

Wetlands

Sustainable use of aquatic plants for pharmaceutical purposes

A newly-completed Water Research Commission (WRC) study explored the pharmaceutical properties of selected aquatic plants.

Background

The study of medicinal properties of indigenous South African aquatic plants is a relatively understudied field. In South Africa, traditional medicine is the preferred form of primary healthcare for around 70% of its population.

Each year, 19 500 t of medicinal plants are used in the treatment of illnesses affecting South Africans. While terrestrial ecosystems are abundant and rich in biodiversity, the lack of ethnobotanical studies done on wetland ecosystems have impacted the amount of potential resources that South Africans could be acquiring.

This WRC study aimed to answer the question whether indigenous South African aquatic plants have the potential to be effective alternative treatment for skin hyperpigmentation, acne and periodontal (gum) disease.

Ethanollic extracts were prepared of the five selected aquatic plant species and tested for their in vitro antibacterial activity using the microdilution broth assay. The five plants selected for the study were *Commelina benghalensis*, *Equisetum ramossissimum*, *Mentha longifolia*, *Typha capensis* and *Zantedischia aethiopica*.

PrestoBlue was used as a growth reagent to detect actively metabolic bacterial cells. The enzyme inhibitory activity of the selected aquatic plants was tested using a colorimetric assay.

Main results

Typha capensis exhibited a minimum inhibitory concentration (MIC) of 250 µg/ml against *P. acnes* while

Mentha longifolia inhibited 50% of tyrosinase enzyme (IC₅₀) at 53.63 µg/ml.

Combinational studies with the plant samples and peppermint essential oil for antimicrobial activity suggests that essential oils have a greater activity of inhibiting Gram-positive oral pathogens. Combinational studies suggest that together with the known drug (kojic acid) the IC₅₀ of *M. longifolia* reduced significantly making it a possible alternative treatment for skin hyperpigmentation.

Conclusions

Although this study focused on a small-scale screening of only a few selected aquatic species based on their traditional uses, there is much promise for expanding the search to more aquatic plant types, families and species.

Future prospects include additional combinational studies of *T. capensis* with current acne treatment (tetracycline) to assess the interaction between the two samples in combination for a more effective treatment or antibacterial agent against *P. acnes*.

The screening of more aquatic plants from various aquatic plant families and species will be considered in order to get a better understanding of which plant families may one day be used in pharmaceutical or cosmetic products.

The search of medicinal aquatic plants will also expand beyond the riparian zone of plant collection and include species which are known as floating or submerged aquatic plants. Depending on their association with the water source in aquatic habitats, different classes of aquatic plants have been known to be medicinal.

By exploring the medicinal potential of different types of aquatic plants, an indication of which types produce more compounds with antibacterial or enzyme activity could be given.

Further reading:

To obtain the report, *Aquatic plants of South Africa for pharmaceutical and cosmeceutical usage* (**Report No. KV 349/15**) contact Publications at Tel: (012) 330-0340; Fax: (012) 331-2565; Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.