

Ethno mycological Notes on the Use of Polypore Fungi in Domestic Production of Alcoholic Beverages in Bulgaria

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ABSTRACT

Domestic production of alcoholic beverages in Bulgaria has long tradition and is widespread throughout the country. The paper provides ethnomycological data related with the special coloration and maturation of national brandy named vernacularly as rakiya by using of polypore fungi which develop on mulberries. The coloration and maturation by *Fomitiporia robusta* was tested by the authors on domestically produced cherry-plum rakiya and was related with the presence of tannins proved during the study in this polypore fungus. The usage of other, similarly looking, hoof-like fungi with a tube hymenophore, which contain tannins with the same purpose by Bulgarian people is supposed but needs confirmation in future studies.

Keywords: brandy, *Fomitiporia robusta*, mulberry, rakiya, tannins

INTRODUCTION

The usage of fungi in production of alcoholic beverages is known since time immemorial. The most popular knowledge at global scale indicates the use of yeasts in alcoholic fermentation for brewing and making of wine and brandy. World-wide known is also the traditional application of heartwoods for manufacturing barrels for colorization and maturation of alcoholic beverages. Bulgaria, as one of the Eastern European and Balkan countries, is not an exception in this respect and is known for its traditional production of wine and brandy named *rakiya*. The knowledge on usage of arboreal species for maturation of wine and rakiya was published in many Bulgarian ethno botanical sources and recently was summarized together with the data on improvement of the antioxidant capacities of brandy [1]. According to these authors, sometimes in domestic production wood and young branches of white and black mulberry (*Morus alba* L., *Morus nigra* L.) and black locust (*Robinia pseudoacacia* L.), as well as oak chips (from *Quercus robur* L.) and more rarely chips

of the smoke tree (*Cotinus coggygria* Scop.) are used to color the rakiya. The development of some polypore fungi (*Polypora* lessl.) on the wood of mulberry and oak trees is quite common. Therefore, we decided to check data on the use of these fungi in the maturation or coloration of the alcoholic beverages. The paper presents the results obtained from this search and is the first on the use of polypore fungi in the domestic production of rakiya in Bulgaria.

MATERIAL AND METHODS

The information was gathered from all available ethno mycological sources and for the whole territory of Bulgaria (for details see [2-5]), from the accessible internet sites and blogs with discussions on the domestic production of wine and rakiya, and from brief oral inquiries conducted with 45 colleagues and 110 of our students from different parts of the country.

The identification of fungi followed [6] and fungal names were checked in [7]. For the testing of the maturation and coloration of rakiya we used domestically produced rakiya, filled in a 500 ml transparent plastic bottle and

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followed the steps of the traditional Bulgarian rakiya producers described in detail in the text below. The preparation of mushroom extracts and chemical analyses followed [8].

RESULTS

Our checking of Bulgarian ethno mycological sources and of the recent handbooks related with domestic production of alcoholic beverages (among which were the popular books of [9-12]) did not reveal published data on usage of polypore or other fungi (except yeasts, which are out of the scope of this study) in this production. However, one of our 45 inquired colleagues (and co-author of this paper – N. C.) mentioned that he has heard about such use of a polypore fungus, which commonly develops on *Morus* trees and is denoted as “*Morus fungus*” or “Fungus from *Morus*”. Our search in internet sites and blogs also revealed mentioning the “*Morus fungus*” in this regard in one of the sites (<http://www.rakiyata.com/forum/viewtopic.php?f=8&t=2078>, published by “stefannankov” on 13.01.2013). The descriptions of its application were quite similar and concerned the usage of the fungus for both maturation and coloration of rakiya. According to them, the fruiting bodies of the fungus (basidiocarps, basidiomata) have to be collected during the summer period and then have to be dried-up. After drying, a tiny piece from the basidiome has to be wrapped in gauze and dumped in the rakiya for some days. The effect of the fungus generally resembles the effect of the active carbon, traditionally used in Bulgaria for improvement of the taste and therefore the polypore is used in production of different types of rakiya (e.g. from the fruits of *Cornus mas* L., *Cydonia oblonga* Mill., *Rosa canina* L., different sorts of plums, grapes and apricots). The taste of the rakiya (45-50%), processed by the fungus, is quite soft and it gets brownish color, which resembles the well-known brownish color of the high quality Bulgarian plum rakiya. If during tasting you were to ask someone what was used for the coloration, it is likely that they will indicate application of oakchips or cinnamon sticks. The advantage of the fungus usage is the lack of both wooden taste and smoke smelt in the final alcoholic product. This type of production is known from two North-Bulgarian regions – in the vicinities of the towns Russe (on the Danube river bank) and Troyan (in Staraplanina Mts) – Fig. 1. According to the text published by “stefannankov” on 13.01.2013 (op. cit.), the

“*Morus fungus*” is used for production of rakiya “in mountain regions with colder climate, where the conditions for the wine-cultures are not favorable”, but more details on the regions were not provided.



Figure 1. Physical map of Bulgaria where the capital Sofia, the towns Russe and Troyan, and village Trudovets are pointed (after <https://www.mapsland.com/maps/europe/bulgaria/large-relief-map-of-bulgaria.jpg>).

The next step in our search was to try to find which was the exact polypore species “hidden” under the name “*Morus fungus*”. The checking of mycological literature (e.g. [13, 14] among the many others) showed that the following polypore species are commonly known to develop on *Morus* trees: *Neofavolus alveolaris* (DC.) Sotome & T. Hatt., *Bresadolia craterellus* (Berk. & M.A. Curtis) Audet, *Inonotus farlowii* (Lloyd) Gilb., *Phellinus gilvus* (Schwein.) Pat., *Inonotus hispidus* (Bull.) P. Karst., *Ceriporus squamosus* (Huds.) Qué., *Phellinus robiniae* (Murrill) A. Ames, *Fuscoporia senex* (Nees & Mont.) Ghib.-Nejh., etc. However, only two of them (*N. alveolaris* and *C. squamosus*) have been reported for Bulgaria [15]. *C. squamosus* has popular vernacular name and it is well-known in the country as the *Trout fungus*. *N. alveolaris* has well-visible peculiarities (hexagonal or diamond-shaped pores combined and yellowish to orange scaly cap) which doubtless will lead to more specified local names. Therefore, it was possible to suppose that these fungi will be more specifically named in the descriptions or in the oral knowledge transmission. We continued the search of the fungus among the producers of rakiya and decided to look by ourselves on the fungi which develop on *Morus* trees. Moreover, we found that the “*Morus fungus*” was recommended in many Bulgarian Internet sites as the best one for production of tinker. Thus,

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Figure 2. Fruiting bodies of *Fomitiporiarobusta* from Troyan region (Photo: N. Chipev).

it seemed much more logical that the fungus we search for should have a *Fomes* (hoof-like) outfit, which is the mostly used fungus on this purpose in Bulgaria [3]. Almost simultaneously, in the beginning of August 2017, one of the authors of the paper (N.C.) brought three fruiting bodies of the fungus, collected for him by a local producer in Troyan region (but on a plum tree – Fig. 2). Independently, another author (M.S-G) found one

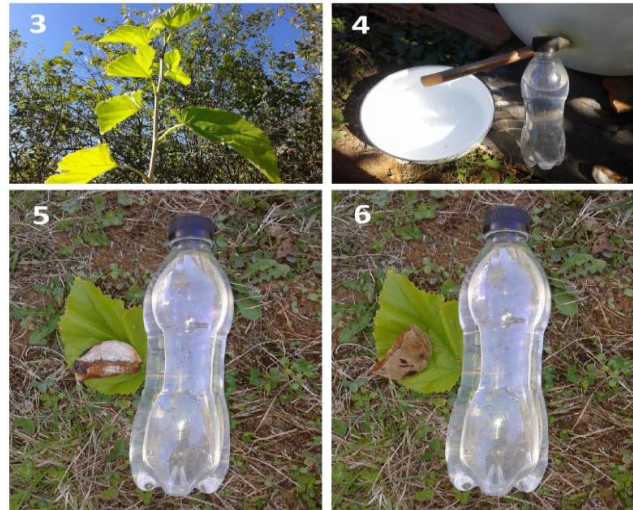


Figure 3. *Morusnigra* branch. 4. Home producing of cherry-plum rakiya. 5 and 6. *F. robustabasidiomata* (top and bottom) collected from *M. nigra* with bottles of home produced cherry-plum rakiya.



Figures 7–9. Steps of coloration of home produced cherry-plum rakiya by using of small pieces of fruiting bodies (arrows) of *F. robustaina* small gauze bag. **10.** Brandy-brown colored cherry-plum rakiya.

fruiting body of the same fungus on the *Morusnigra* bark in the vicinity of Trudovets village (Staraplanina Mts.) – Figs. 3, 5, 6. Both fungi were identified (by B. U.) as belonging to the same species *Fomitiporiarobusta* (P. Karst.)

Fiasson & Niemelä. We immediately started our own experiment with maturation and coloration of the newly-produced home cherry-plum rakiya (52°), using the basidiomata found near Trudovets.

The color obtained by us resembled the colors of rakiya in which oak chips were applied, or which was kept in oak barrels. Therefore, we decided to check the collected basidiomata for presence of tannins. An ethanolic extract of the fungus was subjected to the *Quick Test for Tannins* in which 3 ml 10% ferric chloride (FeCl_3) were added to 3 ml ethanolic extract [8]. According to these authors, formation of blue/black color was a positive indicator for presence of tannins (Fig. 11).



Figure 11. Positive quick test for tannins identification in ethanol extract from a squashed fruiting body of *F. robusta* (Photo: M. Stoyneva-Gärtner).

DISCUSSION

The results from the present study show a yet poorly known use of the polypore fungus *Fomitiporia robusta* in domestic production of specific alcoholic beverage name *drakiya* in Bulgaria.

Most probably, its use the maturation and coloration of rakiya is related with the presence of tannins, which was proved by our tests.

However, we believe that there is still some uncertainty about which polypore species are used in Bulgaria. There are two reasons for this: 1) *Fomitiporia robusta* is not the most typical fungus on different *Morus* trees, for which other species have been outlined as more common inhabitants; 2) it is difficult to believe that all Bulgarian people identify correctly and use only one and the same fungal species from the group of hoof-like fungi with a tube hymenophore. Moreover, the presence of tannins as antinutrients in non-lethal amounts was proved for other polypore species [8, 16, 17]. Therefore, it is more logical to hypothesize that more different species of similarly looking, hoof-like

polypore fungi, which contain tannins are used by Bulgarian people with the same purpose.

CONCLUSION

In Bulgaria, the coloration of alcoholic drinks like *rakiya* by different tint agents has old roots. The present paper showed specific coloration and maturation by using *Fomitiporia robusta* which contains tannins, but coloration and maturation of different local brandies with other polypore species needs further proves through ethno mycological investigations in all country regions.

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