ABSTRACT

North-Eastern region of India falls under the Eastern Himalayan biodiversity hotspot witnessing very high biodiversity. The region has favourable conditions for the presence of high mushroom diversity. Mycophagy is a common practice and the macro fungal diversity is under explored. In the present study, after doing a preliminary ground survey work, five wild mushrooms were evaluated for its macroscopic and microscopic characters followed by molecular characterization using ITS & LSU markers for their identification. The partial DNA sequences were deposited in NCBI GenBank and accession numbers were obtained. The samples were identified as *Volvariella volvacea, Termitomyces heimii, Lentinus sajor-caju, Chlorophyllum hortense* and *Cantharellus subamethysteus.* As per review of available literature, in the present study *Cantharellus subamethysteus* is reported for the first time from India. From the survey, it is reflected that all the five species are edible. The samples were studied for its nutritional, antioxidant potentials and antimicrobial properties that includes protein, carbohydrate, fat, ash, moisture, amino acids, fatty acids, bioactive compounds (GC-MS), ABTS radical scavenging activity, DPPH radical scavenging activity, ferric reducing antioxidant potential, nitric oxide scavenging activity and superoxide scavenging activity. The moisture contents ranged from 88-92%. The ash contents ranged from 40.7-53.3 mg/g of dried sample. The mushrooms were low in fat with 1.02-3.21%. The protein contents were within the range of 29.76-52.08%. The sugar contents were in the range of 20.4-46.6%. All the essential amino acids were present in *Lentinus sajor-caju*. The percentage of essential amino acid was highest in *Cantharellus subamethysteus.* Histidine, arginine, glutamic acid and serine were not detected in any of the studied samples. Fifteen non standard amino acids were also detected in the studied samples. The fatty acid profile showed the presence of palmitic acid, stearic acid, oleic acid, palmitoleic and linoleic acid to be higher in the samples. Among the studied minerals, magnesium was highest in all the samples. The antimicrobial activity was studied against five microbial species viz. *E. coli, P. vulgaris, S. aureus, K. pneumonae* and *B. cereus*. The nutritional evaluation revealed that samples are rich nutritionally with good proportion of protein, carbohydrate, minerals, beneficial fatty acids, amino acids and bioactive components. The samples were also found to have good antioxidant activities and antimicrobial properties. The *in silico* studies were carried out against bacterial proteins; Bacterial efflux pump, Isoleucyl-tRNA synthetase, Dihydropteroate synthase, D-alanine: D-alanine ligase, Topoisomerase ATPase inhibitor and Penicillin binding protein. The bioactive components were found to have potential *in silico* studies against different antimicrobial proteins.