

Preliminary Phytochemical Screening of Leaf Extracts of *Curculigo Orchioides* Gaertn. from the Melghat Region, Maharashtra, India

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Abstract

The present study reports preliminary qualitative phytochemical screening of leaf extracts of *Curculigo orchoides* Gaertn. collected from the Melghat region of Maharashtra, India. Leaf material was washed, shade-dried for approximately 10–15 days, powdered and extracted separately using distilled water, ethanol and methanol in a Soxhlet apparatus. The progress-report records describe screening reactions for selected phytochemical groups using colour and precipitation tests. In the results table, flavonoid reactions were recorded as weak in the ethanolic extract and strong in the methanolic and aqueous extracts. Tannins were recorded as strongly positive in all three extracts, while saponins were positive in all three. Terpenoid and quinone reactions were strongly positive in the ethanolic and methanolic extracts. The iodine test was negative in all three extracts. These observations are preliminary and semi-qualitative; they do not establish the identity or concentration of individual compounds or demonstrate biological efficacy. The results should be verified against original laboratory records, and quantitative assays and chromatographic analysis are recommended for further characterisation.

Keywords: *Curculigo orchoides*; phytochemical screening; leaf extracts; Soxhlet extraction; Melghat; medicinal plants.

1. Introduction

Medicinal plants are sources of chemically diverse primary and secondary metabolites. Preliminary phytochemical screening is frequently used to obtain an initial indication of the classes of compounds that may be present in crude extracts. The observed response depends on plant part, extraction solvent, sample preparation and the specificity of the test reagent. Accordingly, qualitative screening is useful for guiding further chemical investigation, but it cannot by itself confirm the identity or concentration of individual molecules.

Curculigo orchoides Gaertn., commonly known as Kali Musli, is a medicinal herb belonging to the family Hypoxidaceae. Published reviews of *Curculigo* report diverse constituents, including phenolic compounds and phenolic glycosides, norlignans, terpenoids and polysaccharides. Curculigoside and orcinol glucoside are among compounds discussed in the literature on this species; however, compounds reported from other studies or plant parts must not be assumed to occur in the leaf extracts examined here without analytical confirmation (Nie et al., 2013; Wang et al., 2021; Bhukta et al., 2023).

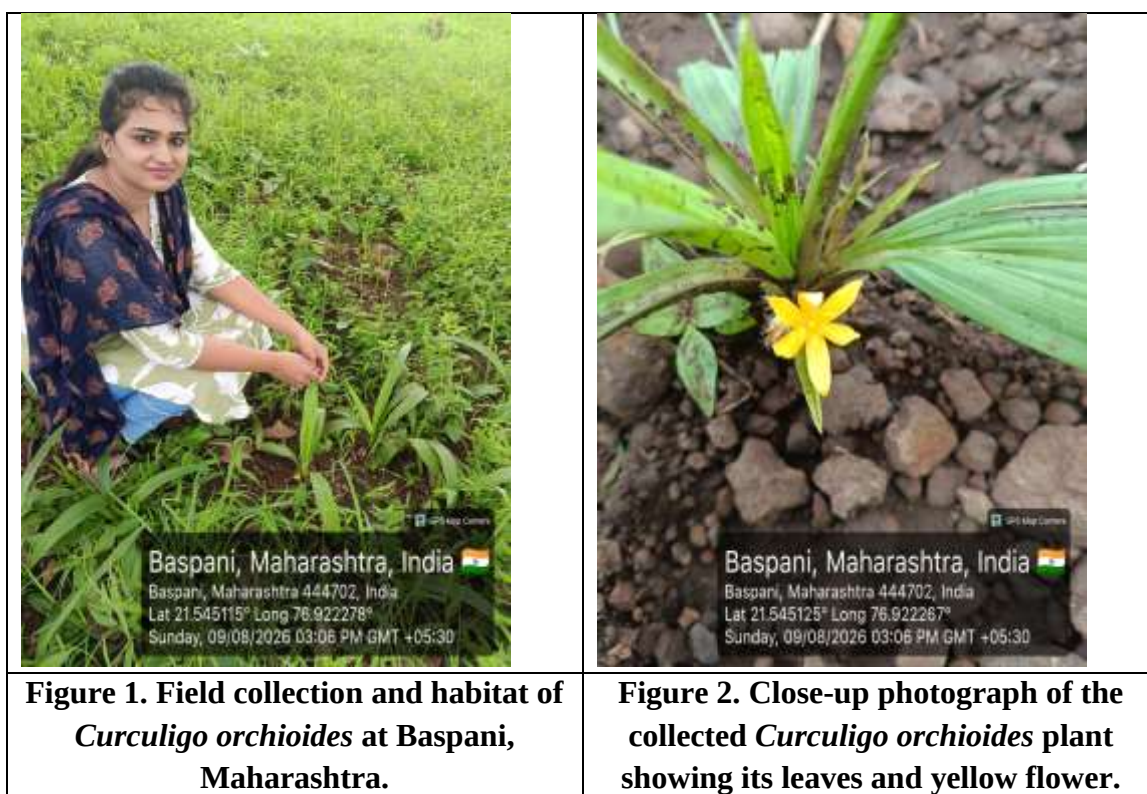
The aim of the present investigation was to document the preliminary phytochemical reactions of aque-

ous, ethanolic and methanolic leaf extracts of *C. orchoides* collected from the Melghat region, Maharashtra, and to identify the extract groups that warrant more detailed quantitative and instrumental analysis.

2. Materials and Methods

2.1. Collection and preparation of plant material

Healthy leaves identified in the research progress presentation as *Curculigo orchoides* Gaertn. were collected from the Melghat region, Maharashtra, India. The leaves were washed with tap water two to three times, excess water was removed, and the material was shade-dried for approximately 10–15 days. The dried leaves were ground to powder without adding solvent. The available progress report does not provide collection coordinates, collection date, botanical authentication details or a voucher specimen number; these should be added from the original field and herbarium records before submission.



2.2. Preparation of extracts

The progress report records the use of 20 g of powdered leaf material for each extraction, with 250 mL of solvent, a muslin-cloth thimble and a Soxhlet apparatus. Separate extracts were prepared using distilled water, ethanol and methanol. The reported extraction duration was 8–10 h and the stated temperature was 55 ± 5 °C. Following extraction, the solvent was evaporated and the crude extracts were stored in airtight containers at 4 °C for further analysis. The precise temperature for each solvent, solvent grade/concentration, extract yield and solvent-removal procedure should be checked against the laboratory notebook. The stated temperature should also be verified because the boiling points of the solvents differ.



Figure 3. Aqueous, methanolic and ethanolic extracts of *Curculigo orchoides* prepared for phytochemical screening.

2.3. Qualitative phytochemical screening

The progress presentation describes preliminary tests for alkaloid-related reactions (iodine and Wagner's tests), starch/carbohydrates, reducing sugars (Fehling's test), cardiac glycosides (Keller–Killiani test), proteins (xanthoproteic test), flavonoids (lead acetate test), phenolic compounds, tannins, phlobatannins, saponins (foam test), phytosterols (Salkowski's test and Hesse's response), terpenoids, quinones, coumarins, emodins, gums/mucilage and resins. Results were recorded using plus/minus symbols. In this manuscript, + denotes a weak reaction, ++ a moderate reaction, +++ a strong reaction and – a negative reaction, following the notation used in the progress-report tables. These categories are ordinal visual observations and are not quantitative measurements.

The progress report cites a preliminary screening procedure attributed to Junaid R. Shaikh and M. K. Patil. The complete bibliographic details and exact protocol should be verified from the original source and laboratory records before submission. The available PPT does not document the number of independent replicates, use of positive/negative controls or quantitative validation; these details have therefore not been invented.

3. Results

The available phytochemical tables show solvent-dependent differences in the qualitative reactions of *C. orchoides* leaf extracts. Flavonoids were recorded as + in the ethanolic extract and +++ in both the methanolic and distilled-water extracts. The tannin test was recorded as +++ in all three extracts. Saponins were recorded as + in all three extracts. The Salkowski test for phytosterols was positive (+) in ethanolic and methanolic extracts and negative in the aqueous extract; Hesse's response was negative in all three. The terpenoid and quinone tests were recorded as +++ in the ethanolic and methanolic extracts. The iodine test and cardiac glycoside test were recorded as negative in the three extracts.

The phenolic-compound test was recorded as negative in ethanolic and methanolic extracts and weakly positive (+) in the aqueous extract. Phlobatannins were recorded as negative in the ethanolic and aqueous extracts and weakly positive (+) in the methanolic extract. The available table records negative results for coumarins, emodins and gums/mucilage. Some entries in the original presentation are cropped or unclear; uncertain values have not been inferred.

Phytochemical group/test	Ethanolic	Methanolic	Distilled water
Iodine test	—	—	—
Flavonoids (lead acetate)	+	+++	+++
Phenolic compounds (lead acetate)	—	—	+
Tannins (10% NaOH test)	+++	+++	+++
Phlobatannins (HCl test)	—	+	—
Saponins (foam test)	+	+	+
Phytosterols (Salkowski test)	+	+	—
Phytosterols (Hesse's response)	—	—	—
Terpenoids	+++	+++	
Quinones (conc. HCl test)	+++	+++	
Coumarins	—	—	—
Emodins	—	—	—
Gums and mucilage	—	—	—
Cardiac glycosides (Keller–Killiani)	—	—	—

Table 1. Summary of the results visible in the progress-report phytochemical tables. The symbols represent qualitative reaction intensity, not measured concentration. Blank cells indicate that the corresponding result could not be reliably read from the source table.

The preliminary screening of *Curculigo orchioides* leaf extracts showed variation in the qualitative reactions among aqueous, ethanolic and methanolic preparations. In the recorded observations, tannins and saponins were detected in all three extracts; flavonoid reactions were observed in each solvent, with stronger recorded reactions in the methanolic and aqueous extracts than in the ethanolic extract. Phenolic compounds were recorded only in the aqueous extract, while the Salkowski test for phytosterols was positive in the ethanolic and methanolic extracts. These findings are qualitative and indicate reactions under the conditions used; they do not quantify the compounds or establish their chemical identities.

The general pattern is consistent with published work showing that phytochemical reactions in *C. orchioides* vary with plant part and extraction solvent. A leaf-extract study by Akhi et al. (2025) reported phytochemical groups including alkaloids, glycosides, tannins and reducing sugars, and also investigated biological activities of different solvent fractions. Kushalan et al. (2022) evaluated phytochemical and antioxidant properties of aqueous and methanolic extracts from leaf and root tissues of wild and tissue-cultured plants. Studies of methanolic root extracts and rhizomes have also reported several classes of

secondary metabolites, but these findings are not directly interchangeable with the present leaf data because the plant parts, solvents, collection sites and protocols differ.

The present study is limited to preliminary qualitative screening. No quantitative estimation, chromatographic confirmation, antioxidant assay or antimicrobial assay is reported here; therefore, the detected reactions should not be interpreted as proof of specific active compounds or therapeutic efficacy. Future work should repeat each test with suitable positive and negative controls, include biological or technical replicates, record extract yield, and confirm constituents through validated quantitative methods and chromatographic analysis. Any unclear or missing reaction in the original observation record should be checked against the laboratory notebook before final publication.

The preliminary phytochemical screening of *Curculigo orchioides* leaf extracts showed differences among the aqueous, ethanolic and methanolic preparations. According to the observations recorded in the present study, tannins and saponins were detected in all three extracts. Flavonoid reactions were positive in all extracts, with stronger recorded reactions in the methanolic and aqueous extracts than in the ethanolic extract. Phenolic compounds were recorded as positive only in the aqueous extract, whereas the Salkowski test for phytosterols was positive in the ethanolic and methanolic extracts and negative in the aqueous extract. These findings describe qualitative colour or precipitation reactions under the procedures used; they do not establish the exact identity or concentration of individual compounds.

The results should be interpreted in relation to published studies while accounting for differences in plant part, solvent, collection site and analytical procedure. Akhi et al. (2025) investigated ethanol, chloroform and n-hexane fractions of *C. orchioides* leaves and reported phytochemical groups including alkaloids, glycosides, tannins and reducing sugars. Their study also investigated antibacterial, antioxidant and other biological activities. These findings support the value of investigating leaf extracts, but their results cannot be assumed to match the present study because the extraction solvents and assay procedures differ.

Nie et al. (2013) reviewed traditional uses, phytochemistry and pharmacology across the genus *Curculigo* and reported that investigations of the genus had identified a broad range of chemical constituents. Wang et al. (2021) subsequently reviewed advances in *Curculigo* phytochemistry and pharmacology, highlighting phenolic compounds and phenolic glycosides, norlignans, terpenoids and polysaccharides among the reported constituents. Much of the chemical-isolation literature concerns rhizomes rather than leaves. Therefore, the published literature provides background for the present work but does not prove that any specific compound is present in the leaf extracts tested here.

The present work is a preliminary qualitative screening study. Quantitative estimation, chromatographic confirmation, antioxidant assays and antibacterial assays should be reported only if they were actually conducted and supported by experimental data. Further work should include positive and negative controls, replicate testing, extract-yield measurements and validated quantitative or chromatographic methods. Any result that is unclear in the original laboratory record should be verified before submission. The findings should not be interpreted as evidence of therapeutic efficacy.

5. Conclusion

Preliminary qualitative screening of *C. orchioides* leaf extracts collected from the Melghat region showed solvent-dependent reactions. The available records indicate strongly positive tannin tests in all three extracts, positive saponin reactions in all three, strong flavonoid reactions in methanolic and

aqueous extracts, and strong terpenoid and quinone reactions in ethanolic and methanolic extracts. These findings provide an initial profile for further investigation but do not establish compound identity, concentration or therapeutic activity. Before publication, all table entries must be checked against laboratory records, unclear results resolved, and collection/authentication and methodological details completed.

References

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