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PHYTOCHEMICAL SCREENING OF ROOT OF CHLOROPHYTUM *BORIVILIANUM* L. (SAFED MUSLI): A MEDICINAL PLANT

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ABSTRACT

Chlorophytum borivilianum L. (Safed musli) plants belong to family Liliaceae contain achemicals substance in the different parts mainly the root was used for investigation. The present study is aimed at development of Physico-chemical screening and to investigate the active principle present in *Chlorophytum borivilianum* for four types of phytochemicals have extracted such as alkaloid, steroid, protein and carbohydrate. Among the four extracts only the Chloroform extract were precede to TLC for alkaloid separation. The solvent system selected for TLC was chloroform and methanol (15:1). The shade dried root is powdered and subjected to soxhelet extraction with petroleum ether, chloroform, 95% ethanol, and distilled water for 18hr in the order of increasing polarity of solvents.

KEYWORD: *Chlorophytum borivilianum*, Chloroform, Alkaloid, TLC, Phytochemical screening

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INTRODUCTION

Chlorophytum borivilianum L. is partly herb with sub-erect lanceolate leaves belongs to the family of Liliaceae, plant can grow well in a range of temperature and rainfall. A sandy loamy soil is ideal for its production. It is usually found in soils rich in organic matter and requires bright sunlight (Oudhia *et al.,* 2001b). It is being grown on an area more than 400 hectares for its tuberous roots (Kothari & Singh 2003) and also grows naturally in most forest parts of central India where climatic conditions are suitable. *Chlorophytum borivilianum* (Safed musli) is endogenous medicinal plant to India and distributed in eastern part of India (Assam, Eastern Ghats, Eastern Himalayas, Bihar and Andhra Pradesh (Datta and Datta 1985, Janick, 1996, Paseshnichenko 1995, Kirtikar & Basu 1981) and distributed in Southern Rajasthan, North Gujrat and Western Madhya Pradesh (Burbott, and Loomis, 1967). Phytochemicals can be derived from any part of the plant like bark, leaves, flowers, roots, fruits, seeds, etc. Phytochemical screening of plants has revealed the presence of numerous chemicals such as alkaloids, tannins, flavonoids, steroids, glycosides and saponins, protein, carbohydrate etc. These Secondary metabolites of plants serve as defense mechanisms against many microorganisms, insects and herbivores (Cowan, 1999). Tuberous roots are used for the preparation of nutritive tonic used in aphrodisiac and also used in diuretic, and astringent useful in dysentery, as an antidiabetic and as appetizing agent (Chetty and Rao 1989). The medicinal plants are those plants that provide medicines to treat illness, maintain and promote health, plants are used to treat illness and tubers are used as lactogogue (Bhandary,1995). The use of traditional medicine is widespread in India (Jeyachandran and Mahesh, 2007). Large number of plants have medicinal properties like *Aloe vera*, *Jatropa*, *Asparagus*, *Digitalis lanata*, *Pisum saivum*, *Datura pinnata*, *Tylophora indica*, *Piper longum*, etc. one such important medicinal plant is *Chlorophytum borivilianum* (Burbott, and Loomis, 1967). These roots contain spermatogenetic, spermatorrhoea and chronic leucorrhoea due to some chemical content. There are around 256 varieties of *Chlorophytum* in the world which are yet known. In India, we have around 17 of them, of which, *C. borivilianum* has got a good market demand.

MATERIALS AND METHODS

Collection and identification of plant: The plant material such as root of *Chlorophytum borivillianum*, commonly known as safed musli are collected from Agriculture University, Sarkanda, Bilaspur (Chhattisgarh) in 2012 and shade dried root of *Chlorophytum borivillianum.* The powdered root is extracted with chloroform by soxhlet apparatus then condensed by evaporation and used for chromatography. The alkaloid spots were separated using the solvent mixture chloroform and methanol (15:1). The colour and Rf values of the separated alkaloids were recorded both under ultraviolet (UV254 nm) and visible light after spraying with Dragendorff's reagent.

Rf = Distance travelled by solute/Distance travelled by solvent

OBSERVATION & RESULTS

Preliminary screening of Secondary Metabolites

The shade dried root is powdered using mixer grinder, and subjected to soxhelet extraction with petroleum ether, chloroform, 95% ethanol, and distilled water for 18h in the order of increasing polarity of solvents. After completion of process the petroleum ether extract, chloroform extract, 95% ethanol and distilled water extract were dried. The condensed extracts were used for testing of phytochemicals such as alkaloids (Hager's test), proteins (Ninhydrin test), steroids, Carbohydrate (Benedict's test) (Table1).

Table 1
represents the observation of secondary metabolites by different tests

S N	Tests	Testing	Solution
1	Alkaloids	Hager's test: Alkaloids give yellow color precipitate with Hager's reagent	Picric acid saturated solution
2	Proteins	Ninhydrin test: Amino acids and Proteins when boiled with 0.2% solution of Ninhydrin, Violet color appears.	Indane 1, 2,3 trione hydrate
3	Steroids	Two ml of acetic anhydride was added to 0.5 g ethanolic extract of each sample with 2 ml H_2S0_4. The colour changed from violet to blue or green in some samples indicating the presence of steroids.	Acetic anhydride, ethanolic extract, H_2S0_4
4	Carbohydrates	Benedict's test: Treat the test solution with few drops of Benedict's reagent (alkaline solution containing cupric citrate complex) and upon boiling on water bath, reddish brown precipitate forms if reducing sugars are present.	Alkaline solution containing cupric citrate complex

Thin layer chromatography (TLC) is coated with thin layer of absorbent usually silica gel, aluminium oxide, or cellulose a chromatography technique used to separate mixtures. The successive extract of root of *Chlorophytun borovillianum* have revealed the presence of Alkaloid, carbohydrate, protein, steroids and the Rf value of TLC that had performed with extract of Chloroform of root of *Chlorophytum borivillianum* is 0.92. Thus the preliminary screening test may be useful in the detection of the bioactive principles and subsequently may lead to the drug discovery and development. Further these tests facilitate their quantitative estimation and qualitative separation of pharmacologically active chemical compound. Table2 represents the various photochemical present in different extracts.

Table2
Preliminary screening of secondary metabolites from Chlorophytum borivillianum

Secondary metabolite	Root			
	Petroleum Ether extract	Ethanol extract	Chloroform extract	Aqueous extract
Alkaloids	+	+	+	+
Protein	+	+	+	-
Steroids	+	+	+	+
Carbohydrate	+	-	-	+

TLC Identification was done by using $CHCl_3$: methanol solvent (15:1) and observing Rf values of alkaloids i.e. 0.92 (light green spot). The petroleum ether extract contains all secondary metabolites i.e. alkaloids, steroids, protein and carbohydrate. The ethanol extract contains alkaloids, protein and steroids. The chloroform extract contains alkaloids, protein and steroids. The aqueous extract contains Alkaloid, steroids and carbohydrate.

CONCLUSION

Chlorophytum borivilianum is widely used in drug industry and its demand is increasing day by day, roots are widely used as a natural sex tonic and are an integral part of more than 100 herbal drug formulations (Oudhia 2001a). The objective of present study is to preliminary screening and characterization of biologically active phytochemicals and qualitative separation of phytochemical of safed musli (*Chlorophytum Borivillianum*) by TLC. Root of safed musli (*Chlorophytum borivillianum*) is used for extraction of various types of phytochemicals. Four types of phytochemicals have extracted such as Alkaloid, steroids, Protein and Carbohydrate. Dried roots of *Chlorophytum* contain 42% carbohydrate, 8–9% protein, 3-4% fiber and 2-17% saponin (Bordia et al. 1995) and purified saponin extract was found more active than other extracts

(Deore & Khadabadi 2010a). Recently Stigmasterol and saponin named as furostanol and Chlorophytoside-I (3b, 5a, 22R, 25R)-26-(β-D- glucopyranosyloxy) 22-hydroxy-furostan-12-one-3yl O-β-D-galactopyranosyl (1-4) glucopyranoside has been isolated (Deore & Khadabadi 2010b). Research studies on *Chlorophytum* conducted in India and elsewhere indicate that saponins are responsible for medicinal properties. Saponins are thought to be highest in roots of forest origin. Thus the above investigations it can be say that *Chlorophytum borivilianum* L. can be used as health powder or health Tonic. *Chlorophytum borivilianum* L. is rare medicinal plant work should be done on in-situ & ex-situ conservation. Work on seed germination and regeneration of tuberous root of *Chlorophytum* species was done (Trivedi 1989, Suri et al., 1999, Deore & Khadabadi 2010) and moisture & dry matter plays important role in growth of Cholophytum tubers (Sheta & Goswami 1989).

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