

Short Communication

Pharmacognostic investigation of the leaves of *Gisekia pharnacioides*

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Pharmacognostic investigation of the fresh, powdered and anatomical sections of the leaves of *Gisekia pharnacioides* Linn was carried out to determine its macro- and microscopical characters and also some of its physical constants. Externally, the leaves possess a symmetrical base, an entire margin, obtuse apex and a pilose surface. Internally, it shows the presence of an anisocytic stomata, unicellular, uniseriate covering trichomes with swollen base and an acute apex, prism and clustered crystals of calcium oxalate and fiber elements. The chemo-microscopy revealed the presence of lignin, mucilage, proteins, starch grains, fats and oils. Phytochemical studies of the powdered leaves revealed the presence of tannins, alkaloids, resins, cardiac glycosides, flavonoids and some carbohydrates. The results of the study could be useful in setting some diagnostic indices for the identification and preparation of a monograph of the plant.

Key words: *Gisekia pharnacioides*, pharmacognostic standardization, leaf morphology.

INTRODUCTION

Gisekia pharnacioides Linn (Family: Molluginaceae) is an annual herb found predominantly in West African sub-region (Hutchinson, 1968). In Nigeria, the plant is found in both the south and northern part of the country. It is known as *lallen shamuwa* (stock henna) or *geron tsuntsaye* (bird's millet) in Hausa; *nalle wanabe* (herds men henna) in Fulfulde (Dalziel, 1956). The seeds of this plant are tiny and resemble those of millet and birds feed on them; thus, the name bird's millet. Traditionally the plant is used on swellings. Its powder is also mixed with other herbs as poultices for sores on cattle. It is also sold in herb's market in Nigeria as a purgative. In India, the fresh plant is used as an anti-helminthics and also as pot herb in time of scarcity. Extracts of the plant is also used for painting and decoration of hands and the sole of feet by women due to the reddish-wine tinge colour (hence, the vernacular name *lallen shamuwa*). *G. pharnacioides* is often collected as fodder for cattle, goat and sheep; however it is also used to cause abortion in Mozambique (Amico, 1977). For these reasons we report the macro- and microscopic and some other pharmacognostic

characters for the leaves of the *G. pharnacioides*, which could be used to prepare a monograph for the proper identification of the plant.

MATERIALS AND METHODS

Samples of *G. pharnacioides* were collected in April 1999, from a farmland at Basawa village Sabon-Gari local Government of Kaduna State, Nigeria and authenticated at the Herbarium of the Department of Biological Sciences, Ahmadu Bello University, Zaria Nigeria, where a sample (voucher number 2036) has been deposited.

Qualitative investigation

The macroscopic features of the fresh leaves of *G. pharnacioides* were determined using the methods of Evans (1996). Anatomical sections, surface preparations of the fresh leaves and powdered samples for the microscopy and chemo-microscopy were carried out according to methods outlined by Brain and Turner (1975) and Evans (1996).

Quantitative investigation

The moisture content, ash and extractives values of the powdered leaves samples and the quantitative microscopy on the anatomical section and the epidermal strips of the fresh leaf of the plant to

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Table 1. Quantitative microscopy of the leaves of *G. pharnacieoides*.

Determinations	Range	Mean*
Palisade ratio	24–32	28.0
Stomatal number	36–48	41.0
Stomatal index	9–13	10.0
Vein-islet number	9–14	11.5
Vein termination number	11–14	12.3

*Mean value of ten counts.

Table 2. Evaluation of some pharmacognostic standards of the powdered leaves of *G. pharnacieoides*.

Evaluative parameters	Value (% w/w)*
Moisture content	11.20 ± 2.0
Ash value	5.50 ± 0.1
Acid-insoluble ash value	2.00 ± 0.4
Alcohol-extractable value	19.60 ± 0.5
Water-extractable value	32.84 ± 2.0

*Mean value of five counts

determine the palisade ratio, stomatal index, vein islet and vein termination number were carried out as described in the British Pharmacopoeia (1980).

Phytochemical investigation

The standard methods of Brain and Turner (1975), Sofowora (1982) and Evans (1996) were used for the phytochemical examination.

RESULTS AND DISCUSSION

The leaves of *G. pharnacieoides* were observed to be perennial, simple, petiolate, and ovate with obtuse apex ranging from 2.5 to 5.5 cm long and 1.5 to 3.8 cm wide. It shows pinnate-reticulate venation with pilose surface, entire margin and symmetrical base. The leaves have green upper surface and pale-green underneath, with characteristic odour and astringent taste.

Microscopically, the cells of the epidermis consist of straight anticlinal walls, anisocytic type of stomata, ranging from 18 to 20 μm in length and 14 to 15 μm in width and present only on the lower surface. Prism and clustered types of calcium oxalates crystals ranging from 13 to 20 μm in length and 10 to 13 μm in width were also observed. Numerous unicellular covering trichomes ranging from 105 to 130 μm long and 12.5 to 15 μm wide were also observed. Few lignified fibre elements ranging from 120 to 155 μm long and 10.5 to 13 μm wide with pointed apex and blunt base were present. Oval-shaped starch grains with concentric striations around the hilum were also present. Transverse section of the leaf of *G. pharnacieoides* through the midrib revealed the presence of upper epidermis with straight anticlinal walls and elongated palisade cells underneath. There are spongy parenchyma cells conspicuously on the lower surface

and in between were the xylem and phloem vessels. Chemo-microscopy revealed the presence of tannins, starch grains, lignin, cellulose, cutin/suberin, gums, and mucilage, proteins, calcium oxalate crystals, fats and oils. The results of the quantitative microscopy Table 1 and the evaluation of some pharmacognostic standards of the leaf of *G. pharnacieoides* are presented in Tables 1 and 2, respectively.

Different chemical compounds such as alkaloids, tannins, flavonoids among others were detected in *G. pharnacieoides*, which could make the plant useful for treating different ailments and having a potential of providing useful drugs of human use. This is because the pharmacological activity of any plant is usually traced to a particular compound(s). The presence of tannins and other phenolic compounds, which have antiseptic properties, could explain the use of this plant for the treatment of sores and as anti-helminthics.

The quantitative determination of some pharmacognostic parameters is useful for setting standards for crude drugs. The vein islet, and vein termination numbers and the other parameters determined in the quantitative microscopy, are relatively constant for plants and can be used to differentiate closely related species. The physical constant evaluation of the drugs is an important parameter in detecting adulteration or improper handling of drugs. The moisture content of the drug is not too high, thus it could discourage bacterial, fungi or yeast growth, as the general requirement for moisture content in crude drug is not more than 14% (African Pharmacopoeia, 1986). Equally important in the evaluation of crude drugs, is the ash value and acid-insoluble ash value determination. The total ash is particularly important in the evaluation of purity of drugs, i.e. the presence or absence of foreign inorganic matter such as metallic salts and/or silica. Since the plant, *G. pharnacieoides*, is useful in traditional medicine for the treatment of some ailments, it is important to standardize it for use as a drug. The pharmacognostic constants for the leaves of this plant, the diagnostic microscopic features and the numerical standards reported in this work could be useful for the compilation of a suitable monograph for its proper identification.

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