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PHYTOCHEMICAL STUDY OF *PTEROBRYOPSIS* SPECIES & *BRYUM CORONATUM* AND STUDY ANTIOXIDANT ACTIVITY OF *PTEROBRYOPSIS* SPECIES

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ABSTRACT :

Bryophytes are useful in medicinal use antibiotic, antioxidant activity and source of food, which is limited for famine period. Generally they are used as an ingredient of bread and soup.phytochemical screening of both mosses like Pterbryopsis Species and Bryum Coranatum. Both mosses the presence of medicinaly active constituent like alkaloid, flavanoid, phenol,saponin and steroids. Antioxidant activity analysis in Pterbryopsis species is done by using DPPH radial scavenging activity. Radial scavenging activity is high in acetone extract as compared to aqueous extract.

KEYWORDS : *medicinal, Antioxidant, Phytochemical .*

INTRODUCTION

Bryophytes:

Sample 1 classification:

Pterobryopsis spp.

Kingdome- Plantae

Subphylum-Musci

Subclass-Bryidae

Order- Leucodontales

Family- Pterobryaceae

Genus- *Pterobryopsis*

Sample 2 classification:

Bryum coronatum

Kingdome- Plantae

Division-Bryophyta

Class- Bryopsida

Order- Bryales

Family-Bryaceae

Genus-*Bryum*

Species- *coronatum*

Bryophyte (Bryon: moss, Phyton: Plants) is group of the simplest and primitive plant of a group embryophyta. Bryophytes are mainly found in cool, moist and wet, shady places. Bryophytes are second largest group in the plant kingdom with about 25,000 bryophyte species and they can be found in any kinds of ecosystem. The bryophytes are divided into three type's mosses, liverwort & hornwort. Moss are those plants which are having rhizoid axis and leaves but are not having root, stem and leaves. Bryophytes are called as plant amphibian.

Bryophytes are second largest group in the plant kingdom with about 25,000 bryophyte species and they can found in any kind of ecosystems (Asakawa *et al.,* 2013 and Glime, 2007). In comparison with higher plants use of bryophytes for human consumption is negligible due to their low caloric value (Forman, 1968) and poor organoleptic properties. Traditionally, use of bryophyte as a food source is limited for famine periods, however in northern regions of Europe and America bryophytes are used as an ingredient of bread or soup. In circumpolar regions bryophytes are used as a common animal feed (Glime, 2007).

Bryophytes due to the presence of high number of biological active compounds in their composition are commonly used in ethanopharmacology and as medicinal plants for treatment of wounds and burns (Singh *et al.*2006; Cheng *et al*., 2012; fu *et al*., 2012; Asakawa *et al.,* 2012). More specificaly bryophytes demonstrate antibacterial, antifungal, antiviral activity, antioxident, antiplatelet, antithrombin, insecticidal, neuroprotective activities, as well as cytotoxicity in respect to cancer cells (Cheng *et al;* 2012).

Bryophytes are economically important. They play role in medicinal use, antibiotic activity, as a source food, as pollution indicator. Bryophytes have a high water retention capacity due to their structure and tend to be most abundant in regions with high levels of atmospheric humidity and low rates of evaporation. Secondary metabolites are also known as Phytochemical, natural product or plant constituent are responsible for medicinal properties of plant to which they belong. Their classification is base chemical structure, composition, their solublity by which they are synthesized. The main classification system includes three major groups terpenoid, alkaloids and phenolic (Justin N.kalberga *et.al 2014).*

MATERIALS AND METHODS

Pteridobryopsis species and *Bryum coronatum* collected from Tamhini ghat (Mulshi). Mr. Shrikant gund identify the bryophyte species. Bryophyte was collected, identified and cleaned from biotic contamination, wash with distilled water and air dried the bryophyte sample. Air dried bryophytes sample grind by using an electrical blender and this powder stored in air tight bottles.

PHYTOCHEMICAL TESTS

Phytochemical analysis:

Secondary metabolites - alkaloids, flavonoids, glycosides, lignin, steroid, saponins, terpenoids and tannins etc. The detection of phytochemicals has been done qualitatively using various phytochemical tests. Samples in the form of powder and different solvent extracts were used for this purpose.

Extract preperation: *Pteridobryopsis species* and *Bryum coronatum* of bryophyte species in powder form extracted with different solvent like methanol, Acetone and water separately. The extracts

are used for preliminary screening of phytochemicals such as alkaloids, glycosides, flavonoids, steroids, terpenoids, tannins, phenolic compound, saponins.

1. Test for alkaloids:

Sr. no.	**Test**	**Observation**	**Inference**
1	Few ml filtrate + few drops of wagner's reagents.	Reddish brown precipitation	Alkaloid present.
2	Few ml filtrate + 1or 2 ml of hager's reagent	Yellow precipitation	Alkaloid present.
3	2ml extract + few drops of mayer' reagent	cream colour	Alkaloid present.
4	2ml extract+ add few drops of tannic acid	yellow brown precipitation	Alkaloid present.

2. Test for flavonoids:

Sr. no.	**Test**	**Observation**	**Inference**
1	Ferric chloride test: 1ml extract + few drops of freshly prepared ferric chloride	green colour formation	Flavonoid present.
2	Sodium hydroxide test: 5ml of 20% NaoH is added to equal volume of extract	yellow colour	Flavonoid present.

3. Test for terpenoids:

Sr. no.	Test	Observation	Inference
1	Salkowaski test: test solution was taken in test tube and add few drops of conc. Sulphuric acid and shake well. Allow it to settle down.	Lower layer turned yellow	Terpenoid present.

4. Test for saponin:

Sr. no.	Test	Observation	Inference
1	2 ml of extract was taken and 20 ml of final volume was make up with distilled water. The suspension was shaken in graduate cylinder for 15 min.	froath formation (not permanent)	saponin present.

5. Test for cardiac glycoside:

Sr. no.	**Test**	**Observation**	**Inference**
1	**Keller killeni tes**t: few ml of extract was dissolved in 1ml glacial acetic acid solution then added 1ml conc. Sulphuric acid	Brown ring obtained	Cardiac glycoside present.

6. **Test for tannin:**

Sr. no.	Test	Observation	Inference
1	Take 1ml extract solution adds equal amount distilled water. Add 2 drops of ferric chlorides	black colour	Tannin present.

7. **Test for sterol:**

Sr. no.	Test	Observation	Inference
1	**Salkowaski Test**: 2 ml of extract was taken in test tube few drops of sulphuric acid was added. After shaking well it was allowed to settle down.	red colour was observed in lower layer	Sterol present

8. **Test for phenolic compound:**

Sr. no.	Test	Observation	Inference
1	Test for ferric chloride: in few ml filtrate, few drops of 5% of ferric chloride solution added	green colour formation	Phenol present

Radical Scavenging activity determination in Pterobryopsis species extract using DPPH method:

In a test tube 0.3 ml extract was added and mix with 2.6 ml of methanol + 0.3 ml 2,2 diphenyl 1-picryldrazyle (DPPH). Mixture was incubated for 20 minutes in a dark place in room temperature. Absorption was measure using a quartz cuvette with a spectrophotometer at 515/517nm. Three parallel measurements were carried out.

RESULT AND DISCUSSION:

Well recognized source of phytochemical are angiosperm and other higher plant such as pteridophytes, gymnosperm. The majority of the phytochemical are extracted from angiosperms, pteridophytes, gymnosperms etc. use of bryophyte as asource of phytochemical is a very negligible though they are potential source of phytochemicals. Aim and objectives of this research is to focus lower plant groups such as bryophytes as an alternative source of phytochemical.

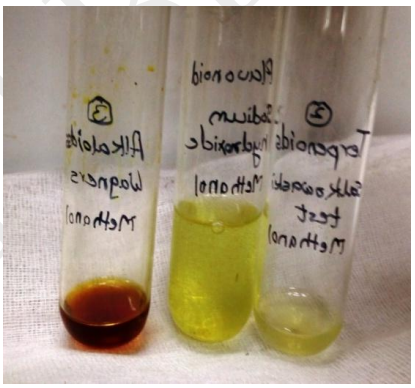
1. ***Pteridobryopsis species***

Test	Aqueous	Methanol	Acetone
Alkaloid	+	+	+
Flavonoid	+	-	+
Terpenoid	+	+	-
Saponine	+	+	-
Glycoside	+	+	-
Tannin	-	-	-
Sterol	-	-	-
Phenolic	-	-	-

2. *Bryum conronatum*

Test	Aqueous	Methanol	Acetone
Alkaloid	+	+	+
Flavonoid	+	+	+
Terpenoid	-	+	-
Saponine	-	-	-
Glycoside	-	-	-
Tannin	-	-	-
Sterol	-	-	-
Phenolic	-	-	-

Water Extract *Bryum coranatum* **Acetone extract *Bryum coranatum***



Methanol extract *Bryum coranatum*

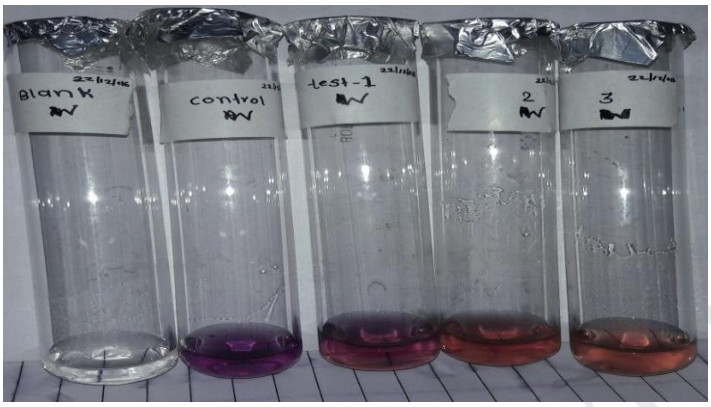
Radical scavenging activity determination in *Pterobryopsis species* extracts using DPPH

1.Aqueous extract:

	Methanol (ml)	DPPH (ml)	Plant extract	O.D at 517nm
Blank	3.0	-	-	000
Control	2.9	0.1	-	0.73
Test 1	2.8	0.1	0.1	0.186
Test 2	2.7	0.1	0.2	0.213
Test 3	2.6	0.1	0.3	0.254

Percentage activity = control (abs)_ test(abs) /Control (abs) ×100

= 0.73- 0.186 / 0.73 ×100
= 74.52%



Radical scavenging activity of *Pterobryopsis species* in water extract

1. Acetone extract:

	Methanol	DPPH	Plant extract	O.D at 517nm
Blank	3.0	-	-	000
Control	2.9	0.1	-	0.79
Test 1	2.8	0.1	0.1	0.378
Test 2	2.7	0.1	0.2	0.296
Test 3	2.6	0.1	0.3	0.158

% activity = control (abs)-test (abs)/control (abs) × 100

= 0.79 - 0.158 / 0.79 ×100

= 80%

Radical scavenging activity of *Pterobryopsis species* in Acetone extract

Radial scavenging activity of *Pterobryopsis species* in methanol extract is 74.52% and acetone extract is 80%.

CONCLUSION:

The results of the qualitative phytochemical screening of these two moss plants indicated the presence of medically active constituents such as alkaloids, flavonoids, terpenoid, phenols, saponin and steroids. The extracts of *Pterobryopsis species* were subjected to various phytochemical tests. Methanol Extracts showed the presence of alkaloid, flavonoid, terpenoid,saponine and cardiac glycoside. Acetone extract showed presence of flavonoid, alkaloid. And water extract showed presence of alkaloid, flavonoid, terpenoid,saponine and cardiac glycoside. The extracts of *Bryum coranatum* were subjected to various phytochemical tests. Methanol Extracts showed the presence of terpenoids, alkaloid andalkaloids. Acetone extract showed presence of alkaloid, flavonoid. And water extract showed presence of alkaloid, flavonoid.

Amongst criteria of extraction efficiency major stress was put on the yield of extracted substances and the antioxidant activities of the extracts, considering recent interest just in this kind of activity of natural compounds and for this purpose DPPH radical scavenging activity analysis was used. Considering interest in studies of bryophyte biologically active compounds and more broadly in the composition of bryophyte secondary metabolites, for the extraction low cost, low-toxicity, volatile solvents and their mixtures were selected with ability to extract substances with possibly.

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