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Preliminary phytochemical analysis of *Vanda testacea* (Lindl.) Rchb.f., plant specimen of Orchidaceae family

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Abstract

The present research paper represents the preliminary phytochemical screening of the crude extract of *Vanda testacea* (Lindl.) Rchb.f., plant belongs to the Orchidaceae family exposed to find out the presence of various bioactive components. The specimen shows the occurrence of Alkaloids, Flavonoids, Carbohydrate, Phenolic compounds, Glycosides and Tannins mostly while Proteins and Free Amino Acids and Gums and mucilage in trace amount. The diversity of phytochemicals found suggests that whole plant of *Vanda testacea* (Lindl.) Rchb.f., could serve as a source of useful drugs for future.

Keywords: *Vanda testacea* (Lindl.) Rchb.f., phytochemical, alkaloid, flavonoids, glycosides, tannin

Introduction

Medicinal plants are part and parcel of human society to combat diseases, from the beginning of civilization (Biswas *et al.* 2002) [1]. According to the World Health Organization, 2003 about 80% of the population of developing countries being unable to afford pharmaceutical drugs rely on traditional medicines, mainly plant based, to sustain their primary health care needs (Goyal *et al.* 2008) [5]. Herbal medicines are in great demand in the developed as well as developing countries for primary healthcare because of their wide biological and medicinal activities, higher safety margins and lesser costs (Crag *et al.* 1997 and Padma 2005) [3, 12].

The genus *Vanda* in the family Orchidaceae is among the five most horticulturally important orchid genera in the world, which contains over about 73 species, mainly distributed in Southeast Asia (Gardiner *et al.*, 2013) [6]. They are mostly epiphytes, while some can have lithophytic and monopodial growth features. Some of them are employed as unrefined drugs with a domestic cognomen “Rasna” in Ayurvedic medicine (Hossain *et al.* 2011) [7]. Their folkloric medical uses are also perceived across Nepal, Thailand, India, Bangladesh, and many other countries in South Asia (Khan *et al.* 2019) [9].

Several *Vanda* species (e.g., *Vanda testacea*, *Vanda cristata*, *Vanda parviflora*, *Vanda spathulata*, and *Vanda roxburghii*) have been unveiled for their medical applications in the treatment of diverse illnesses (Hossain *et al.* 2011 and Khan *et al.* 2019) [7, 9]. In Indian folkloric medicine, the juice from *Vanda coerulea* leaves can improve indigestion and diarrhea (Panda *et al.* 2013) [13], while its flower decoction is applied as a tonic and appetizer (Deb *et al.* 2009) [4]. Similarly, the paste made from the roots or whole plants of *V. cristata* is used to treat dislocated bones and heal varieties of skin wounds (Deb *et al.* 2009) [4], while its leaf extracts exhibit curing capacities for cough, bronchitis, weakness, and tonsillitis (Panda *et al.* 2013) [13]. Interestingly, applying different forms of *Vanda* crude mixtures containing varying bioactive compounds for healing diseases is a promising and straightforward medication to support human well-being.

Although being widely used by the peoples in traditional medicines, only very few species of genus *Vanda* are screened out for their bioactive components and mechanism-based pharmacological activities. For the precise use of these medicinal orchids in traditional medicines and for development of evidence-based medicines, it is crucial to critically

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analyze these species regarding current knowledge on ethno-pharmacology, chemical constituents and biological activities. It is also important to determine the gaps between the traditional knowledge and evidence-based research (Manandhar 2002, Maridassa *et al.* 2008, Hossain *et al.* 2011, Begum *et al.* 2018, Khan *et al.* 2019, Joshi *et al.* 2020 and Rajendra Yonzone 2018) [10, 18, 7, 2, 9, 8, 14]. Therefore from the extensive survey of literature, it is found that there is lack of information on phytochemicals study of the whole plant specimen *Vanda testacea* (Lindl.) Rchb.f., hence the plant specimen is selected for the preliminary phytochemical screening.

Morphology of *Vanda testacea* (Lindl.) Rchb.f., Gard., Chron. n. s. 8: 166. 1877

Plant epiphytic. Stem erect, sheathed. Leaves 8-25 × 1.5-2 cm, equitant, oblong, coriaceous, apex unequally 2-lobed, 3-dentate, lobules triangular to rounded. Inflorescence laxly many-flowered; peduncle stout; rachis 7-13 cm long. Flowers 1.9-2.1 cm across; sepals and petals cream-yellow, lip white, purple or reddish pink. Dorsal sepal 7-11 × 3-5.4mm, obovate-spathulate, obtusely rounded and incurved at apex; side sepals 5.8-9.4 × 3-5.5 mm, spreading, obovate-spathulate, falcate, apex rounded, incurved and twisted. Petals 6-11 × 2.5-4.5 mm, spreading, spathulate, concave, base narrow and twisted. Lip 3-lobed, spurred, sessile, 8-9.5mm long. Fruit long-stalked.

Flowering and Fruiting: April-September.



Fig 1: *Vanda testacea* (Lindl.) Rchb.f. plant in habitat



Fig 2: *Vanda testacea* (Lindl.) Rchb.f. Enlarges view of flowers

Materials and Methods

Sample Collection

Whole plant parts of *Vanda testacea* (Lindl.) Rchb.f. were collected in a separate sterile polythene bags from the forest area of Bhandara district (Maharashtra state, India Collected by J. V. Gadpayale), Collected plant parts were examined and identified with the help of regional floras and Taxonomic experts.

Preparation of Solvent Extracts

The cleaned, healthy plant materials are cut in to small sections and dried under shade for three to four weeks. The dried material was ground into fine powder in an electric grinder. Powder so obtained was stored in desiccators' setup and used for extraction. It was extracted in soxhlet apparatus using various solvents according to their polarity. Petroleum ether extract, Chloroform extract, Acetone extract, Ethanolic extract, Aqueous extract.

Phytochemical Evaluation

The extracts were subjected to find the occurrence of preliminary phytoconstituents present in it viz. alkaloids, carbohydrates, glycosides, Phytosterols, fixed oils & fats, phenolic compounds & tannins, proteins & free amino acids, gums & mucilage, flavonoids, Lignins and Saponins. The following results are found Table: Preliminary Phytochemical Screening of *Vanda testacea* (Lindl.) Rchb.f.

Table 1: Preliminary Phytochemical Screening of *Vanda testacea* (Lindl.) Rchb.f.

| Sr. no | Phytoconstituents | Petroleum Ether extract | Chloroform extract | Acetone extract | Ethanolic extract | Aqueous extract |
|--------|--------------------------------|-------------------------|--------------------|-----------------|-------------------|-----------------|
| 1 | Alkaloids | +++ | ++ | + | + | + |
| 2 | Carbohydrates | ++ | + | + | + | + |
| 3 | Glycosides | ++ | - | - | + | + |
| 4 | Flavonoids | +++ | - | - | + | + |
| 5 | Phytosterols | - | - | - | - | - |
| 6 | Fixed oils and Fats | + | - | - | - | - |
| 7 | Saponins | - | - | - | + | + |
| 8 | Phenolic compounds and Tannins | +++ | + | + | + | + |
| 9 | Lignins | - | - | - | - | - |
| 10 | Proteins and Free Amino Acids | ++ | + | - | - | - |
| 11 | Gums and Mucilage | + | - | - | - | - |

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