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Physico-Chemical and Phytochemical Analysis of Adathodai Kirutham

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ABSTRACT :

Adathodai Kirutham is a traditional Siddha formulation widely used for its therapeutic benefits, particularly in respiratory ailments. The present study focuses on the physico-chemical and phytochemical analysis of Adathodai Kirutham to establish standardization parameters. Physico-chemical tests such as organoleptic characters, specific gravity, refractive index, iodine value, saponification value, acid value, and peroxide value were determined as per the Indian Pharmacopoeia standards. Preliminary phytochemical screening was conducted using petroleum ether and hydro-alcohol extracts. Results revealed that the formulation exhibited pale yellow color, pleasant odor, and characteristic taste with specific gravity 0.9522 g/ml, refractive index 1.464, iodine value 0.7988, saponification value 127.65, acid value 1.5452 mg KOH/g, and peroxide value 3.10 mEq. Phytochemical analysis indicated the presence of carbohydrates, quinones, and fixed oils/fats. These findings provide valuable baseline standards for the quality control and authentication of Adathodai Kirutham.

Keywords : Adathodai Kirutham, Physico-chemical analysis, Phytochemical screening, Siddha medicine, Standardization

Introduction

Traditional Siddha formulations have been used for centuries in the treatment of various diseases, with Adathodai (Justicia adhatoda Linn.) being one of the most significant herbs. Adathodai Kirutham is specifically employed in the management of respiratory disorders, owing to its expectorant, bronchodilator, and anti-inflammatory properties (Murugan et al., 2020). Despite its therapeutic value, standardization of such formulations is crucial for ensuring safety, efficacy, and reproducibility (World Health Organization, 2011). This study was undertaken to evaluate the physico-chemical and phytochemical parameters of Adathodai Kirutham in order to establish reference standards for its quality control.

Materials and Methods

The formulation of Adathodai Kirutham was obtained and subjected to analysis at a certified drug testing laboratory. Physico-chemical parameters including organoleptic properties, specific gravity, refractive index, iodine value, saponification value, acid value, and peroxide value were determined according to procedures outlined in the Indian Pharmacopoeia (1996).

Rancidity was checked as per the method described by David and Pearson (1962). Preliminary phytochemical screening was performed using petroleum ether and hydro-alcohol extracts for the detection of major phytoconstituents such as alkaloids, carbohydrates, glycosides, proteins, flavonoids, phenolic compounds, tannins, phytosterols, cholesterol, terpenoids, quinones, anthocyanins, carboxylic acids, gums and mucilage, and fixed oils and fats (Singh & Sharma, 2020).

Results

The physico-chemical analysis of Adathodai Kirutham is summarized below:

Parameter	Result
Organoleptic	Pale yellow color, pleasant odor, characteristic taste
Rancidity	Absent
Specific Gravity	0.9522 g/ml
Refractive Index	1.464
Iodine Value	0.7988
Saponification Value	127.65
Acid Value	1.5452 mg KOH/g
Peroxide Value	3.10 mEq

Table 1. Physico chemical parameters of Adathodai Kirutham.

Phytoconstituent	Result
Carbohydrates	Present (+)
Quinones	Present (+)
Fixed oils & fats	Present (+)
Other constituents	Absent (–)

Table 2. Preliminary Phytochemical Screening of *Adathodai Kirutham*

Discussion

The physico-chemical parameters of Adathodai Kirutham were found to be within acceptable limits as per pharmacopoeial standards. The low acid value (1.5452 mg KOH/g) and peroxide value (3.10 mEq) suggest stability and minimal oxidative deterioration. The presence of fixed oils and fats is consistent with the formulation's lipid-based medium, which aids in the extraction and preservation of active constituents.

The phytochemical profile revealed the presence of carbohydrates, quinones, and fixed oils/fats, indicating potential therapeutic roles such as antioxidant and anti-inflammatory effects (Rao et al., 2018; Kumar et al., 2021). The absence of alkaloids and flavonoids may suggest that the activity of Adathodai Kirutham is largely due to its lipid and quinone components, rather than classical alkaloidal activity reported for Adathodai leaves (Vasica alkaloids). These findings highlight the importance of standardization for ensuring consistent efficacy of Siddha formulations (WHO, 2011).

Conclusion

The present study provides baseline data on the physico-chemical and phytochemical characteristics of Adathodai Kirutham. The formulation demonstrated stability, acceptable quality parameters, and the presence of selected phytoconstituents. This standardization work supports its continued use in Siddha medicine and provides a framework for quality control in future studies.

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