristic inventory and analysis of medicinal plantsused in Traditional African Medicine. J Ethnopharmacol. 2020; 249, 112351. https://doi.org/10.1016/j.jep.2019.112351

[4] Van Schalkwyk FJ, Stander MA, Nsizwane M, Mathee A, Van Wyk, B-E. Fatal pyrrolizidine alkaloid poisoning of infants caused by adulterated *Senecio coronatus*. Forensic Sci. Int. 2021; 320,110680. https://doi.org/10.1016/j.forsciint.2020.110680

[5] Wink M, Van Wyk B-E, Mind-altering and Poisonous Plants of the World, Briza Publications, Pretoria, South Africa 2008.