



RESEARCH ARTICLE

QUALITATIVE AND QUANTITATIVE ANALYSIS BIOACTIVE METABOLITES OF *SPILANTHES CALVA* DC

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ABSTRACT

The present study investigate the phytochemical screening and quantification of primary and secondary metabolites like carbohydrates, protein, lipids, phenol, tannin and flavonoids from *Spilanthes calva* DC. The *S. calva* plant showed highest carbohydrate value (5.96%) than the other primary metabolites so it can act as a good remedy for nutritional disorders. Estimation of Secondary metabolites showed that phenol content (1.8%) is higher *Spilanthes calva* DC than the other metabolites. Thus *Spilanthes calva* DC can act as a good therapeutic agent.

INTRODUCTION

Spilanthes calva DC is distributed all throughout the Indian Peninsula. The common habitat of this Indian medicinal plant is in moist habitats of the plains and lower hill regions. This plant has been credited as medicinal pant for its curative properties. This Indian medicinal plant has various local names. In Kannada, this plant is known as DoddaVanaMugali, Hem-Mugulu and Vanamugali; in Malayalam: KuppaManjet; in Marathi: Akkalkara and Pipulka; in Punjabi: Akarkarha and Pokormul; in Telugu: Maratimogga, Maratiteega or Maratitige. The medicinal plant, *Spilanthes calva* DC is an annual herb which is up to 60 centimetre tall. The stems are erect or decumbent at base and more or less hairy. Leaves in this Indian medicinal plant grow in the opposite direction. The leaves are triangular ovate or lanceolate in shape. Each leaf margins dentate or almost entire and is available as sparsely pubescent beneath. Flower heads of the *Spilanthes calva* DC are ovoid and pale yellow. The flowers mature as long-peduncled, solitary or in terminal panicles. Achenes of *Spilanthes calva* DC has innumerable medicinal properties and thus it finds its use on a daily basis. The plant when boiled in water is used to treat dysentery.

The decoction is also given as a diuretic and lithotriptic and used as a bath for relieving rheumatism and as a lotion for scabies and psoriasis. The juice from this Indian medicinal plant is a vulnerary. The pounded herb is used as a poultice to dress wounds. The pungent flower heads are chewed to relieve toothache and affections of the gums and throat, and paralysis of the tongue. The bio-active phytocompounds are synthesized by primary or rather secondary metabolism of living organisms. Plant cells produce two types of metabolites. Metabolites are compounds synthesized by plants for both essential functions, such as growth and development (primary metabolites), and specific functions, such as pollinator attraction or defense against herbivores (secondary metabolites). Primary metabolites are involved directly in growth and metabolism. Secondary metabolites are considered products of primary metabolism and are generally not involved in metabolic activity. Previously the crude drugs/extracts prepared from plants were identified by comparison only with the standard descriptions available in the literature, but recently due to advancement in the field of pharmacognosy, various techniques have been followed for the standardization of crude drugs. Phytochemical screening is one of the techniques to identify new sources of therapeutically and industrially important compounds. Qualitative phytochemical screening will help to understand a variety of chemical compounds produced by plants and quantification of those metabolites will help to extract, purify and identify the

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bioactive compounds. Fresh specimens were collected in the month of September from Munnar, district in Idukki, of Kerala state, India.

MATERIALS AND METHODS

Collection of Plant Material

The whole plant *Spilanthes calva* DC, were collected from Munnar, district in Idukki, of Kerala state, India. The plant was authenticated by BSI, and specimen has been deposited as herbarium in KFRI Peechi, Thrissur for future reference.

Preparation of the plant extracts

The whole plant was washed under running tap water to remove the surface pollutants and the plant were air dried under shade. The powdered whole plant samples were subjected to successive extraction with petroleum ether, methanol and acetone using Soxhlet apparatus. Fresh leaf material was ground using distilled water and filtered and used as an aqueous extract. The extracts obtained using solvents were concentrated using rotary vacuum evaporator and then dried. The extract thus obtained was used for various analyses.

Phytochemical Screening of extracts

Petroleum ether, methanol, aqueous and acetone extracts were used for preliminary phytochemical analyses using standard procedures.

Quantitative profiling

Quantitative estimation of various phytochemical viz. Total Proteins (Lowry *et al.*, 1951), Total Carbohydrates (Dubois *et al.*, 1956), Total Lipids (Sadasivam and Manickam, 2008), Total Phenols (Omoruyi *et al.*, 2011), Total Tannins and Lignin (Boham and Kocipai, 1994), Total Flavonoids (Chang *et al.*, 2002), present in the *Spilanthes calva* DC was analyzed according to the standard protocols.

RESULTS AND DISCUSSION

In the present investigation primary and secondary metabolites were qualitatively and quantitatively analysed using *Spilanthes calva* DC whole plant and the results are shown in Table 1 & 2 and Figure 1.

Table 1. Preliminary Phytochemical screening of *spilanthes calva* DC whole plant

Plant Constituents	Petroleum ether	Methanol	Aqueous	Acetone
Alkaloids	+	+	+	+
Flavonoids	+	+	+	+
Phenolics and Tannins	+	+	+	+
Steroids and Sterols	+	+	+	+
Carbohydrates	+	+	+	+
Saponins	+	+	+	-
Glycosides	+	+	+	+
Proteins and amino acids	+	+	+	+

Table 2. Quantification of Primary metabolites of *Spilanthes calva* DC whole plant

Sl.No.	Primary metabolites	Weight in %
1	Carbohydrates	5.96
2	Protein	1.1
3	Lipid	2.9

The primary metabolites present in the sample are represented in the Table 2. earlier reports are not found. In the present investigation carbohydrate, protein and lipid content in *Spilanthes calva* DC 5.96, 1.1, 2.9 *respectively*. According to their findings *Spilanthes calva* DC are good source of pharmaceutical agents that may be suitable for the management of hyperglycemic related conditions like obesity and diabetes mellitus. Similarly the whole plant *Spilanthes calva* DC also can be regarded as a remedy for nutritional disorders and can also act as pharmaceutical agent because of its better carbohydrate content. Secondary metabolite analysis is necessary for extraction, purification, separation, crystallization, identification of various phytochemicals. Among the secondary metabolites higher level of phenols was observed (Fig1). The higher amount of phenol 1.8% is revealed the importance in regulation of plant growth, development and disease resistance. The level of flavonoid content was .09%. flavonoids are potent antioxidants, antimutagenic and anticarcinogenic effect. The presence of tannin.04% in *Spilanthes calva* DC whole plant was also contribute various medicinal properties such as antimicrobial, anti-inflammatory and astringent activity.

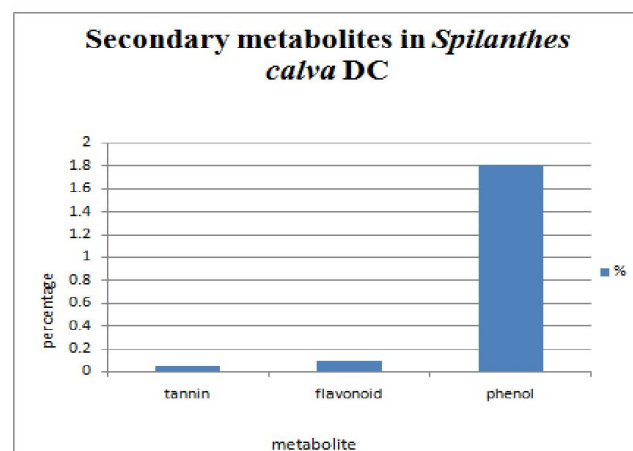


Fig. 1. Quantification of Secondary metabolites of *Spilanthes calva* DC whole plant

Conclusion

Thus, the result obtained in the present study indicates *Spilanthes calva* DC whole plant have the potential to act as a source of useful drugs because of presence of various phytochemical components. The results are very much encouraging but advanced work is necessary before being put into practice.

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