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Species composition of xylomicobiota of some woody plants distributed in Azerbaijan

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ABSTRACT

The presented work was studied according to the species composition of fungi participating in the formation of xylomicobiota of natural forests located in the territory of various economic regions. During the study, 51 species of fungi belonging to the Basidiomycota division of xylotrophic macromycetes were discovered on 30 species of woody plants. The recorded fungi are characterized by a wide diversity in terms of the color of the decay they cause, their ecotrophic relationships, hyphal systems, their relationship to substrates, and other characteristics. Thus, 84.3% of the recorded fungi are eurytrophs, 80.5% are white rot-causing fungi under natural conditions, and 86.4% are polytrophs in terms of ecotrophic relationships.

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INTRODUCTION

As is known, mushrooms and their metabolic products are convenient and profitable sources of enzymes and many other biologically active substances (BAS) necessary for various industries and scientific research, and this is one of the already clearly accepted realities of recent times (Bhambri *et al.*, 2022; Chen, 2020; Dudekula *et al.*, 2020). Thus, various substances synthesized by them are widely used in biotechnology (Lin and Lang, 2019; Niego *et al.*, 2023; Psurtseva *et al.*, 2023) and their application areas are expanding day by day, and today, microbial enzymes, as well as various BAMs, are used or are considered promising in areas such as food, leather, textiles, perfumery, animal husbandry, poultry farming, and others (Hyde *et al.*, 2019; Pundir *et al.*, 2024; Saad *et al.*, 2022; Wang *et al.*, 2020). Therefore, preserving the obtained producers for conducting fundamental and applied research, enriching the gene pool of culture collections with fungi with new properties are considered extremely important tasks of modern time.

Xylotrophic macromycetes are a unique group of fungi capable of completely decomposing lignocellulose-containing substrates, which allows them to mobilize the carbon stored in wood (Mukhin and Diyarova, 2022; Naranjo-Ortiz and Gabaldón, 2019). Xylotrophic macromycetes (Chen *et al.*, 2025), which are a specific component of some ecosystems and the basis of the mechanism for regulating the processes of decomposition of plant residues and accumulation of various substances, are also one of the most important objects of research in various aspects.

As a result of these studies, a number of interesting results were obtained, and the scientific and practical foundations for the use of xylotrophic macromycetes were developed and applied to production (Bolesławska *et al.*, 2024; Bosch *et al.*, 2024). However, today, there is limited information on the biology of strains of different geographical and ecological species in culture, and the possibility of preserving the gene pool of rare and endangered species in mycelial culture. This limitation can also create certain problems in the use of these mushrooms producers of these or other biologically active substances. Thus, only by comprehensively studying pure cultures is it possible to study the ecological characteristics of a mushroom species and optimize the parameters required to realize their natural potential.

Research has been conducted for a long time on the distribution of mushrooms in the territory of the Republic of Azerbaijan, especially in its forest ecosystems, and their study in various aspects. As a result of the conducted research, it was determined that mushrooms, including their species belonging to xylotrophic macromycetes, are widespread in all ecologically diverse areas of Azerbaijan, and among them there are many strains that are promising as producers of BAS, including enzymes (Akhundova *et al.*, 2019; Bakhshaliyeva *et al.*, 2020; Shatirova *et al.*, 2022). However, even in this case, the data obtained are not sufficient to fully assess the potential of xylomicobiota, which is typical of Azerbaijani forests, as a BAS producer, especially from a biotechnological perspective, at least because the results obtained so far have not yet been used in practice.

Therefore, the purpose of the presented work is to create a collection of xylotrophic basidiomycetes isolated from forest ecosystems with diverse ecological conditions in Azerbaijan and to the general characteristics of the strains to be included in the collection.

MATERIALS AND METHODS

Since xylotrophic macromycetes are widespread in areas with woody plants, to isolate them were used forest ecosystems located in ecologically diferent areas of Azerbaijan. As forest ecosystems were used the main geomorphological units of Azerbaijan such as the Greater Caucasus (GC), the Lesser Caucasus (LC), the Talysh Mountains (TM) and the Kur-Araz Lowland (KA) (Fig. 1).

Fig. 1. General view of the research areas

The fruiting bodies of the mushroom taken from the research areas and brought to the laboratory were identified, and then their pure cultures were obtained. For identification, macro- (visual description of the fruiting body) and micro- (shape and size of basidiomycetes, shape and size of spores, hyphae involved in the formation of the hyphal system, and other microstructural elements) characteristics of the collected fruiting body are determined. These characteristics are the basis for the identification of mushroom. These characteristics are specified according to the keys indicated in the relevant identifiers (Bernicchia, 2005), and the identification of the mushroom to the species is completed. When naming mushrooms, information was used provided by the İMA (MycoBank, n.d.).

RESULTS AND DISCUSSION

The studies were conducted between 2016- 2024 years and covered all xylotrophic macromycetes that were distributed in the areas studied and, as noted, it covered all xylotrophic macromycetes that could be recorded. As a result, during the research period, about 800 basidiomas were collected in that area, and 700 of them were identified to species level based on a classical mycological approach. The names of the identified species, the substrates on which they were first recorded (A), their eco-trophic relationships and the color of the decay they cause in natural conditions (B), and their distribution areas (C) are annotated below:

Division: Bazidiomycota
Class : Agaricomycetes
Order: Polyporales
Family: Polyporaceae

Cerrena unicolor (Bull.: Fr.)Murill.
A.: GC, *Faqus orientalis* L and eurytroph.
B: Polytrophy and white
C: There is sufficient literature on the distribution of the mushroom worldwide (Bernicchia, 2005) and in Azerbaijan (Bakhshaliyeva *et al.*, 2020).

Fomes fomentarius (L.:Fr.) Fr.
A.: GC, *Populus alba* L. and eurytroph.
B.: true biotroph and white.
C: The mushroom is a cosmopolitan species widely distributed worldwide (Bosch *et al.*, 2024) and is characterized by a frequency of occurrence typical of dominants in the xylomycobiota of Azerbaijan. This mushroom was found in all economic regions sampled during the research.

Fomitopsis annosa (Fr.) P. Karst.
A: GC, *Tilia cordata* Mill. and eurytroph.
B.: polytrophic and brown.
C: Although there is no literature on the mushroom's cosmopolitan nature, it has been found in many countries around the world. Research conducted in Azerbaijan has also revealed the spread of this mushroom, which was confirmed in all 5 economic regions where we conducted our research.

F. cytisina (Berk.) Bondartsev and Singer.
A: GC, *Morus alba* L and eurytroph
B: Polytrophic and white.
C: There is literature information about its distribution around the world, including in Azerbaijan, but it is not considered a very widespread mushroom. This has been confirmed in our research, as it was encountered in Guba-Khachmaz and Lenkaran-Astara ER during the course of the research.

F. officinalis (Batsch) Bondartsev and Singer.
A: GC, *Carpinus betulus* L and eurytroph

B: Polytroph and brown

C: In many countries of the world, including in Azerbaijan (Bakhshaliyeva *et al.*, 2020), the spread of the mushroom was discovered, which was confirmed in the course of our research in the territories of Eastern Zangezur and Guba-Khachmaz Economic Regions.

F. pinicola (Sw.:Fr.) P.Karst.

A: GC, *Carpinus betulus* L and eurytroph

B: Polytrophic and brown.

C: It is a mushroom species that is widely distributed and characterized as cosmopolitan in the world (Sun *et al.*, 2024), including in Azerbaijan (Akhundova *et al.*, 2019; Bakhshaliyeva *et al.*, 2020).

F. rosea (Alb. Et Schwein.:Fr.) P.Karst

A: LA, *Faqus orientalis* L and eurytroph

B**:** Polytroph and brown

C: There is literature information about its spread in several parts of the world, and such information includes Azerbaijan as part of the world. Thus, prior to our research, as well as during the course of research, it was determined that the mushrooms was found on various trees in the territory of the GC.

Trichaptum biforme (Fr.)Ryvarden*(=Hirschioporus pargamenus* (Fr.) Bondartsev and Singer).

A: LA, *Populus alba* L and eurytroph

B**:** Polytrophy and white

C: The spread of the mushroom and its occurrence in many countries around the world, including in Azerbaijan, has been confirmed in a number of studies.

Lentinus strigosus (Schwein.) Fr.

A: LA, *Tilia cordata* Mill.and conditional stenotroph

B: Saprotroph and white.

C:There is literature information about the distribution of the mushroom both in the world and in Azerbaijan.

Lenzites betulina (L.) Fr.

A: TM, *Populus alba* L. and eurytroph

B: Polytrophy and white

C: The mushroom is not considered a widespread species in the world, including in Azerbaijan. In our research, the mushroom was found not only in TM, but also in GC.

Polyporus squamosus (Huds.) Fr., Systema Mycologicum 1: 343 (1821)

A: GC, *Tilia cordata* Mill. and eurytroph

B: Polytrophy and white

C: This species, which belongs to the category of edible mushrooms (Bernicchia, 2005), has been found to be distributed in many countries around the world. In our studies, the spread of the mushroom was detected in LC, TM and KA

P. vaporarius (Pers.) Fr.

A: LC, *Carpinus betulus* L. and eurytroph

B: Polytrophy and white

C: It is not considered a widespread mushroom..

P. varius (Pers.)Fr.

A: LA, *Carpinus betulus* L and eurytroph

B: Polytrophy and white

C: Like other species of the genus *Polyporus,* this mushroom is considered edible, but its nutritional properties have not been fully elucidated, although there is information about its distribution in many countries of the world. Previous and current studies in Azerbaijan have revealed the prevalence of the mushroom and have determined that it has a frequency of occurrence typical of random and rare species.

Pycnoporus cinnabarinus (Jacq.:Fr.) P.Karst

A: *Carpinus betulus* L. and eurytroph

B: Polytrophy and white

C: Although the mushroom is not a widespread species, there is literature information about its distribution in many parts of the world, including Azerbaijan.

Trametes heteromorpha (Fr.) Lloyd.

A: GC, *Fraxinus* L. and eurytroph

B: Polytrophic and brown

D: There is information in the literature about its worldwide distribution, but it is not considered a widespread mushroom.

T. hirsitum (Wulfen :Fr.) Lloyd
A: GC, *Carpinus betulus* L. and eurytroph
B: Polytrophy and white
C: It is a relatively widespread species in most parts of the world, including Azerbaijan.

T. pubescens (Schumach.) Pilát
A: TM, *Carpinus betulus* L. and eurytroph
B: Polytrophy and white
C: It is a relatively widespread species in most parts of the world, including Azerbaijan.

T. versicolor (L.:Fr.) Pilat.
A: GC , *Faqus orientalis* L. and eurytroph
B: Polytrophy and white
C: The mushroom is considered a widespread species both in the world and in Azerbaijan.

T. zonata Wettst.
A: TM, *Alnus* Mill and eurytroph
B: Saprotroph and white
C: The mushroom has been found to be widespread in several countries around the world, including Azerbaijan, in studies conducted.

Tyromyces amorphous (Fr.) Murrill
A: LC, *Carpinus betulus* L. and conventional stenotroph
B: Polytrophy and white
C: The mushroom is not considered a widespread species in the world, and this fact has been confirmed by studies conducted in Azerbaijan.

Family: Meruliaceae
Bjerkandera adusta (Willd.:Fr.) P.Karst
A: GC, *Populus alba* L. and eurytroph
B: Polytrophy and white.
C: It is a species known to be widespread throughout the world, including Azerbaijan.

Heteroporus biennis (Bull.) Lázaro İbiza(=*Abortiporus biennus* (Bull.) Singer).
A: LA, *Carpinus betulus* L. and eurytroph
B: Polytrophy and white
C: The spread of the mushroom in many regions has been confirmed in a number of studies, which have also been found in other studies conducted in Azerbaijan.

Rigidoporus ulmarius (Sowerby) Imazeki
A: LA, *Ulmus* L. and stenotroph
B: Polytroph and brown
C: According to literature data, the mushroom is also found on other substrates, but all studies conducted in Azerbaijan have determined its distribution only on Elm.

Family: Fomitopsidaceae
Daedalea quersina (L)Pers
A: LA, *Quercus castaneifolia* C.A.M. and conditional stenotroph.
B: Polytrophy and white
C:There is literature information about the occurrence of this fungus in several countries around the world. A similar situation is also valid for studies conducted in Azerbaijan.

Laetiporus sulphureus (Bull.) Lázaro İbiza
A: LC, *Quercus castaneifolia* C.A.M. and eurytroph
B: Polytroph and brown
C. There is sufficient literature on the distribution of the mushroom both in the world and in Azerbaijan. In our studies, the mushroom was found in all remaining ER.

Family: Ganodermataceae
Ganoderma adspersum (Schulzer)Donk
A: LA, *Carpinus betulus* L. and eurytroph
B: Polytrophy and white
C: These are species known to be distributed worldwide, and their distribution in Azerbaijan has been known since the last century.

Ganoderma lipsiense (Batsch) G.F.Atk (=*G. Applanatum* (Pers) Pat.)
A: GC, *Carpinus betulus* L. and eurytroph
B: Polytrophy and white
C: It is a species widely distributed in most regions of the world, including the Caucasus. Its distribution was determined in the first studies conducted with

xylotrophic macromycetes in Azerbaijan, and it is the species whose distribution has been determined in all subsequent studies.

G. lucidum (Curtis) P. Karst
A: LC, *Faqus orientalis* L. and eurytroph
B: Polytrophy and white
C: It is a species known to be widespread around the world, but its distribution is uneven, and for this reason the mushroom is considered a "Red Book" object in some regions. Although the mushroom is a rare find in studies, it has also been found in all other ER.

G. resinaseum Boud.
A: LC, *Tilia cordata* Mill. and eurytroph
B**:** Polytrophy and white
C: The area of the mushroom includes many countries of the world, including the Republic of Azerbaijan. In our research, the mushroom was also found in the Guba-Khachmaz ER.

Family: Phanerochaetaceae
Hyphoderma setigerum (Fr)Donk
A: GC(GK), *Populus alba* L. and eurytroph
B: Polytroph and mixed
C: They are mushrooms that are rarely found in the world. There is information about its distribution in Azerbaijan, and during our research, its distribution was additionally determined in the Ganja-Gazakh ER.

Order: Hymenochaetales
Family: Hymenochaetaceae
Inonotus cuticularis (Bull.) P. Karst.
A: TM, *Tilia cordata* Mill. and eurytroph
B: Polytrophy and white
C: Studies conducted in several regions of the world have determined the spread of the mushroom, which has also been confirmed in Azerbaijan.

I. hispidus (P.Karst) P.Karst
A: GC, *Morus alba* L. and eurytroph
B: Biotroph and brown
C: It is one of the most widespread species in the world. It is also widespread in Azerbaijan and is most often found on *Yapon stifnolobiumu* and *Morus alba* trees.

I. pini (Brot.) Teixeira (=*Porodaedalea pini* (Brot) Murill).
A: GC, *Populus alba* L. and eurytroph
B: Polytrophy and white
C: It is one of the mushroom species whose distribution has been determined in studies conducted in several regions of the world. This mushroom has been found in ecologically diverse areas of Azerbaijan, both in previous and current studies.

I. radiatus (Sowerby) P.Karst
A: TM, *Tilia cordata* Mill. and eurytroph
B: Polytrophy and white
C: It is known that the mushroom's range includes many regions of the world, including the Republic of Azerbaijan. During our research, the fungus was also found to be prevalent in the GK and GK ecological regions.

Phellinus contiguus (Pers.) Pat
A: GC (GK), *Carpinus betulus* L. and eurytroph
B: Polytrophy and white
C: The mushroom is reported to be distributed in several areas of the world, including Azerbaijan. However, the mushroom is not considered widespread in Azerbaijan, and its distribution in Azerbaijan has been determined for less than 10 years.

Ph. gilvus (Schwein.) Pat.
A: TM, *Populus alba* L. and eurytroph
B: Polytrophy and white
C: n the conducted studies, it was found that the mushrooms spread in many regions of the world, which has also been confirmed in Azerbaijan.

Ph. igniarius (L) Quel
A: GC, *Faqus orientalis* L. and eurytroph
B: Polytrophy and white
C: This mushroom, which called false tinder, is known to be found on almost all continents of the world, and Azerbaijan is no exception in this regard.

Ph. pini (Brot.) Bondartsev et Singer
A: GC, *Tilia cordata* Mill. and eurytroph
B: Polytrophy and white

C: There is information about its spread around the world, including in Azerbaijan.

Ph. pomaceus (Pers.) Maire
A: KA, *Prunus cerasifera* Ehrh. and conditional stenotroph
B: Polytrophy and white
C: It is known to be widespread worldwide. This fungus is mainly found on fruit plants such as cherry and plum, and is more characteristic of Azerbaijani conditions. More precisely, these species are involved in the formation of the mycobiota of stone fruit plants.

Ph. robustus (P.Karst) Bourdot et Galzin
A: KA, *Quercus castaneifolia* and eurytroph
B: **GC** (GK), Polytrophy and white**.**
C: There is sufficient literature on its distribution in most regions of the world, including Azerbaijan.

Ph. tremulae (Bondartsev) Bondartsev et Borissov in Bondartsev.
A: TM, *Populus alba* L. and eurytroph.
B: Polytrophy and white
C: There is literature information on the distribution of the mushroom in many regions of the world, including studies conducted in Azerbaijan.

Fuscoporia torulosa (Pers.) T. Wagner and M. Fisch. (=*Phellinus torulosus* (Pers.) Bourdot and Galzin)
A: TM, *Parrotia persica* (DC.)C.A.Mey and eurytroph
B: Polytrophy and white
C: A number of studies have revealed the spread of the mushroom in some regions of the world, which has also been confirmed in studies conducted in Azerbaijan to date.

Order : Agaricales
Family Pleurotaceae
Pleurotus cornucopiae (Paulet)Quel
A: GC, *Populus alba L.* and eurytroph
B: Polytrophy and white
C: Although this mushroom, which belongs to the category of edible mushrooms, is known to be widespread in several regions of the world, but it is not cultivated intensively.

P. ostreatus (Jacq.) P. Kumm
A: GC, *Carpinus betulus* L. and eurytroph
B: Politrof və ağ
C: It is considered one of the most widespread species in the world. A similar idea can be said for Azerbaijan.

Famliy: Schizophyllaceae
Schizophyllum commune Fr.
A: TM, *Alnus* Mill and eurytroph
B: Polytrophy and white
C: The prevalence of the fungus in many countries around the world, including Azerbaijan, has been repeatedly identified in recent studies.

Family: Physalacriaceae
Armillaria mellea (Vahl) P. Kumm
A: GC, *Carpinus betulus* L and eurytroph
B: Biotroph and white
C: This species, which belongs to the category of edible mushrooms, is widely distributed in the world and is considered phytopathogenic despite being edible. It has also been found in Azerbaijan, and this has been confirmed in previous studies, as well as in our own studies.

Flammulina velutipes (Curtis)Singer
A: GC , *Faqus orientalis* L. and eurytroph
B: GC, Polytrophy and white
C: This species, which is considered an edible mushroom, is currently among the most widely cultivated species, and therefore its distribution is known in several regions of the world. It is also known to be widespread in Azerbaijan, but there are no cases of its cultivation either intensively or extensively.

Family: Pluteaceae
Pluteus leoninus (Schaeff.) P. Kumm
A: LA, *Faqus orientalis* L. and conditional stenotroph.
B: Polytrophy and white

C: This mushroom, which is known to be distributed worldwide, is not considered a widespread species for the mycobiota specific to Azerbaijan, and the inclusion of Azerbaijan in its range is based on information obtained in recent years.

Family: Stereaceae

Stereum gausapatum (Fr)Fr

A: GC (GK), *Populus alba* L and eurytroph

B: Polytrophy and white

C: This mushroom, which is known to be widespread in many regions of the world, is not foreign to Azerbaijani nature, and there is information in the literature about its distribution.

S. hirsutum (Willd.)Pers

A: GK, *Populus alba* L. and eurytroph

B: Polytrophy and white

C: Compared to other species of the Sterium genus, it is a relatively widespread species in the world, including Azerbaijan.

Family: Peniophoraceae

Peniophora gigantea (Fr) Massee

A: LC, *Carpinus betulus* L. and eurytroph

B: Polytrophy and white

C: It is known to be widespread in several regions of the world, including Azerbaijan.

Thus, it is clear from the above data that a total of 51 species were recorded during the research, which belong to 29 genera. Some of the recorded genera are represented by 1, some by 2, some by 3 or more species. Among the recorded mushrooms, the genera *Fomitopsis, Ganoderma, Inonotus, Phellinus* and *Trametes* are represented by the most species. Thus, in the studies, the distribution of 7 species belonging to the genus *Phellinus*, 6 belonging to the genus *Trametes*, 5 belonging to the genus *Fomitopsis*, and 4 belonging to each genus *Ganoderma* and *Inonotus* was determined.

The recorded mushroom species differ from each other in terms of their eco-trophic relationships, their relationship to the substrates they spread on, their hyphal systems, and their frequency of occurrence. These differences are summarized in Table 1. As can be seen, most of the recorded mushroom species belong to eurytrophs according to their relationship to the substrate, polytrophs according to their ecolotrophic relationships, whites according to the color of the decay they cause in natural conditions, and trimitics according to their hyphal systems. All of this allows us to note that mushroom, which were first recorded, have different roles in the ecological functions they perform in natural conditions. For example, let's take mushroom, which are involved in regulating biodiversity. Of the above-mentioned fungi, the number of species that live only on living trees is 3 (*Armillaria mellea, Fomes fomentarius* and *Inonotus hispidus*). In addition, polytrophic mushrooms such as *Fomitopsis pinicola, Fuscoporia torulosa, Laetiporus sulphureus, Phellinus igniarius, Ph. pomaceus, Ph. torulosus* and others cause white or brown rot in plants, resulting in changes in the productivity and morphology of the plant, which in most cases are negative. However, while saprotrophic species of xylotrophic macromycetes do not directly participate in the regulation of biodiversity, they takes part in the mineralization of organic substances, and ensure the turnover of the exchange of substances in nature, which is one of the issues necessary for the sustainability of the ecosystem in general.

Table 1. General characteristics of recorded xylotrophic macromycetes in terms of their relationship to substrates, ecolotrophic relationships, color of the decay they cause, and hyphal systems (%)

According to their relationship to the substrate	
Eurytrophs	84,3
Conventional stenotrophs	13,7
Stenotrophs	2,0
Ecolotrophic relationships	
True saprotrophs	7,7
True biotrophs	5,9
Facultatives or polytrophs	86,4
The color of the decay they cause	
White	80,4
Brown	19,6
Hyphal systems	
Monomitic	19,2
Dimitic,	36,6
Trimitic	44,2

It would be appropriate to touch on one point in the data provided in Table 1, which is related to the ecolo-trophic distribution of the recorded mushroom. As seen, 5.8% of the mushroom recorded in studies belong to true biotrophs. However, it is possible to take them into pure culture in standard nutrient media, such as AMJ, and this has been confirmed in our studies. Therefore, it would be correct to note that the biotrophy of these fungi is not physiological, but ecological in nature. In general, there is no literature information about the existence of a mushroom species whose biotrophy is physiological among xylotrophic macromycetes.

Among the mushrooms recorded in the studies, there are also promising species (*Ganoderma lucidum, Laetiporus sulphureus, Pleurotus ostreatus, Schizophyllium commune, Trametes hirsuta, T. versicolar* and oth.) in world practice as producers of various biologically active substances, which is a noteworthy point in organizing the production of useful products based on them in the future.

When determining the number of species of mushrooms recorded in studies (whether they were more or less), it became clear that the total number of species of xylotrophic mushrooms recorded as a result of studies conducted by various authors between 1950 and 2024 is 214.

This includes both agarical (hymenophores are usually plate-shaped) and aphyllophorid (hymenophores are usually tubular structures) macromycetes. The mushrooms recorded in our studies account for 24.5% of this. Thus, the xylomycobiota of various forest ecosystems of Azerbaijan was studied according to its species composition, and the colonization of 51 mushroom species belonging to the *Basidiomycota* division of xylotrophic macromycetes found on 30 species of woody plants was determined. The recorded species are not characterized by wide diversity in terms of the color of the decay they cause, ecotrophic relationships, hyphal systems, attitude to substrates, and other characteristics. Among them are species that are considered active producers of biologically active substances in world practice, which opens up new prospects for organizing the production of products useful for practical needs on their basis in the future.

REFERENCES

Akhundova NA, Orucova SB, Bahshaliyeva KF, Muradov PZ, Rahimov EA. 2019. Evaluation by the oxidase activity of xylotropic macromycetes causing white decay. Advances in Bioscience and Biotechnology **10**, 179–187.

Bakhshaliyeva K, Namazov N, Hasanova A, Mammadova F, Muradov P. 2020. Assessment of the prospects of studying and using mushrooms of Azerbaijan as effective producers of biologically active substances. Periódico Tchê Química **17**(34), 403–411.

Bernicchia A. 2005. Polyporaceae s. Fungi Europaei **10**, 808 pp.

Bhambri A, Srivastava M, Mahale VG. 2022. Mushrooms as potential sources of active metabolites and medicines. Frontiers in Microbiology **13**, 837266. https://doi.org/10.3389/fmicb.2022.837266

Bolesławska I, Górna I, Sobota M, Bolesławska-Król N, Przysławski J, Szymański M. 2024. Wild mushrooms as a source of bioactive compounds and their antioxidant properties—Preliminary studies. Foods **13**(16), 2612. https://doi.org/10.3390/foods13162612

Bosch J, Dobbler PT, Větrovský T. 2024. Decomposition of *Fomes fomentarius* fruiting bodies: Transition of healthy living fungus into a decayed bacteria-rich habitat is primarily driven by Arthropoda. FEMS Microbiology Ecology **100**(5), fiae044. https://doi.org/10.1093/femsec/fiae044

Chen M, Li Q, Liu C, Meng E, Zhang B. 2025. Microbial degradation of lignocellulose for sustainable biomass utilization and future research perspectives. Sustainability **17**(9), 4223. https://doi.org/10.3390/su17094223

Chen S. 2020. The pharmacological effects of triterpenoids from *Ganoderma lucidum* and the regulation of its biosynthesis. Advances in Biological Chemistry **10**, 55–65.

Dudekula UT, Doriya K, Devarai SK. 2020. A critical review on submerged production of mushroom and their bioactive metabolites. 3 Biotech **10**(8), 337. https://doi.org/10.1007/s13205-020-02333-y

Hyde KD, Xu J, Rapior S. 2019. The amazing potential of fungi: 50 ways we can exploit fungi industrially. Fungal Diversity **97**, 1–136.

Lin Zh, Lang B. 2019. Ganoderma and health. Biology, Chemistry and Industry. Springer Nature, Singapore, 203 pp.

Maheshwari R. 2016. Fungi: Experimental methods in biology. 2nd edition. CRC Press, 358 pp.

Mukhin VA, Diyarova DK. 2022. Eco-physiological adaptations of the xylotrophic basidiomycetes fungi to CO_2 and O_2 mode in the woody habitat. Journal of Fungi **8**(12), 1296. https://doi.org/10.3390/jof8121296

Naranjo-Ortiz MA, Gabaldón T. 2019. Fungal evolution: Diversity, taxonomy and phylogeny of the fungi. Biological Reviews **94**(6), 2101–2137.

Niego AGT, Lambert C, Mortimer P. 2023. The contribution of fungi to the global economy. Fungal Diversity **121**, 95–137. https://doi.org/10.1007/s13225-023-00520-9

Psurtseva NV, Kiyashko AA, Senik SV, Shakhova NV, Belova NV. 2023. The conservation and study of macromycetes in the Komarov Botanical Institute Basidiomycetes Culture Collection—Their taxonomical diversity and biotechnological prospects. Journal of Fungi **9**(12), 1196. https://doi.org/10.3390/jof9121196

Pundir A, Thakur MS, Prakash S. 2024. Fungi as versatile biocatalytic tool for treatment of textile wastewater effluents. Environmental Sciences Europe **36**, 185. https://doi.org/10.1186/s12302-024-01007-3

Saad M, Sitohy AZ, Omar MA, El-Saadony BT, Sitohy B. 2022. Mushroom: Chemistry, bioactive components, and application. IntechOpen. https://doi.org/10.5772/intechopen.104182

Shatirova MI, Muradov PZ, Bektashi NR. 2022. Use of chemical and microbiological methods to synthesize natural polyacetylenes. Chemistry of Natural Compounds **58**, 1–5. https://doi.org/10.1007/s10600-022-03586-0

Sun J, Yang H, Ge-Zhang S, Chi Y, Qi D. 2024. Identification of a *Fomitopsis pinicola* from Xiaoxing'an Mountains and optimization of cellulase activity. Forests **15**(9), 1673. https://doi.org/10.3390/f15091673

Wang L, Li J, Zhang J. 2020. Traditional uses, chemical components and pharmacological activities of the genus *Ganoderma* P. Karst.: A review. RSC Advances **10**, 42084–42097.