International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Qualitative and Quantitative Analysis of Edible Mushroom *Calocybe indica* using Solvent Extracts

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Abstract: ***Mushrooms are white rot fungi regarded as one of the well known food and possessing various kinds of biopharmaceutical compounds. Phytochemicals of mushrooms are nutritionally functional and a source of physiologically beneficial medicines. Mushrooms are rich in protein, minerals and vitamins and they contain an abundance of essential amino acids. Qualitative and quantitative phytochemicals were analyzed to study the presence of alkaloids, carbohydrates, glycosides, proteins, flavonoids, triterpenoids, phenols, tannins, saponins and anthroquinones. In the present study Calocybe indica was used to find out the phytochemical analysis in different solvents like, acetone, petroleum ether and aqueous. This study demonstrated that the acetone extract of calocybe indica had highest protein content compared to petroleum ether and aqueous extracts.***

Keywords: *Calocybe indica*, acetone, petroleum ether and aqueous, qualitative and phytochemicals

1. Introduction

Mushrooms have been widely used as food and food ingredients in many food products for a long time. Mushroom extracts and compounds have been found with special central effects that could be of pharmacological interest. From a nutritional point of view, mushrooms contain high protein and low fat. Recently, mushrooms have received much attention as source of biological active substance i.e., secondary metabolites (Royse, 2005). The mushroom defined as a macro fungus with a distinctive fruiting body, On the other hand human health and fitness mushroom cultivation is one of the most commercially agriculture. Microbial technology can help in large scale recycling of agro waste in India (Chavbey *et al*., 2010).

Calocybe indica, a tropical edible mushroom, is popular because it has good nutritive value and it can be cultivated commercially. The current investigation was undertaken to determine a suitable substrate and the appropriate thickness of casing materials for the cultivation of *C.indica* and commonly known as milky white mushroom, grown during the summer in the, gaugetic plain of Bangladesh and west Bengal of india (Chakravathy *et al*.,1981). It is becoming more popular, due to its robutst size, attractive color, sustainable yield, delicious taste, and unique texture (Purkayartha and Chandra, 1974). *C.indica* is rich in protein, lipids, mineral, fiber, carbohydrate and is abundant with essential amino acids (Alam *et al*., 2008); (Mallvandharri *et al*., 2006).

2. Materials and Methods

2.1 Collection of materials

Calocybe indica was collected from Vellayani Agriculture College, Truvandrum. Mother spawn was raised from the fruit body of *Calocybe indica* which appeared on the substrate bed incubated with the spawn material. Three solvents Acetone, petroleum ether and Aqueous and paddy straw substrate were used. The paddy straw was used as substrate. The mushroom were dried and made into powder and prepare in to different solvent extracts.

Qualitative phytochemicals were analyzed by using standard procedures. Alkaloids (Evans, 2002), Carbohydrates (Harborne, 1998), Glycosides (Siddiqui *et al*., 1997), proteins (Lowry*et al*., 1951), Flavonoids (Harborne, 1973), triterpenoids (Ayoola *et al*., 2008), phenols (Sofawora, 1993), tannins (Trease & Evans, 1989), saponins (Kumar *et al*., 2009) and anthroquinones (Adebayo *et al*.,2012). Quantitative phytochemicals like protein (Lowry *et al*., 1951), Flavonoid (Ordonez *et al*., 2006), Phenols (Siddhuraju, 2007), Glycosides (Solich *et al*.,, 1992) were analyzed.

3. Results and Discussion

3.1 Qualitative analysis

3.1.1. Phytochemical analysis of *Calocybe indica* in paddy straw using solvent extracts

The Phytochemical analyses of Calocybe indica in paddy straw using solvents were presented in Table 1.

The phytochemical screening of different solvent extracts of paddy straw revealed the presence of alkaloids, glycosides, proteins, flavonoids, triterpenoids, phenols, tannins. The compounds carbohydrates, saponins and anthroquinones were given negative result. The compounds alkaloids glycosides, proteins, flavonoids, triterpenoids, phenols, tannins were present in all the three solvent extracts. The acetone extract showed positive result to alkaloids, glycosides, proteins, flavonoids, triterpenoids, phenols, tannins and negative results to carbohydrates, saponins and anthroquinones. Similar results were reported for *Calocybe*

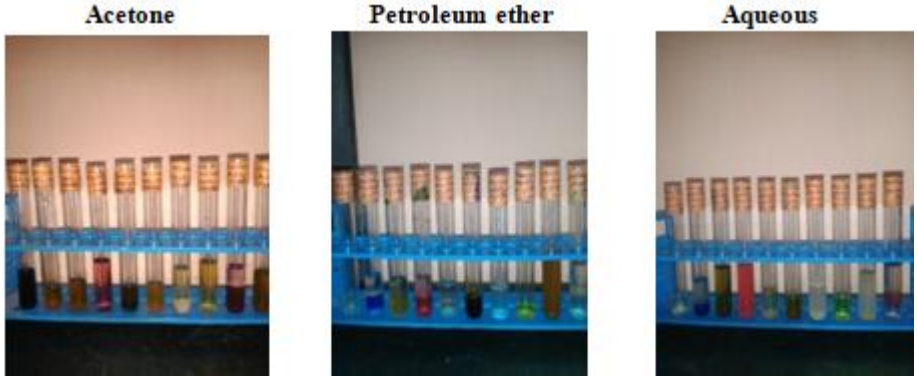
indica Prabu and Kumuthakalavalli, (2014). The compounds glycosides, proteins, flavonoids, triterpenoids, phenols, tannins were observed in petroleum ether extract and negative results were carbohydrates, saponins and anthroquinones. The result correlated with Egwim *et al.*, (2011). The aqueous extract showed the presence of alkaloids, glycosides, proteins, flavonoids, triterpenoids, phenols, tannins and absence of carbohydrates, saponins and anthroquinones. Similar reports were observed by Barros *et al*., (2007).

Table 1: Phytochemical analysis of *Calocybe indica* in paddy straw using solvent extracts

Substrate	Compounds	Solvents		
		Acetone	Petroleum ether	Aqueous
Paddy straw	Alkaloids	+	++	+
	Carbohydrates	-	-	-
	Glycosides	+	++	++
	Proteins	++	+++	++
	Flavonoids	++	++	+
	Triterpenoids	+++	+	+
	Phenols	++	++	++
	Tannins	+	+	++
	Saponins	-	-	-

Denotes very high concentration (+++), high concentration (++), small concentration (+), absent (-).

3.1.2. Phytochemicals Analysis of *Calocybe indica* using solvent extracts



3.2. Quantitative analysis

3.2.1. Quantitative phytochemical analysis of *Calocybe indica* in paddy straw using solvent extracts

The Phytochemical quantitative analyses of Calocybe indica in paddy straw using solvent extracts were presented in Table 2.

The Acetone extract of *Calocybe indica* showed the activity against glycoside 3.42 ± 0.43 mg/g, protein 6.89 ± 0.22 mg/g, flavonoid 1.67 ± 0.10 mg/g, phenol 3.32 ± 0.21 mg/g and tannin 3.33 ± 0.41 mg/g. Similar reports were supported to this study Hantano *et al.*, (2016). The petroleum ether extract showed maximum protein content 5.32 ± 0.32 mg/g followed by tannin 3.21 ± 0.32 mg/g, glycoside 2.67 ± 0.23 mg/g, phenol 2.58 ± 0.44 and flavonoid 1.32 ± 0.94 mg/g respectively. These results correlated with Anwar and Prazybylski, (2012). The aqueous extract showed the glycoside content 2.33 ± 0.20 mg/g, protein 4.42 ± 0.11 mg/g, flavonoid 0.46 ± 0.43 mg/g, phenol 2.22 ± 0.31 mg/g and tannin 3.09 ± 0.13 mg/g.

Table 2: Quantitative phytochemical analysis of *Calocybe indica* in paddy straw using solvent extracts

Substrate	Compounds	Solvent extracts		
		Acetone	Petroleum ether	Aqueous
Paddy straw	Glycoside	3.42 ± 0.43	2.67 ± 0.23	2.33 ± 0.20
	Protein	6.89 ± 0.22	5.32 ± 0.32	4.42 ± 0.11
	Flavonoid	1.67 ± 0.10	1.32 ± 0.94	0.46 ± 0.43
	Phenol	3.32 ± 0.21	2.58 ± 0.44	2.22 ± 0.31
	Tannin	3.33 ± 0.41	3.21 ± 0.32	3.09 ± 0.13

4. Conclusion

Phytochemical analysis showed that mushroom is rich in almost all types of secondary metabolites which are essential for life. According to the result clearly indicates that the acetone extract of *Calocybe indica* has significant phytochemical constituents. All the extracts of such as proteins, carbohydrates, flavonoids, tannins, glycosides, phenols. This study demonstrates that the acetone extract of *calocybe indica* had highest protein content compared to petroleum ether and aqueous extracts.

Acknowledgement

The authors thank the department of Botany and Research Centre, Scott Christian college (Autonomous), Nagercoil for providing laboratory facilities during the period of this research.

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