# PRELIMINARY PHYTOCHEMICAL STUDIES ON ROOT TUBER EXTRACT OF *CHLOROPHYTUM BORIVILIANUM* SANTAPAU & FERNANDES

PANDA S.K[1*] AND DAS D[2]

[1]The Pharmaceutical College, Samaleswari Vihar, Tingipali, Barpali - 768 029

[2]School of Pharmaceutical Sciences, SOA University , Bhubaneswar –751 030

## ABSTRACT

The present communication deals with the preliminary phytochemical studies on root tubers extract of *Chlorophytum borivillianum* Santapau & Fernandes known in commerce as 'Safed musli'. This plant of high economic importance due to mainly aphrodisiac & rejurnetive properties. No study report are available on the phytochemical studies of the roots. Hence, the present attempt has been undertaken to investigate the preliminary phytochemical properties. The study revealed the presence of more phytoconstituents as alkaloids, glycosides, steroids, saponins & flavonoides etc. in methanolic extract.

**KEY WORDS** :- *Chlorophytum borivillianum*, Seasonal plant, Phytochemical.

## 1.INTRODUCTION

*Chlorophytum borivilianum* Sant. & Fern. is a small herbaceous plant belongs to Family Liliaceae having bunches of fleshy tuberous roots. Leaves are linear and flowers are white. It is a seasonal plant and grown in well drained loamy sandy soil of more moisture holding capacity. It is a native Indian plant with versatile therapeutic uses. It is used as tonic for complete rejuvenation of human body and acts as aphrodisiac, galactogogue and useful in bleeding piles, increasing sperms and arthritis. It is used over 200 Ayurvedic formulations and known in commerce as 'Safed musli'. This drug is sold as 'Desi vigra' and due to economical aspect known as 'White Gold'. The current production in India is 500-600 tones against demand of 3500 tones. High demand versatile therapeutic uses and controversy in identification has given chance for adulteration of the drug.

Different Qualitative phytochemical studies are carried out to know the presence of different secondary metabolites/phytoconstituents responsible for the therapeutic values of the drug. The efficacy of the drug is directly related to percentages of active constituents present in it and it varies from plant to plant.

Therefore, an attempt has been made to study the preliminary phytochemical of *C. borivilianum* with few related Pharmacognostical studies and reported in this communication.

*** For Correspondence**

E-mail ID : skpanda2006@rediffmail.com

## 2.MATERIALS AND METHODS

Authenticated planting materials were collected through NBPGR (ICAR) from NRC for M & AP, Anand, Gujrat bearing DS no. 413 dated 5th July 2004 and planted by following standard method of cultivation in herbal garden. *C. borivilianum* root tubers are harvested in time and voucher specimen preserved for future references.

Root tubers were made free from aerial parts & wiry rootlets and thoroughly washed,peeled & shade dried. They are powdered to 40 mesh and stored in airtight glass container.

**Extraction :**

100gm of dried coarse powder of *c. borivilianum* root tubers were successively extracted by Soxhlet apparatus by using solvents of increasing polarity(Pet. Ether $40^0 – 60^0$, Chloroform, Ethyl acetate and Methanol). All extracts colour, consistency and extractive values were recorded and shown in Table 1.

**Preliminary Phytochemical Studies:**

The individual extracts were subjected to qualitative investigation for the presence of phytoconstituents like Carbohydrates, Proteins & amino acids, Alkaloids, Glycosides, Tannins & phenolic compounds, Flavones & Flavonoides, Sterols & Steroids, Gums & Mucilages and Saponins as Shown in Table 2.

**Fluorescence analysis of successive extracts :**

Fluorescence characteristics of all successive extract of root tubers of *C.borivilianum* was observed in daylight and UV light i.e. both short & long wave length

and tabulated in Table 3.

**Thin Layer Chromatographic Studies:**

The TLC technique is an important qualitative analytical tool for micro – analytical separation & determination of natural products and discovery of chemical races. The thin layer chromatographic studies of all extract were carried out by using pre-coated silica gel 60 $F_{254}$ plate of Merck (Cat. No. 1–05554) with different solvent system and spray treatment. The developed spots were identified & the calculation of $R_f$ value were made and recorded in table 4.

**Table -1:Data shows the colour, consistency and extractive values of *C. borivilianum* root tubers by hot process (Soxhlet) extraction**

| Sl. No. | Solvent | Colour | Consistency | Percentage w/w of Extract |
|---|---|---|---|---|
| 1 | Petroleum ether (40 – 60$^0$C) | Yellow | Greasy | 0.27 |
| 2 | Chloroform | Brown | Greasy | 0.012 |
| 3 | Ethyl acetate | Light Yellow | Sticky | 0.75 |
| 4 | Methanol | Dark Brown | Viscous | 9.78 |

**Table - 2 : Qualitative Phytochemical analysis report for presence of Phytoconstituents in *C.borivilianum***

| Sl. No | Phytochemical Test | Petroleum ether Extract | Chloroform Extract | Ethyl acetate Extract | Methanol Extract |
|---|---|---|---|---|---|
| 1 | Carbohydrates | - | + | + | ++ |
| 2 | Proteins & Amino acids | - | + | - | + |
| 3 | Alkaloids | - | + | - | + |
| 4 | Glycosides | - | + | - | + |
| 5 | Tannins & Phenolic Compounds | - | - | + | +++ |
| 6 | Flavones & Flavonoides | - | - | + | + |
| 7 | Phytosteroids | ++ | + | + | + |
| 8 | Gums and Mucilages | - | - | - | ++ |
| 9 | Saponins | - | + | + | +++ |

+++ Prominently Present, ++ Moderately Present, + Slightly Present, - Absent

**Table - 3 :Fluorescence Characteristics of Successive Extracts**

| Sl. No. | Types of Extract | Day Light | UV Light Short | UV Light long |
|---|---|---|---|---|
| 1 | Petrolium Ether | Yellow | Yellowish Green | Green |
| 2 | Chloroform | Brown | Green | Deep green |
| 3 | Ethyl acetate | Light yellow | Yellowish Green | Green |
| 4 | Methanolic | Dark brown | Green | Brown to Black |

**Table – 4: Spots elicited & their $R_f$ values in TLC of *C. borivilianum* root tubers extracts**

| Sl. No | Extracts | Solvent System | Spray Treatment | No of Spots | $R_f$ Values |
|---|---|---|---|---|---|
| 1 | Pet.ether | Benzene: Chloroform :: 4:1 | Expose to Iodine Vapours | 3 | 0.14, 0.47, 0.61 |
| | | n-Hexane:Acetone:: 4:1 | Expose to Iodine Vapours | 4 | 0.27, 0.37, 0.48, 0.61 |
| 2 | Chloroform | Benzene: Chloroform :: 4:1 | Expose to Iodine Vapours | 2 | 0.14, 0.48 |
| | | n-Hexane: Ethyl acetate :: 4:1 | Expose to Iodine Vapours | 4 | 0.21, 0.35, 0.56, 0.69 |
| 3 | Ethyl acetate | Chloroform : Methanol :: 95:5 | 2% $H_2SO_4$, heated at 105$^0$C for 5 min. | 3 | 0.09, 0.11, 0.48 |
| | | Chloroform: Methanol: Water :: 5:1:0.5 | 2% $H_2SO_4$, heated at 105$^0$C for 5 min. | 4 | 0.26, 0.41, 0.51, 0.61 |
| 4 | Methanol | Methanol: Acetone:n-Hexane:: 4:1:2 | 2% $H_2SO_4$, heated at 105$^0$C for 5 min. | 2 | 0.19, 0.52 |
| | | Toulene: Ethyl formate: Formic Acid:: 5:4:1 | 2% $H_2SO_4$, heated at 105$^0$C for 5 min. | 7 | 0.1, 0.21, 0.29, 0.4, 0.54, 0.88, 0.92 |

## 3.RESULTS AND DISCUSSION

Preliminary phytochemical studies was carried out on the root tubers extract of *C. borivilianum* Santp & Fern. recommended as choice of drug for its aphrodiasiac, galactogogue and other miscellaneous uses in traditional system of medicine.

In Phytochemical investigation the percentage yield of methanol extract was found to be more than when compared to petroleum ether extract (Table 1).

The qualitative investigation test performed in four extracts (Pet. ether, Chloroform, Ethyl acetate & methanol) revealed the presence of alkaloids, glycosides, steroids, saponin & flavonoids etc (Table 2). Methanolic Extract of the drug contains more number of phytoconstituents with more percentage yield. The presence of organic constituents are considered to be responsible for pharmacological action.

The concentrated petroleum ether, chloroform, etylacetate & methanol extract of the root were subjected for fluorescence characteristics and TLC studies. All extracts viewed under ordinary light and UV light having wave length of 254nm & 365nm (Table 3). Equal amount of all stated extract were loaded on the TLC plates in duplicate and developed by using two different solvent system for each extract with same spray treatment . But different spray treatment methods was followed as per the characteristics of extract & detection of main active constituents in extract. Methanolic extract

showed more no of spots as compare to other extract.

All these studies will be of immense use in carrying out further research and revalidation of its use in Ayurvedic system of medicine.

## 4.ACKNOWLEDGEMENT

The authors are greatful to Dr. S. Maiti, Director, NRC for A & P and Dr. R.V. Singh, Head Germplasm of Exchange Division, NBPGR, New Delhi for supplying of authentic sample. They are also thankful to Dr. A.K. Dalai., Revenshaw College and Dr. Brahmam & Dr. Sexena of IMMT (RRL), Bhubaneswar for authentication of plant and Mr. A.K. Agrahari for assisting in the work.

## REFERENCES

Anonymous, The Wealthof India, Vol-III, CISR, New Delhi, 1992, 482.

Ansari M.M, Ahmad J, Ahmad A, Ansari S.H, Pharmacognostical characterization and Standardization of Morus alba stem bark, Journal of Medicinal and Aromatic Plant Science, 28, 2006, 28.

Chatwal G.R, Instrumental Methods of chemical Analysis, 5th Edition, Himalaya Publishing House, Mumbai, 2005, 2.600.

Khandelwal K.R, Practical Pharamacognosy, 14th Edn., Nirali Prakashan, Pune, 2005, 149, 157.

Kirtikar k.R and Basu B.D, Indian Medicinal Plants, Lalit Mohan Basu publications, Allahabad, India, 1987, 2508.

Kokate C.K, Purohit A.P and Gokhale S.B, Pharmacognosy, 29th Edn., Nirali prakashan, Pune-2, 2004, 211.

kokate C.K, Practical Pharmacognosy, 4th Edn., Vallabh Prakashan, Delhi, 1994, 107.

Raaman N., Phytochemical Techniques, New Indian Publishing Agency,New Delhi,2006, 19.

Ravishanker S, Text book of Pharmaceutical Analysis, 3rd Edition, Rx Publication, Tirunelvels, 2001, 14-1.

Sivarajan V.V and Balachandran I, Ayurvedic Drugs and their Plant Sources, Oxford & IBH publications co.pvt.ltd, New Delhi, 1994, 314.

Stahl E, Thin layer Chromatography:A Laboratory hand book, 2nd Edn., Springer,2001,321.