Available online at www.ijrbp.net

DOI: http://dx.doi.org/10.18782/2322-0392.1292

ISSN: 2322 – 0392

Int. J. Rec. Biotech. (2020) *8*(2), 35-41

Research Article

International Journal of Recent Biotechnology

Peer-Reviewed, Refereed, Open Access Journal

Determination Phytochemical Analysis of Dried Roots of *Chlorophytum borivilianum*

Neeta Mani[1*], S. P. Mishra[2], Vandana Pathak[3], Ravindra Singh[4] and R. C. Tripathi[5]

[1]Research Scholar, Deptt. of Biological Sciences, [2]Associate Prof. & Head, Deptt. of Crop Sciences, [3]Prof. & Dean, Faculty of Science and Environment, [4]Associate Prof. & Head, Deptt. of Biological Sciences, [5]Associate Prof. & Director of Research Directorate, Mahatma Gandhi Chitrakoot Gramoday Vishwavidyalaya, Chitrakoot, Satna, Madhya Pradesh

*Corresponding Author E-mail: neetamani2010@gmail.com

Received: 3.05.2020 | Revised: 15.06.2020 | Accepted: 23.06.2020

ABSTRACT

The present study was investigated for comparative Phytochemical investigation of dried tubers of Chlorophytum borivialianum between two treatment tcb_1 and tcb_2. Chlorophytum borivialianum commonly called as Safed musli. The present study revealed the presence of some important Phytochemical constituents in different solvents viz; Petroleum ether, Hexane, Ethyl acetate and Acetone. Estimation of Soluble protein, reducing sugar, non-reducing sugar in different tubers extract of Safed musli were performed along with the estimation of Total Carbohydrate, oil and Tannin in tubers powder of Safed musli. So this study tried to investigate the highest Phytochemical constituents between tcb_1 and tcb_2.

Keywords: *Phytochemical, Safed musli, Hexane, Ethyl acetate and Acetone*

INTRODUCTION

In the recent years there has been renewed internet in natural medicine as pharmaceutical industries depend in part on plants for the production of secondary compounds. The genus *Chlorophytum* belonging to family *Liliaceae* is comprised of about 75 spp. of perennial, rhizomatous herb, distributed in Tropical and Sub-Tropical regions of the world (Kirtikar & Basu 1994) out of which 17 spp. Are found in India (Anonymous, 1992). The peeled and dried fasciculated roots of *C. borivilianum* are considered a wonder drug in traditional Indian systems of medicine due to its aphrodisiac and natural tonic properties (Singh & Chauhan 2003). *Chlorophytum* b.Sant.et Fernand (Family; *Liliaceae*) is an important medicinal herb. It grows wild during the rainy season on the sloppy fertile land and produces fasciculated storage roots which are reputed to possess aphrodisiac properties. In India it is mainly in Southern Rajasthan, North Gujarat and Western Madhya Pradesh (Geetha & Maiti, 2002). *C. borivilianum* known as '*Safed musli'* the roots of this plant form an important ingredient of herbal tonics prescribed in the Ayurvedic system of medicine in India (Kirtikar & Basu 1975).

Cite this article: Mani, N., Mishra, S.P., Pathak, V., Singh, R., & Tripathi, R.C. (2020). Determination Phytochemical Analysis of Dried Roots of *Chlorophytum borivilianum*, *Int. J. Rec. Biotech. 8*(2), 35-41. doi: http://dx.doi.org/10.18782/2322-0392.1292

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It is also used for treatment of certain diseases like rheumatism, renal calculus and lencorrhoea. It is lactating, energetic to heart. Tubers roots are having great medicinal value containing the steroidal sapogenin (1-2%), Proteins (10-12%) and calcium.(Pullioh 2006).

MATERIALS AND METHODS

Plant material collection and cultivation

The present experimental work was performed in Agriculture farm of M.G.C.G.V.V. Chitrakoot University. For this study the Safed musli, tCb_1 and tcb_2 collected from Chitrakoot Forest and D.R.I Chitrakoot (M.P) during both the year 2016-17 and 2017-18 and transplanted in the Agriculture farm of M.G.C.G.V.V. Chitrakoot Satna (M.P) during first week of July month and harvested after one year. The roots of *Safed musli* were collected for the analysis of physiochemical and Phytochemical was conducted on Biochemistry and Biotechnology Lab in the Department of Crop Sciences, Faculty of Agriculture, Nana Ji Deshmukh New Agriculture Campus, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, Satna (M.P.). The prepared power was store in air tight container for further analysis.

Preparation of Plant extract

The collected fresh roots of Safed musli were washed thoroughly with distilled water and under shade dried. The dried root was grind well into a fine powder in a mixer grinder and sieved (Sieved no.45).The powder was store in air tight container. Weighted 5.0 g powder of Safed musli in 250 ml iodine flasks containing 100 ml solvents such as hexane, petroleum ether, acetone and chloroform separately. The flasks were kept in dark for 24 hours and filter by using Whatsmann filter paper No.1. These extracts were used for physicochemical analysis, preliminary Phytochemical screening and estimation of soluble protein, reducing sugar, non-reducing sugar, total carbohydrate, oil and Tannin respectively.

Methods

The Physiochemical analysis of powder of roots of *Shatavari* was performed by standard method (Anonymes & Lohar, 2007). Phytochemical screening of different root extracts such as Petroleum ether extract (PEE), Hexane extract (HE), Ethyl acetate extract (EAE) and Acetone extract (AE) were carried out by method described by (Raval et al., 2012). The soluble protein was estimated by Lowery's method with some modification (Lowery's, 1951). Reducing sugar was estimated by Dinitrosalicyclic acid (DNS) method (Miller,1972).The determination of total carbohydrate or soluble sugar by Anthrone method (Hedge and Hofreiter,1962) and the content of non- reducing sugar can also be calculated by subtracting the reducing sugar from total carbohydrate contents. Tannin estimation (%) by Folin Denis method (Schanderl, 1970). Determination of oil content (in %) by Soxhlet extraction method in Petroleum ether (B.P. 60-80^{O}C) was used for the extraction purposes (A.O.A.C (1970)).

Experimental Analysis

Physiochemical analysis

Physiochemical parameters showed the identity, purity and strength of the plant powder. The percentage yield (w/w) of different physiochemical parameters was performed triplicately which showed in table 1.

Table1-1: The percentage yield (w/w) of physiochemical parameters of *Safed musli.*

S. No.	Parameters	Root of *Safed musli*	
		tcb_1	tcb_2
1.	Loss on drying at 105^{o}C	6.3293 ± 0.5597	4.2950± 1.9021
2.	Total ash value	0.5127±0.1231	0.5583 ±0.3192
3.	Acid insoluble ash value	0.5450 ±0.0600	0.5315 ±0.02450
4.	Water soluble ash value	0.5617 ±0.1167	0.5970 ±0.2130

Table1-2: Preliminary Phytochemical screening of different root extracts of *Safed musli* of the *tcb*$_1$ and *tcb*$_2$

Name of Phytoconstituents	Root of *tcb*$_1$ (2016-17)				Root of *tcb*$_2$ (2017-18)			
	PEE	HE	EAE	AE	PEE	HE	EAE	AE
Carbohydrate (Fehling's test)	+	+	+	+	+	+	+	+
Saponin (Foam test)	-	+	-	+	+	-	+	+
Tannin (Lead acetate test)	+	+	+	+	+	+	+	+
Terpanoids (Liebermana-Burchard test)	-	-	+	+	-	-	-	-
Flavonoids (Alkaline reagent test)	+	+	-	+	-	+	-	-
Steroids (Salkowski method)	+	+	+	+	+	+	+	+

Whereas, (+) denotes present and (–) denotes absent

Table1-3: Estimation of soluble protein by Lowery's method

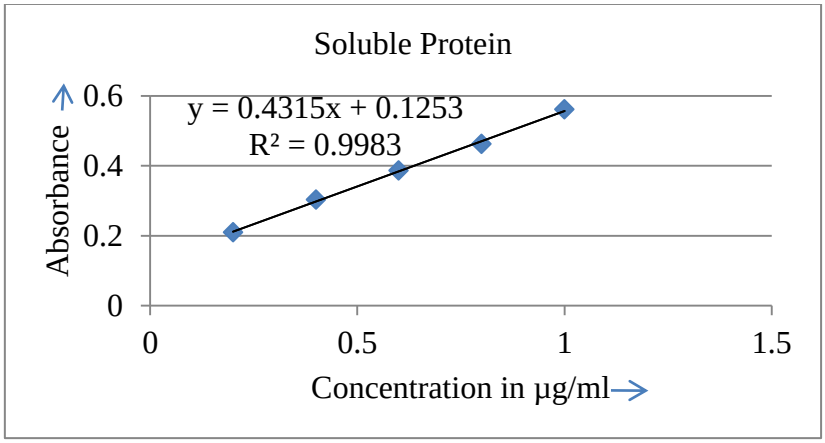

Fig.- 1: Standard curve of soluble protein

Sample table of soluble protein

S.No.	*Safed musli* tubers extracts	Conc. in µg/ml	
		tcb$_1$	*tcb*$_2$
1.	Petroleum ether	0.2033±0.002	0.0422±0.2156
2.	Hexane	0.3336±0.002	0.3106±0.0082
3.	Ethyl acetate	1.7523±0.025	1.5605±0.0205
4.	Acetone	2.1357±0.013	2.0053±0.0020

*ND = Not detected

Table1-4: Estimation of reducing sugar by DNS method

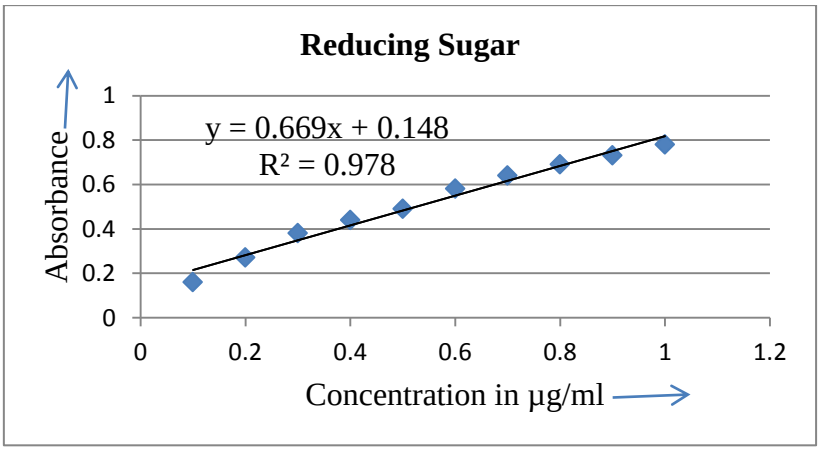

Fig.- 2: Standard curve of Reducing Sugar

Sample table of reducing sugar

S.No.	*Safed musli tubers* extracts	Conc. in µg/ml	
		tcb_1	tcb_2
1.	Petroleum ether	1.7967±0.0059	1.6023±0.050
2.	Hexane	1.4977±0.0029	1.4230±0.0067
3.	Ethyl acetate	2.3497±0.0342	2.2301±0.0054
4.	Acetone	2.9177±0.0173	2.6935±0.0086

Table1-5: Estimation of total carbohydrate by Anthrone method

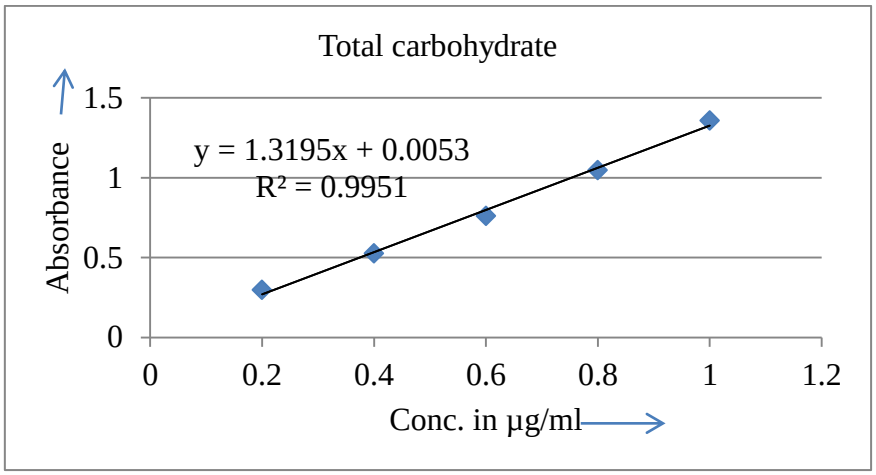

Fig.- 3: Standard curve of total carbohydrate

Sample table of total carbohydrate

S.No	Name of sample	Conc. in µg/ml	
		tcb_1	tcb_2
1.	*Safed musli* tubers root	3.7399± 0.0169	3.5201±0.026

Sample table of Non-reducing sugar

S.No	*Safed musli* tubers extracts	Conc. in µg/ml	
		tcb_1	tcb_2
1.	Petroleum ether	2.1376	1.7234
2.	Hexane	2.3169	2.0224
3.	Ethyl acetate	1.5098	1.1704
4.	Acetone	1.0464	0.6024

Note: SD=Standard deviation; ND=Not Detected

Table1-6: Estimation of tannin by Folin – Denis method

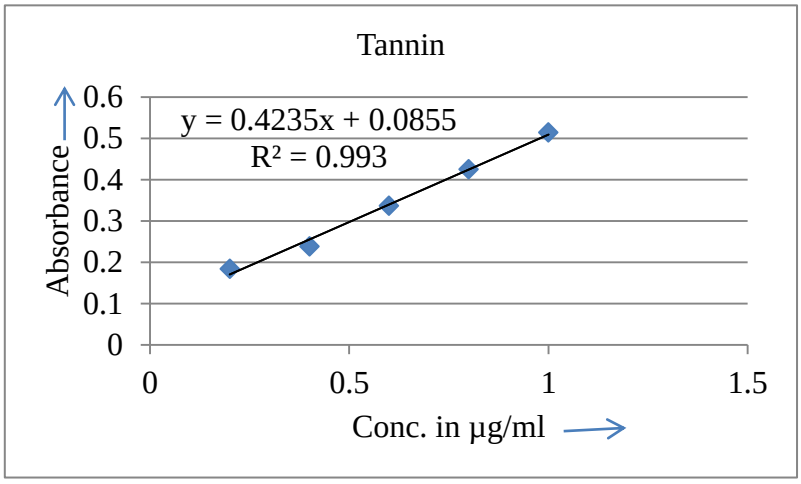

Fig.- 4: Standard curve of tannin

Sample table of tannin

S.No	Name of sample	Conc. in µg/ml	
		tcb₁	***tcb₂***
1.	***Safed musli tuber root***	1.8000±0.0169	0.7200±0.0082

Table1-7: Estimation of Oil by Soxhlet method

S.No	Name of sample	Percentage (%)	
		tcb₁	***tcb₂***
1.	***Safed musli* tubers root**	4 %	3.5%

DISSCUSSIONS

In present study, tried to find out the, Physiochemical and Phytochemical variation between *tcb₁* and *tcb₂*. Present study were carried out on comparative, Physiochemical and Phytochemical analysis on tubers of *Safed musli*, between Chitrakoot Forest and D.R.I. Chitrakoot. The percentage yields of Physiochemical analysis Such as LOD, Total Ash, Acid in soluble and Water insoluble ash values of *tcb₁* values were 6.32933±0.559701, 0.51275±0.12311, 0.5450±0.0600, 0.5617±0.1167 while *tcb₂* values were 4.295±1.9021,0.5583±0.3192,0.5315±0.0245,0 .5970±0.2130 recorded respectively.

The preliminary Phytochemical screening of P. ether, Hexane, Ethyl acetate and Acetone extracts were carried out and showed the presence of Carbohydrate in all four extracts of both the accessions. In the case of *tcb₂* Saponin were present in Hexane and Acetone but Absent in P.ether & Ethyl acetate while in *tcb₁*, saponin were present in P.ether, Acetone and Ethyl acetate. Tannin were present in both accessions. In *tcb₂* terpanoids were absent in Acetone & Ethyl acetate and absent in Hexane and P.ether but in *tcb₁* the terpanoids were present in all four extracts .Flavonoids were present in Hexane, P.ether & Acetone but absent in only Ethyl acetate ,in *tcb₂* but in *tcb₁*, the flavonoids was present in only Hexane extracts and absent in other three extracts.

The total Carbohydrate estimation was done by powder form of dry tubers root of *Safed musli*. So the highest total Carbohydrate value was recorded in *tcb₁* (3.7399±0.1690) and the lowest in *tcb₂* (3.5201±0.0216).

The highest reducing sugar value was recorded in *tcb₁* that was Acetone extract (2.9177±0.0173), E. acetate value was (2.3497±0.0343), P.ether value was (1.7967±0.0059) and Hexane value was (1.4977±0.0029) While the lowest reducing

sugar value was recorded in tcb_2 that was Acetone extract (2.6935±0.0086), E. acetate (2.2301±0.0054), P. ether (1.6023±0.0050), Hexane (1.4230±0.0067).

The highest Non-reducing sugars value was in tcb_1, Hexane (2.3169), P. ether (2.1376) E.acetate (1.5098) and Acetone (1.0464) and the lowest non-reducing sugar value in tcb_2 that was recorded in Hexane (2.0224), P.ether (1.7234), E.acetate (1.1704) and Acetone (0.6024).

The highest soluble protein value were recorded in tcb_1 Acetone extracts (2.1357±0.0163µg/ml) Ethyl acetate 1.7523±0.0205, Hexane (0.3336±0.0082 and P.ether (0.2033±0.0082) and the lowest soluble protein value was recorded in tcb_2.So the Acetone value was recorded (2.0053±0.0020), then E.Acetate value was (1.5605±0.00205) and Hexane extract value was (0.3106±0.0082) and P.ether value was (0.0422±0.2156).

The highest Tannin value in tcb_1 (1.80±0.0169) and lowest value was in tcb_2 (0.7200±0.0082). The highest oil percentage was recorded in tcb_1 4% and lowest was recorded in tcb_2 that was 3.5%.

CONCLUSION

The preliminary and quantitative phytochemical analysis were studied in the present investigation. The root powder was extracted with different solvents and the extracts were phytochemically analysed. One or more phytoconstituents present in the extracts. Numerous studies have been conducted on root part of *Safed musli*, this plant has developed as a drug by pharmaceutical industries.

Acknowledgements

The authors are Thankful to V.C. of M.G.CG.V.V. Chitrakoot, Satna, M.P. for providing facilities to carry out the research work.

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