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ANTIOXIDANT ACTIVITY CHARACTERISTICS OF THE GANODERMA LU-CIDUM SPOROCARPS EXTRACT

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Currently, the search for new natural compounds capable of neutralizing the activity of certain substances is constantly being conducted. Basidiomycetes cause increased interest in many scientists as producers of a wide range of compounds with different biological activity, including antioxidant. Ganoderma lucidum contains various compounds that exhibit a variety of biological activities, including increased immunity, antitumor, antimicrobial, anti-inflammatory and antioxidant activity.

Keywords: Ganoderma lucidum, antioxidant activity, biologically active substances.

Introduction

Free radicals and reactive oxygen species, which are formed as by-products of certain metabolic processes, can cause serious damage to cells as a result of uncontrolled oxidation. Some studies show that Ganoderma lucid-um extracts increase the activity of superoxide dismutase and catalase, as well as other enzymes involved in the elimination of highly reactive oxygen species [1].

Material and research methods

An extract of Ganoderma lucidum fungus sporocarp was used as an object of study. In the work, spectrophotometric, chemical and statistical methods were used.

Ethanol extracts were obtained from the dry milled sporocarps of Ganoderma lucidum. Next, the extract was filtered and dried at a temperature of 100–105 °C until a constant mass was obtained. The content of dry extrac-tive substances in fungi extracts was determined by the gravimetric (weight) method.

Determination of the total content of phenolic compounds in the extract of the fungus by the method of Folin – Ciocalteu

To determine the total content of phenolic substances in the studied fingi extracts, a calibration curve was constructed for the standard substance with which gallic acid was chosen. Using the calibration curve, a direct equa-tion of the form y = kx+b was derived, according to which further calculations were performed.

Determination of the antiradical activity of the extract of the fungus by ABTS

The formation of $ABTS^{\cdot}+$ radical cations was started by adding crystals of ammonium persulfate to a final concentration of 2,45 mM. After adding ammonium persulfate, the mixture was thoroughly mixed and left for 12–16 hours in the dark at room temperature.

In the process of determining the antiradical activity, equal aliquots of the studied extracts were added to the radical solution, and the degree of quenching of the radical was assessed over time. The measurements were carried out in a cuvette with an optical path length of 1 cm, λ=734 nm.

Results

The content of dry extractive substances determined by the gravimetric method in all the studied extracts of the fruiting bodies of fungi was 0.0033±0.00001 g. According to the data obtained, it was shown that the content of total phenolic compounds in terms of gallic acid in 50 μl of the extract was 454,3±12,4 mg/l.

Phenolic acid has a pronounced antiradical activity. With increasing concentration, the antioxidant activity of phenolic acid increases and reaches a maximum at a concentration of 10-2 mol. This allows us to make the as-sumption that it is precisely this acid that is likely to make the maximum contribution to the manifestation of the antioxidant properties of the extracts of the fruiting bodies of the studied fungus. It was shown that the obtained fungi extract from fruiting bodies showed antiradical activity in this model. The percentage inhibition of 50 μl of the extract was 36,8±0,5, which suggests that this extract has a pronounced antioxidant activity.

Conclusion

The obtained extract of Ganoderma lucidum fungus sporocarp contains phenolic compounds and has a pronounced antioxidant activity, the manifestation of which can be explained by the high antioxidant activity of phenolic acid, which is one of the components of the extract.

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HEALTH STATUS OF THE POPULATION OVER THE WORKING AGE IN THE TERRITORY OF THE REPUBLIC OF BELARUS

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Belarus has an ageing population: since 1980, the population over 60 has reached 19.4%. The aim of this work is to assess the health status of the population older than the working age of Belarus and the city of Minsk according to medical statistics.

Analyzing the accumulated morbidity, each pensioner of the regions has about 2 diseases, Minsk pensioners – 3–4. The main class of chronic diseases of the population over the working age is the IX class of ICD-10 "diseases of the circulatory system" (BSC): in Minsk the prevalence is almost 99%, in the regions – 57% (in Belarus as a whole – 68, 6%).

The incidence of acute myocardial infarction (AMI) is decreasing (1,5% per year in Belarus as a whole and 3% in Minsk), cerebrovascular diseases (CVD) are decreasing by 1,5% per year, in Minsk the growth is 3% per year. Coronary heart disease (CHD) in Minsk affects 54,4% of people of retirement age, lower incidence in the regions – 25,4%.

Diseases of the endocrine system are mainly thyroid diseases (BSD) and diabetes mellitus (DM). Diabetes mellitus affects 9,1% of pensioners in Minsk and 7,1% in Belarus as a whole. Mortality and lethality are almost the same in all regions [2].

Diseases of the eye and its accessory apparatus are not fatal, but a big problem for the elderly: the prevalence of pensioners in Belarus is 15,5%, in Minsk – 31,3%. The main nosological forms of eye diseases are cataract (34.5% in structure) and glaucoma (21.2% in structure), which lead to vision loss.

Diseases of the musculoskeletal system and connective tissue – the number 3 problem of patients of retirement age: the incidence in the regions – 17%, in Minsk – 32%, of which about 40% – arthrosis. With low mortality, this class of diseases dramatically reduces the quality of human life.

Injuries, poisoning and some other consequences of external causes in Minsk are a much bigger problem than in the regions.

On average, in recent years, almost healthy pensioners-less than 5%; those with chronic diseases: in Minsk-77,9%, in the regions of the Republic-71,5%. Pensioners suffering from chronic diseases (group D III): disability in Minsk-28,1%, in the regions-15,3%.

The highest mortality rate is observed at the age over 85 years – annual losses at this age averaged 23,4% of men and 19,2% of women in 2013-2018 [1]. Age-related mortality dynamics is shown in the figure 1.

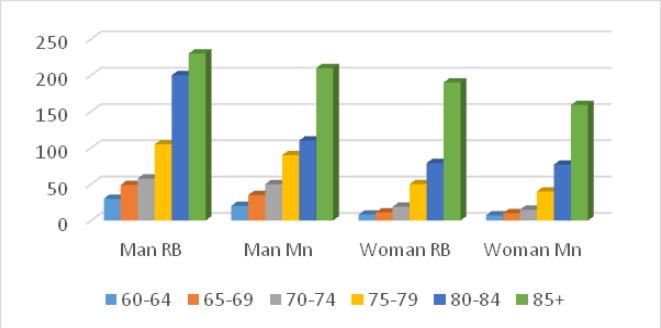

Fig. 1. – Age-related mortality from all causes of men and women aged 60+ in Belarus (Belarus) and Minsk (Minsk), average for 2013–2018, number of people per 1000

Every year, on average, 54% of the population of retirement age in Minsk and 43,9% in the regions used inpatient treatment in 2013-2018 among the hospitalized adults, there were 40,1 and 41%, respectively. The