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Macrofungi of Guba district of Azerbaijan: biological characteristics and utilization potential

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Abstract: This article reports a study of the pharmacological value of mushrooms, their biologically active substances, and research trends, with a focus on species found in the Guba district of Azerbaijan. The research was conducted based on both herbarium specimens from previous years and fungal specimens collected by the authors in recent years. As a result, out of a total of 104 species and one variation recorded in the studied territory 27 have valuable therapeutic effects. Fungi belong to 22 genera, 16 families, and 7 orders, within the phyla Ascomycota and Basidiomycota. Most of the collected mushrooms have antibacterial, anticancer, antioxidant and immunomodulatory properties. Of these, *Fomes fomentarius*, *Fomitopsis quercina*, *Ganoderma lucidum*, *Morchella esculenta*, *Phellinus igniarius*, *Pleurotus ostreatus*, *Schizophyllum commune* and *Suillus granulatus* combine five or more therapeutic effects. Among the studied mushrooms, *Boletus edulis*, *Cerrena unicolor*, *Collybia nuda*, *C. odora*, *Coprinellus micaceus*, *F. quercina*, *Ganoderma applanatum*, *G. lucidum*, *Hydnum repandum*, *Hypholoma fasciculare*, *Laetiporus sulphureus*, *Lentinus tigrinus*, *Ph. igniarius*, *Pholiota aurivella*, *P. ostreatus*, *S. commune*, *Stereum hirsutum*, *S. granulatus*, *Trametes hirsuta* and *T. ochracea* possess potent antimicrobial compounds that exhibit strong inhibitory effects against pathogenic bacteria, viruses, and fungi. The study identifies potential uses of these mushrooms in the country and lays the foundation for future research.

Keywords: *antibacterial, antioxidant, biologically active compounds, biomedical potential, immunomodulator, medicinal mushrooms*

INTRODUCTION

Fungi are a unique kingdom of organisms that are indispensable in the trophic structures of diverse ecosystems. In recent years, global interest in mycological research has increased due to their exceptional nutrient density, high bioavailability, and diverse pharmacological potential [Sknepnek et al., 2026]. As sedentary organisms, fungi have developed sophisticated metabolic pathways to synthesize a wide range of bioactive secondary metabolites, including polysaccharides, phenolic compounds, carotenoids, functional proteins, and lipids [Pawde et al., 2026].

To date, approximately 700 species of fungi have been identified as having significant medicinal value [Wasser, 2010; Pigoń-Zając et al., 2025]. These fungal species serve as a natural library for over 130 pharmacological applications, ranging from potent antimicrobial (antiviral, antibacterial and antifungal) activities to systemic health improvements, such as immunomodulation, hepatoprotection, and cardiovascular stabilization [Wasser, 2002; Sułkowska-Ziaja et al., 2023]. Particularly interesting from a clinical perspective is the genus *Cordyceps* Fr., which recent longitudinal studies continue to validate as a highly efficient agent in regulating lipid profiles by significantly reducing LDL cholesterol and triglycerides [Wang et., 2015; Park et al., 2025].

In addition, the oncology-related properties of fungal macro-molecules have been brought to the forefront of contemporary pharmacology [García-Estrada et al., 2026]. In more than 30 species, medically vital polysaccharides have demonstrated the capacity to inhibit tumor progression and suppress metastatic pathways by modulating of the host immune response and through direct antioxidant signaling [Randeni, Xu, 2024].

Recent scientific literature highlights the emergence of Myconutraceuticals, focusing on the synergistic effects of fungal compounds in treatment of chronic inflammation and neurodegenerative conditions [Kała, 2025; Thakur et al., 2025]. Myconutraceuticals are natural therapeutic agents derived from mushrooms

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containing bioactive compounds, such as polysaccharides and triterpenoids, used to regulate the immune system, prevent chronic diseases, and improvesystemic health.

Although the study of the systematic classification of fungi in Azerbaijan began in the 1960s, research regarding the specific biological properties and therapeutic potential of local fungal taxa remains limited [Bahshaliyeva et al., 2019; Aghayeva et al., 2022; Alimammadova-Husuyeva et al., 2025; Yusifova et al., 2025]. The aim of this study is to fill this gap by evaluating the bioactive compounds of medicinal mushrooms from the Guba district in the context of modern pharmaceutical requirements and recent clinical findings.

MATERIAL AND METHODS

Research area. Guba district is located in the northeastern part of Azerbaijan, encompassing both mountainous and foothill zones, with its highest peaks reaching approximately 4466 meters (Mount Bazarduzu) above sea level. Forests are covering a significant portion of the region's diverse landscape and are primarily composed of broad-leaved trees, mainly by beech, hornbeam, and oak-. The botanical diversity of the area has been extensively documented through regional floristic studies [Askerov, 2005; Ibadullayeva, 2011; Gurbanov, 2024].

Specimens. The research was conducted based on both herbarium collections from previous years and new specimens collected by the authors in recent years in Guba district. New specimens have also been added to the herbarium of the Institute of Botany, BAK. In total 41 ones were considered for this study. Sampling sites (Fig. 1) were Gultepe (N 41°17′38″ E0 48°28′30″), Kechresh (N 41°20′38.79″ E0 48°25′53.83″), Ispik (N 41°20′27.60″ E0 48°28′9.37″), Uchgyun (N 41°19′47″ E0 48°22′57″) and II Nyugedy (N 41°18′09″ E0 48°34′07″).

Various fundamental taxonomic methods were applied to identify the collected species [Lodge et al., 2004]. In addition to the assessment of macromorphological features, important microscopic diagnostic parameters such as the architecture, pigmentation, size and morphology of spores and hymenial elements were analyzed. Thin fungal sections were prepared in sterile water, mainly containing Congo red.

Statystic analyses. Twenty different measurements were recorded for each taxonomically significant structure using a 40x objective lens, with mean values used for statistical analysis. High-resolution micrographs were taken with a specialized microscope (Axio Imager Vert. A1, Carl Zeiss, Germany) with an integrated digital camera (Axiocam Zeiss, 105 color). All confirmed fungal specimens are officially preserved in the mycological herbarium at the BAK.

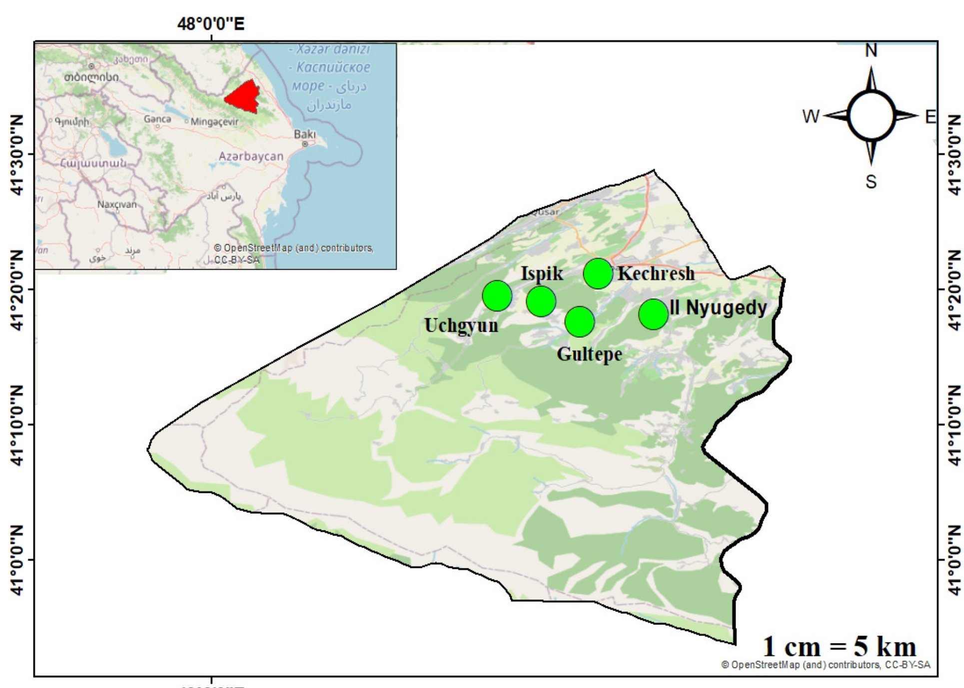

Figure 1. Study area, sampling sites are marked on the map. Scale bar 1 cm = 5 km.

Existing literature sources [Arora,1986; Sadigov, 2001, 2007; Elkhateeb, 2019; Mustafabayli et al., 2021; Wasser, 2014;] were used for identification of fungi. Fungal and plant names were checked according to the appropriate informative data bases [Index Fungorum, World Flora Online].

RESULTS AND DISCUSSION

Taxonomy. The studied mushrooms belong to 27 species of 16 families and 7 orders (Table 1). These are *Morchella esculenta* (L.) Pers., *Macrolepiota procera* (Scop.) Singer, *Collybia nuda* (Bull.) Cooke, *C. odora* (Bull.) Z.M. He & Zhu L. Yang, *Pleurotus ostreatus* (Jacq.) P. Kumm., *Coprinellus micaceus* (Bull.) Vilgalys, Hopple & Jacq. Johnson, *Schizophyllum commune* Fr., *Hypholoma fasciculare* (Huds.) P. Kumm., *Pholiota aurivella* (Batsch) P. Kumm., *Boletus edulis* Bull., *Gyrodon lividus* (Bull.) Sacc., *Suillus granulatus* (L.) Roussel, *Hydnum repandum* L., *Phellinus igniarius* (L.) Quél., *Fomitopsis quercina* (L.) Spirin & Miettinen, *Laetiporus sulphureus* (Bull.) Murrill, *Cerrena unicolor* (Bull.) Murril, *Fomes fomentarius* (L.) Fr., *Ganoderma applanatum* (Pers.) Pat., *G. lucidum* (Curtis) P. Karst., *Lentinus tigrinus* (Bull.) Fr., *Polyporus tuberaster* (Jacq. ex Pers.) Fr., *Trametes hirsuta* (Wulfen) Lloyd, *T. ochracea* (Pers.) Gilb. & Ryvarden, *T. pubescens* (Schumach.) Pilát, *T. versicolor* (L.) Lloyd, *Stereum hirsutum* (Wild.) Pers.

Table 1. Ecological status of fungal species used in this study.

Phyla	Order	Family	Species	Ecology
Ascomycota	Pezizales	Morchellaceae	*Morchella esculenta* (L.) Pers.	facultative saprotroph
Basidiomycota	Agaricales	Agaricaceae	*Macrolepiota procera* (Scop.) Singer	saprotroph
		Clitocybaceae	*Collybia nuda* (Bull.) Cooke	saprotroph
			Collybia odora (Bull.) Z.M. He & Zhu L. Yang	saprotroph
		Pleurotaceae	*Pleurotus ostreatus* (Jacq.) P. Kumm.	xylotrophic
		Psathyrellaceae	*Coprinellus micaceus* (Bull.) Vilgalys, Hopple & Jacq. Johnson	saprotroph
		Schizophyllaceae	*Schizophyllum commune* Fr.	xylotrophic
		Strophariaceae	*Hypholoma fasciculare* (Huds.) P. Kumm.	parasitisic
			Pholiota aurivella (Batsch) P. Kumm.	parasitisic
	Boletales	Boletaceae	*Boletus edulis* Bull.	mycorrhizal
		Paxillaceae	*Gyrodon lividus* (Bull.) Sacc.	mycorrhizal
		Suillaceae	*Suillus granulatus* (L.) Roussel	mycorrhizal
	Cantharellales	Hydnaceae	*Hydnum repandum* L.	mycorrhizal
	Hymenochaetales	Hymenochaetaceae	*Phellinus igniarius* (L.) Quél.	parasitisic
	Polyporales	Fomitopsidaceae	*Fomitopsis quercina* (L.) Spirin & Miettinen	xylotrophic
		Laetiporaceae	*Laetiporus sulphureus* (Bull.) Murrill	parasitisic
		Polyporaceae	*Cerrena unicolor* (Bull.) Murril	xylotrophic
			Fomes fomentarius (L.) Fr.	
			Ganoderma applanatum (Pers.) Pat.	parasitisic
			Ganoderma lucidum (Curtis) P. Karst.	parasitisic
			Lentinus tigrinus (Bull.) Fr.	parasitisic
			Polyporus tuberaster (Jacq. ex Pers.) Fr.	xylotrophic
			Trametes hirsuta (Wulfen) Lloyd	xylotrophic
			Trametes ochracea (Pers.) Gilb. &	xylotrophic
			Ryvarden	xylotrophic
			Trametes pubescens (Schumach.) Pilát	xylotrophic
			Trametes versicolor (L.) Lloyd	
	Russulales	Stereaceae	*Stereum hirsutum* (Wild.) Pers.	xylotrophic
2	7	16	27	

Ecology. The collected specimens are clearly classified into four trophic guilds based on their ecological roles. Saprotrophs (soil and litter decomposers) including *Collybia nuda, C. odora, Coprinellus micaceus*, *Macrolepiota procera*, *Morchella esculenta* (often classified as a facultative saprotroph); xylotrophics (wood decomposers) including *Cerrena unicolor*, *Fomitopsis quercina*, *Lentinus tigrinus*, *Pleurotus ostreatus*, *Polyporus tuberaster*, *Trametes hirsuta*, *T. ochracea*, *T. pubescens*, *T. versicolor*, *Schizophyllum commune*, *Stereum hirsutum*; parasitisics (polypores and other wood-inhabiting) including *Fomes fomentarius, Ganoderma applanatum*, *G. lucidum*, *Hypholoma fasciculare*, *Laetiporus sulphureus*, *Phellinus igniarius*, *Pholiota aurivella*; mycorrhizals (symbiotrophic) including *Boletus edulis*, *Gyrodon lividus*, *Hydnum repandum*, and *Suillus granulatus* (Fig. 2).

Possible medical applications. Information on the medicinal value of mushrooms has been improved based on the latest literature and local knowledge. As a result, 27 out of 104 species of one variation recorded in the Guba district have medicinal value (Table 2).

Figure 2. Some medicinally important macrofungi collected from the study area: A. *Boletus edulis*, B. *Collybia odora*, C. *C. nuda*, D. *Coprinellus micaceus*, E. *Fomes fomentarius*, F. *Ganoderma applanatum*, G. *G. lucidum*, H. *Laetiporus sulphureus*, I. *Lentinus tigrinus*, J. *Macrolepiota procera*, K. *Polyporus tuberaster*, L. *Suillus granulatus*.

Table 2. Fungal species with biological activities.

Species \ Use possibilities	Anti-atherogenic	Antibacterial activity	Antibiofilm	Anticancer activity	Antidiabetic activity	Antifungal activity	Antihyperglisemic activity	Antiinflammatory activity	Antimutagenic	Antineoplastic activity	Antioxidant activity	Antiproliferative	Antiviral activity	Cardiovascular	Immunomodulatory	Hepatoprotective	Hypocholesterolemic	Neuroprotective	Wound treatment
Morchella esculenta				+	+		+	+			+				+				
Macrolepiota procera				+											+				
Collybia nuda		+		+							+								
C. odora						+									+				
Pleurotus ostreatus				+			+						+	+	+		+	+	
Coprinellus micaceus		+									+							+	
Schizophyllum commune		+		+		+	+	+							+				
Hypholoma fasciculare		+		+															
Pholiota aurivella		+	+								+								
Boletus edulis		+						+		+	+								
Gyrodon lividus											+								
Suillus granulatus		+		+							+				+	+			
Hydnum repandum		+		+							+								
Phellinus igniarius		+		+			+	+			+					+			
Fomitopsis quercina		+		+				+			+				+				
Laetiporus sulphureus		+		+							+								+
Cerrena unicolor		+		+				+			+								
Fomes fomentarius				+	+			+	+		+				+			+	
Ganoderma applanatum		+		+				+			+								
G. lucidum		+		+							+				+	+			
Lentinus tigrinus		+		+							+				+				
Polyporus tuberaster				+							+								
Trametes hirsuta		+									+	+							
T. ochracea		+		+							+				+				
T. pubescens					+						+				+			+	
T. versicolor				+											+				
Stereum hirsutum	+	+									+								

Morchella esculenta (Morel) is a macrofungus known for its antioxidant, immunomodulatory, and antidiabetic properties. It is considered promising for its anticancer and anti-inflammatory effects [Chouhan et al., 2025; Mahtal et al., 2025]. Water-soluble polysaccharides of the fungus *Macrolepiota procera* (Parasol mushroom) exert immunomodulatory effects by increasing cytokine production. In addition, ultrasonically extracted polysaccharide fractions have significant chemoprophylactic effects against human colon cancer and induce apoptosis in lung adenocarcinoma cells [Nowacka-Jechalke et al., 2022; Zara et al., 2022]. *Collybia nuda* (Wood Blewit) especially has high antioxidant, antitumor and antimicrobial activities. Studies show that it may be a potential inhibitor of angiogenesis, which limits cancer progression [Deshmukh et al., 2023]. *C. odora* (Aniseed mushroom) is known for its volatile compounds, immunomodulatory effects, and potent antimicrobial activity against various pathogens. Despite its medicinal value, this species can be confused with similar species such as the deadly poisonous *C. rivulosa* (Pers.) Z.M. He & Zhu L. Yang. For safety reasons, it can be distinguished from poisonous species by its characteristic blue-green color and strong aniseed aroma when young [Türkoğlu et al., 2011]. *Pleurotus ostreatus* (Oyster mushroom) is a highly valued medicinal mushroom with cholesterol-lowering and glucose-regulating metabolism, cardiovascular and metabolic benefits. The species exhibits potent immunomodulatory, antiviral, and anticancer properties. It also has potent neuroprotective and hypo-cholesterolemic effects [Karim et al., 2020; Garmanchuk et al., 2022; Pamalka et al., 2026; Udobi et al., 2026]. *Coprinellus micaceus* (Glistening ink cap) is a saprotrophic mushroom with pharmacological potential. Its bioactive compounds have high antioxidant and antimicrobial activity. Studies have also shown that this mushroom is a potential agent in the treatment of neurodegenerative diseases. Unlike the species *Coprinopsis atramentaria* (Bull.) Redhead, Vilgalys & Moncalvo, which is traditionally associated with "coprine" poisoning, *C. micaceus* does not contain the coprine compound [Redhead et al., 2001; Nguyen et al., 2015]. *Schizophyllum commune* (Split Gill Fungus) is a basidiomycete known for producing schizophylane, a β-glucan that serves as a clinical adjuvant in cancer treatment. Recent research highlights its broad therapeutic spectrum, including potent immuno-modulatory, antitumor, anti-inflammatory, and antimicrobial activities, as well as emerging potential in regulating blood sugar and lipid levels. However, since this species can also act as a pathogen causing respiratory and invasive infections, its clinical use necessitates timely safety assessments, standardized dosing, and controlled extraction processes. [Dasgupta et al., 2025; Kumar et al., 2025]. *Hypholoma fasciculare* (Sulphur Tuft mushroom) is a poisonous mushroom species of interest due to its diverse secondary metabolites that exhibit potent antimicrobial and cytotoxic effects. It is also considered a potential candidate for the production of new antibiotics and antitumor agents. However, due to its severe gastrointestinal distress, its medical significance is limited to the isolation of specific chemical constituents in the laboratory. [Al-Salihi et al., 2021; Wang et al., 2022]. *Pholiota aurivella* (Golden Scalycap) is known for its properties, exhibiting significant antimicrobial, antibiofilm and antioxidant activities against oxidative stress. Its extracts are considered a promising source for the development of new natural antibiotics and biomedical tools [Regeda et al., 2021; Yaman et al., 2025]. *Boletus edulis* (King Bolete) is known as a rich source of bioactive compounds, including polysaccharides and phenolic derivatives, which exhibit significant antioxidant, anti-inflammatory, and antimicrobial properties. It also has antineoplastic potential and its extracts have been shown to inhibit the proliferation of human colon cancer cells [Rosa et al., 2020; Tan et al., 2022; Quero et al., 2024]. *Gyrodon lividus* (Alder Bolete) has been relatively poorly studied for its medicinal value, although experimental evidence suggests that it has antioxidant properties. However, its unique ability to scavenge mercaptans has also been highlighted, suggesting potential applications in the detoxification of volatile sulfur compounds [Bal, 2018]. *Suillus granulatus* (Weeping Bolete) is known for its proven antioxidant, antimicrobial and immunomodulatory effects. Recent studies have shown that this species has cytotoxic effects against liver cancer cells and has antiprotozoal potential. This suggests that the mushroom is a promising candidate for the development of nutritional supplements and antitumor drugs after clinical validation [Zhao et al., 2024; Judžentienė, Šarlauskas, 2025]. *Hydnum repandum* (Wood Hedgehog) contributes significant antioxidant capacity and the ability to reduce oxidative stress. Although currently only in vitro, its ability to inhibit the growth and biofilm formation of pathogens such as methicillin-resistant *Staphylococcus aureus* Rosenbach, as well as its cytotoxic effect against some cancer cell lines, has been studied [Dizeci et al., 2021; Kebert et al., 2024].

Phellinus igniarius (Willow Bracket) is a polypore fungus with potent antioxidant activity and antidiabetic effects. Extensive studies highlight its diverse bioactive profile, including anticancer, antimicrobial, anti-inflammatory, and hepatoprotective properties, which are supported by both traditional uses and modern biochemical analyses of fermentation fractions [Boateng, Yang, 2024]. *Daedalea quercina* (Oak Mazegill) is notable for its rich phytochemical profile, especially its potent antioxidant, antibacterial and anti-inflammatory effects [Barrientos et al., 2016; Srih et al., 2025]. *Ganoderma applanatum* (Artist's Conk) enhances immune function through cellular stimulation and also exhibits potent antioxidant and antimicrobial effects against antibiotic resistance. This mushroom also has the ability to stimulate tumor cell apoptosis, reduce anti-inflammatory cytokines, and has hepatoprotective effects [Boromensky et al., 2021; Karunarathna et al., 2025; Rijia et al., 2025]. *G. lucidum* (Reishi or Lingzhi, Lacquered Bracket mushroom) is one of the most extensively studied medicinal mushrooms and is known for its potent immunomodulatory, antioxidant, and broad-spectrum antimicrobial activities. Its extracts can inhibit tumor proliferation and induce apoptosis, and also offer therapeutic potential for metabolic diseases, liver protection, and regulation of gut microbiota [Boromensky, Bisko, 2020; Plosca et al., 2025; Shady et al., 2025]. *Laetiporus sulphureus* (Chicken of the Woods) has a wide biomedical potential due to its rich content of polysaccharides and terpenoids, especially due to its ability to stimulate apoptosis in cancer cells. This fungus offers innovative therapeutic possibilities such as accelerating the healing of diabetic wounds and regulating melanogenesis processes, while also playing a role in the prevention of chronic diseases through its antioxidant and antimicrobial properties [Petrović et al., 2024; Dariusz et al., 2025; Novaković et al., 2025]. *Cerrena unicolor* (Massy Maze Polypore) is increasingly recognized as having significant biomedical potential, with potent antioxidant and anti-inflammatory properties. Recent experimental studies have shown that its laccases have cytotoxic effects on ovarian and colon cancer cells, while its metabolites show promise in detoxifying toxic compounds and as antimicrobial and antiparasitic agents [Pigoń-Zając et al., 2025; Sondej et al., 2025]. *Fomes fomentarius* (Hoof Fungus) is known as a bioresource rich in polysaccharides, triterpenoids and phenolic compounds, which provide multiple pharmacological benefits, including potent antioxidant, anti-inflammatory and immunomodulatory effects. In addition, its antitumor, neuroprotective effects, as well as its significant antimutagenic potential to prevent chronic degenerative diseases, are highlighted. Of particular note is the isolation of fomentariolus, which exhibits antidiabetic activity and has a regulatory effect on glucose metabolism comparable to standard pharmaceutical treatments [Morales, 2024; Rašeta et al., 2025]. *Lentinus tigrinus* (Tiger Sawgill) mushroom exhibits potent antioxidant and broad-spectrum antimicrobial effects. In addition, it is considered a promising medical tool as an anticancer and immunomodulator [Desiderio et al., 2025; Aguilar et al., 2026]. *Polyporus tuberaster* (Tuberous Polypore) mushroom has antioxidant and anticancer effects. In addition, extracts of the mushroom have significant potential in the prevention of oxidative stress-related pathologies and in the development of functional food products [Song et al., 2023; Cai et al., 2026].

CONCLUSION

Within the scope of this study, the taxonomical and ecological structure of macrofungi collected from the rich forest and mountainous ecosystems of the Guba district of Azerbaijan was comprehensively analyzed, and 27 fungal species identified among the recorded total microbiota elements were found to have high pharmacological and therapeutic potential. The antioxidant, antimicrobial, immunomodulatory, and particularly anticancer effects of the studied species confirm their potential to serve as valuable sources in modern medicine and pharmacology. Furthermore, the anti-inflammatory properties of these fungi offer a natural alternative for the treatment of various inflammatory diseases. Our results, along with the potential for studying the biologically active compounds of locally important medicinal fungal taxa, create a fundamental basis for the future development of new food supplements (myconutraceuticals) and natural pharmaceuticals as an accessible method of improving overall health.

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Azərbaycanın Quba rayonunun makrogöbələkləri: bioloji xüsusiyyətləri və istifadə potensialı

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Bu məqalədə, Azərbaycanın Quba rayonunda rast gəlinən növlərə diqqət yetirilərək, göbələklərin farmakoloji dəyəri, onların bioloji aktiv maddələri və tədqiqat tendensiyaları haqqında məlumat verilir. Tədqiqat işi həm əvvəlki illərə aid herbari nümunələri, həm də müəlliflər tərəfindən son illərdə toplanmış göbələk nümunələri əsasında aparılmışdır. Nəticədə, tədqiq olunan ərazidə qeydə alınmış ümumilikdə 104 növ və bir variasiyadan 27-sinin qiymətli terapevtik təsirlərə malik olduğu müəyyən edilmişdir. Göbələklər Ascomycota və Basidiomycota şöbələrinə aid olmaqla 22 cins, 16 fəsilə və 7 sıra ilə təmsil olunur. Toplanılan göbələklərin əksəriyyəti antibakterial, antixərçəng, antioksidant və immuntənzimləyici xüsusiyyətlərə malikdir. Bunlardan *Fomes fomentarius*, *Fomitopsis quercina*, *Ganoderma lucidum*, *Morchella esculenta*, *Phellinus igniarius*, *Pleurotus ostreatus*, *Schizophyllum commune* və *Suillus granulatus* beş və daha artıq sayda terapevtik təsir xüsusiyyətlərini özündə birləşdirir. Tədqiq olunan göbələklərdən *Boletus edulis*, *Cerrena unicolor*, *Collybia nuda*, *C. odora*, *Coprinellus micaceus*, *F. quercina*, *Ganoderma applanatum*, *G. lucidum*, *Hydnum repandum*, *Hypholoma fasciculare*, *Laetiporus sulphureus*, *Lentinus tigrinus*, *Ph. igniarius*, *Pholiota aurivella*, *P. ostreatus*, *S. commune*, *Stereum hirsutum*, *S. granulatus*, *Trametes hirsuta* və *T. ochracea* patogen bakteriya, virus və göbələklərə qarşı yüksək inhibitor təsir göstərən güclü antimikrob xüsusiyyətlərə malikdir. Aparılan araşdırmalar göbələklərin istifadə imkanlarını üzə çıxarır və gələcək tədqiqatlar üçün əsas verir.

Açar sözlər: *antibakterial, antioksidant, bioloji aktiv birləşmələr, biotibbi potensial, immunomodulyator, tibbi əhəmiyyətli göbələklər*

Макромицеты Кубинского района Азербайджана: биологические особенности и потенциал использования

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В статье представлены результаты исследования фармакологической ценности грибов, их биологически активных веществ и современных направлений исследований с акцентом на виды, обнаруженные в Кубинском районе Азербайджана. Исследование проводилось как на основе гербарных образцов прошлых лет, так и на образцах грибов, собранных авторами за последние годы. В результате установлено, что из 104 видов и одной разновидности, зарегистрированных на территории исследований, 27 обладают ценным терапевтическим действием. Грибы относятся к отделам Ascomycota и Basidiomycota и представлены 22 родами, 16 семействами и 7 порядками. Большинство собранных грибов обладают антибактериальными, противораковыми, антиоксидантными и иммуномодулирующими свойствами. Из них *Fomes fomentarius*, *Fomitopsis quercina*, *Ganoderma lucidum*, *Morchella esculenta*, *Phellinus igniarius*, *Pleurotus ostreatus*, *Schizophyllum commune* и *Suillus granulatus* сочетают в себе пятъ или более терапевтических эффектов. Среди изученных грибов - *Boletus edulis*, *Cerrena unicolor*, *Collybia nuda*, *C. odora*, *Coprinellus micaceus*, *F. quercina*, *Ganoderma applanatum*, *G. lucidum*, *Hydnum repandum*, *Hypholoma fasciculare*, *Laetiporus sulphureus*, *Lentinus tigrinus*, *Ph. igniarius*, *Pholiota aurivella*, *P. ostreatus*, *S. commune*, *Stereum hirsutum*, *S. granulatus*, виды *Trametes hirsuta* и *T. ochracea* обладают мощными противомикробными свойствами, проявляя сильное ингибирующее действие против патогенных бактерий, вирусов и грибов. Проведенное исследование выявляет потенциальные возможности применения грибов и закладывает основу для дальнейших исследований.

Ключевые слова: *антибактериалъные, антиоксидантные, биологически активные соединения, биомедицинский потенциал, иммуномодулятор, лекарственные грибы*