

Exploration of the Physio-Chemical Properties of *Kedrostis foetidissima* (Jacq.) Cogn. Herb by Proximate and Qualitative Phytochemical Analysis

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Abstract In a herb, presence of phytochemicals and its physiochemical properties are responsible for its pharmacological and therapeutic potentials. *Kedrostis foetidissima* (Jacq.) Cogn. is an herbaceous perennial plant belongs to Cucurbitaceae family, having worldwide distribution and still being used traditionally for many therapeutic purposes. Proximate analysis and preliminary qualitative phytochemical analysis of this plant was carried out in this study to explore the physical and chemical characters like moisture, crude protein, crude fibre, total ash, ether extract, sand / silica, salt, calcium, phosphorus, gross energy and phyto-constituents which are reasons for the plant having different pharmacological activities such as antimicrobial, immunomodulatory, anti-inflammatory, antioxidant and growth promotion.

Keywords *Phytochemical Evaluation; Proximate Analysis; Kedrostis foetidissima* (Jacq.) Cogn.

1. Introduction

Kedrostis foetidissima (Jacq.) Cogn. commonly known as Appakovai in Tamil is a medicinal plant. It has the habitat of growing in rain-forest, river margins, deciduous and semi-evergreen woodland, dry bush lands, wooded grassland and around the fence. The distribution is worldwide and rich in the regions of South Africa and Asia. In India, the *Kedrostis foetidissima* (Jacq.) Cogn. is widely distributed in the areas of Gujarat, Punjab, Uttar Pradesh, Maharashtra, Tamilnadu and Andhra.

The herb is a perennial plant producing annual stems up to 3 meters long from a tuberous, perennial rootstock. The leaves have a very unpleasant smell, but a favored food of some native peoples, where they are commonly harvested from the wild for local use (Leffers, 2003). This herb found to be very effective in the treatment of asthma, urinary tract infections, diarrhoea and skin diseases. The

leaf extracts were used as anti-fouling agents especially for the treatment of bloat in cattle. The leaf juice was used for the treatment of cold in children and used as immune modulator (Nirmala and Pandian, 2013). The whole plant extracts of *Kedrostis foetidissima* (Jacq.) Cogn. was taken orally for curing chest pain in humans and the leaves were used in traditional ethnoveterinary medicine for the treatment of Aloye disease in cattle by the Zay people in Ethiopia (Giday et al., 2003). The decoction was used to treat diarrhoea in babies of 3 - 4 months of age in Uganda, (Tabuti *et al.*, 2003) and India (Amutha and Lalitha, 2012). The Paliyan tribes in Tamilnadu used the juice of the leaves of *Kedrostis foetidissima* (Jacq.) Cogn., herbs for the treatment of common cold, cough and asthma in children (Karuppusamy, 2007). The indigenous people lived in the rain forest of Africa and South America consumed *Kedrostis foetidissima* (Jacq.) Cogn., leaves as edible food in boiled form as snacks at times of food scarcity (Teklehaymanot and Giday, 2010).

Proximate and nutrient analysis of herbs plays a crucial role in assessing nutritional significance and health effects (Taiga, 2008). WHO has also emphasized on the importance and need of determining proximate analysis on herbal drug's standardization (Niranjan and Kanaki, 2008). The medicinal and therapeutic potentials of herbs depend upon the type of phytochemical substance they synthesize and store. In a novel drug discovery, the basic and essential details regarding the chemical constituents are generally provided by the qualitative phytochemical screening of plant extracts (Das Talukdar *et al.*, 2010). Hence the present study was taken to estimate the physiochemical and phytochemical properties of *Kedrostis foetidissima* (Jacq.) Cogn., for future exploration of its pharmacological and therapeutic potentials.

2. Materials and Methods

2.1. Collection and Identification of Plants

Whole plant of *Kedrostis foetidissima* (Jacq.) Cogn., was collected from base villages of Siruvani hills, Coimbatore, Tamilnadu, during the period of July to August and authenticated by the Department of Botany, Arignar Anna Government Arts and Science College, Namakkal, Tamilnadu, India.

2.2. Preparation of Crude Powder

The collected plants were washed with pure water and blotted gently on filter paper sheets and shade dried. The plant materials were finely powdered using a mechanical mixer / grinder after complete drying. The whole plant powder was used for proximate analysis and for the preparation of aqueous and alcoholic extracts.

2.3. Composite Analysis of Herbal Powders

100 g crude powders of *Kedrostis foetidissima* (Jacq.) Cogn whole plant was used for composite analysis to estimate moisture, crude protein, crude fibre, total ash, ether extract, sand & silica, salt, calcium, phosphorus and gross energy at Animal Feed Analytical and Quality Assurance Laboratory (AFAQAL), Veterinary College and Research Institute, Namakkal, Tamilnadu by using standard composite analysis procedures.

2.4. Preparation of Aqueous and Alcoholic Extracts

Aqueous and alcoholic extracts were prepared separately from the powdered plant materials of 100 g each by using 400 ml of sterile distilled water and 400 ml of ethanol respectively. Both extracts were kept in an orbital shaker for 48 hours at room temperature. Then the extracts were filtered by using Whatman filter paper No. 1, to separate the extractable substances. The collected filtrate were then evaporated at 37°C on hot air oven and the dried extracts were collected in a sterile container and

stored at 4°C, until used for study.

2.5. Qualitative Phytochemical Analysis

The qualitative phytochemical analysis of aqueous and alcoholic extracts of *Kedrostis foetidissima* (Jacq.) Cogn (whole plant) was done by using the method of Trease and Evans (1983) and Kokate et al., (1990) at the laboratory of Ethno Veterinary Herbal Research Centre for Poultry, Teaching Veterinary Clinical Complex Campus, Namakkal, Tamilnadu.

5 gm of dried aqueous and alcoholic extracts of both the plants were added with 50 ml of distilled water and heated below 50°C for 1-2 minutes and utilized for the detection of various phytochemicals.

3. Results and Discussion

3.1. Proximate Analysis of Herbs

The proximate analysis result of whole plant crude powder of *Kedrostis foetidissima* (Jacq.) Cogn., showed a variant proportion of constituents depicted in Table 1. The *Kedrostis foetidissima* (Jacq.) Cogn., showed significant levels of calcium, phosphorus, crude protein, total ash and gross energy.

Table 1: Proximate analysis of whole plant powder of *Kedrostis foetidissima* (Jacq.) Cogn.

S. No.	Constituents	level
1	Moisture (%)	9.11
2	Crude Protein (%)	17.47
3	Crude Fibre (%)	16.19
4	Ether Extract (%)	3.70
5	Total Ash (%)	20.52
6	Sand & Silica (AIA) (%)	5.85
7	Calcium (%)	3.49
8	Phosphorus (%)	0.39
9	Salt (%)	0.89
10	Gross Energy (kcal/kg)	3305

3.2. Qualitative Phytochemical Analysis

The extractive value for the aqueous and alcoholic was calculated and was found to be 7.3 and 6.5% respectively. The extracts were further examined for its physical characterization like color, odor, consistency etc. The color of the aqueous extract was brownish green with crystalline sediments on drying. The colour of the alcoholic extract was darkish green with semi solid oily consistency on drying. Both the extracts had characteristic odor, showed the suspect of having various phytochemicals.

Phytochemicals and its secondary metabolites are responsible for their pharmacological and therapeutic actions like antimicrobial, immunomodulatory, anti-inflammatory, antioxidant, antiviral, wound healing, anticancer, anthelmintic and growth promotion (Erdman et al., 2007). The qualitative phytochemical screening of aqueous and alcoholic extracts of whole plant crude powder of *Kedrostis foetidissima* (Jacq.) Cogn. is showed in Table 2. The alcoholic extract phytochemical analysis results of *Kedrostis foetidissima* (Jacq.) Cogn. indicates the presence of various constituents like saponins, phenols, tannins, alkaloids, flavonoids, triterpenoids, volatile acids and glycosides in moderate to good amounts and in low amounts of phylobatannins and hydrolysable tannins. The aqueous extracts showed the same, but in low level and with the absence of phenols, phylobatannins, volatile acids, hydrolysable tannins and glycosides. Presence of terpenoids, saponins, phenols, tannins, alkaloids,

volatile acids, glycosides and flavonoids in the ethanolic extract of *Kedrostis foetidissima* (Jacq.) Cogn., showed promising suspect on the herb for having various pharmacological potentials.

Table 2: Phytochemical screening of aqueous and alcoholic extracts of whole plant of *Kedrostis foetidissima* (Jacq.) Cogn.

S. No.	Phytochemicals	Extract	
		Aqueous	Alcoholic
1	Saponins	+	++
2	Tannins	+	++
3	Phenols	-	++
4	Alkaloids	+	++
5	Terpenoids	+	+++
6	Flavonoids	+	++
7	Amino acids and Proteins	-	-
8	Carbohydrates	-	-
9	Phylobatannins	-	+
10	Volatile Acids	-	++
11	Hydrolysable tannins	-	+
12	Glycosides	-	++
13	Cardiac Glycosides	-	-
14	Vitamin C	-	-

4. Conclusion

Significant level of crude protein, calcium, gross energy in the whole plant powder of *Kedrostis foetidissima* (Jacq.) Cogn., and presence of various therapeutic phytochemicals in the ethanolic extract, subjected the herb for further detailed phytochemical studies and search for promising pharmacological potentials in lab animal, animal and poultry models.

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