

VALIDATING THE USE OF *hippobromus*
pauciflorus (L.f.) Radlk FOR THE
TREATMENT OF EYE INFECTIONS IN THE
EASTERN CAPE, SOUTH AFRICA

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(L.f.) Radlk FOR THE TREATMENT OF eye infections
IN THE EASTERN CAPE, SOUTH AFRICA

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This thesis is dedicated to my brother P. Ravindra Chary and family

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GENERAL ABSTRACT

General abstract

An ethnobotanical survey of plants used for the treatment of eye infections was carried out in the Eastern Cape Province of South Africa. The study revealed that 12 plant species are commonly used with *Hippobromus pauciflorus* (L.f) Radlk being the most frequent.

The crude extracts of the leaves, stem bark and roots of the plant were investigated for antimicrobial activity against 10 bacterial and four fungal strains. The methanol extracts of the plant parts were the most active and showed appreciable activity against Gram-positive and Gram-negative bacteria. The methanol extracts of the leaves and stem bark inhibited the growth of fungi with activities ranging from 78.70% to 100% on *Aspergillus niger* and *Penicillium notatum*. The acetone extracts of the leaves and stem bark were active against *A. niger* (51.76%) and *P. notatum* (77.22%).

The aqueous extract of *Hippobromus pauciflorus* leaves at 50, 100 and 200 mg/kg body weight doses were evaluated for anti-inflammatory, analgesic and antipyretic activities in male Wistar rats. Anti-inflammatory activity was studied by using carrageenan- and histamine induced oedema right hind paw volume while the analgesic effect was evaluated using formalin-induced pain and tail flick nociception response. The brewer's yeast-induced pyrexia model was used for the antipyretic investigation. The extract at all the doses used significantly inhibited both the carrageenan- and histamine-induced inflammation in a manner that was not dose dependent. The extract reduced the formalin-induced pain licking as well as prolonged the reaction time in the tail flick-induced pain.

The effects of the aqueous extract of the plant leaves at 50, 100 and 200 mg/kg body weight doses were investigated for 14 days on some biochemical parameters of male Wistar rats. The extract at all the doses tested did not significantly alter the levels of white blood

cells, red blood cells, mean corpuscular volume, platelets, neutrophils, monocytes, lymphocytes and large unstained cells. While the levels of haemoglobin, packed cell volume and basophils increased at specific doses, those of mean corpuscular haemoglobin, mean corpuscular haemoglobin concentration and eosinophils decreased.

In vitro antiviral activities of the plant against herpes simplex virus type 1(HSV-1) and coxsackie virus B6 were investigated. Cytotoxicity was evaluated by MTT assay in Vero cells. At concentrations ranging from 165-270/μg/ml there was significant antiviral activity against HSV-1, but toxicity was also noted. There was no antiviral activity against coxsackie virus B6.

Bioactivity-guided fractionation of the leaves of *H. pauciflorus* yielded three known compounds. From the ethyl acetate fraction, two compounds were isolated (epicatechin and β-sitosterol) and from the n- hexane fractions, one compound (lupeol) was isolated. They were isolated and identified using various techniques. The antimicrobial, anti-inflammatory, analgesic and anti-pyretic activity of these compounds have been reported in literature.

The structure and distribution of foliar appendages on the leaves of *H. pauciflorus* were examined by scanning electron microscope. The leaves have long unicellular non-glandular trichomes which were distributed over the mid rib and densely populated at the edges of the adaxial and abaxial surfaces.

In general, the experiments and tests conducted in this study appear to have justified the use of *Hippobromus pauciflorus* for the treatment of eye infections and make a substantial contribution to the knowledge base of the use of herbal medicine for the treatment of the eye infections.

INTELLECTUAL PROPERTY AGREEMENT STATEMENT

All the elderly and the traditional healers who contributed one information or the other during the preliminary investigation on the folkloric use of (*Hippobromus pauciflorus*) were adequately financially rewarded with further verbal agreement and understanding that this research shall not be for commercial purposes but to serve as an enlightenment information to the community and the entire Eastern Cape Province on the efficacy, safety and toxicity of this plant.

ETHICAL COMMITTEE APPROVAL

The study involving the use of animals in this project was carried out following the approval of the Ethical Committee on Animal Use and Care of the University of Fort Hare.

COMPLIANCE STATEMENT

No part of this study in any form has been commercialized. The thesis is meant to be used for information dissemination on the medicinal potentials of (*H. pauciflorus*) to the immediate community and the entire Eastern Cape Province of South Africa.

Supervisor signature

Student signature