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STUDY OF OAK BARK'S TECHNOLOGICAL PROPERTIES AND THEIR INFLUENCE ON EXTRACTION

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ABSTRACT

The present research has been indicate the basic technological properties of oak bark, which is composed of specific surface - 184,60 ± 1,60%, bulk weight - 0,60 ± 0,003%, porosity - 0,51 ± 0,01%, intercellular environment - 0 34 ± 0,01%, humidity - 8,47 ± 0,12%. Determined that additional grinding bark oak rolling way possible to intensify the process of extracting and increase the quantity of extractives substances and tannins.

Key Words: Oak Bark, Technological Properties, Extraction**.**

INTRODUCTION

The centuries-old tradition and experience used in folk medicine formed a deep trust in the medicinal plants in all social strata. Plants used in medicine for many centuries.

Despite the significant progress of modern organic chemistry, which produces high-quality synthetic pharmacologically active substances used in pharmacy, that is why the popularity of herbal medicines in the world doesn't only fall but steadily increasing. According to statistics, up to 20-60% prescriptions drugs in different countries are medicinal plants. This trend is due to the action of herbal remedies softer, less resistance and virtually no side effects.

The bases of many medicinal herbal remedies are extracts of medicinal herbs. Assortments of extracts in Ukraine are increasing every year due to the development of the pharmaceutical industry and import finished substances. A high level of technological processes and diversity of raw herbal extracts allows for the production of liquid, thick and dry.

The bases of many medicinal herbal remedies are extracts of medicinal herbs. Given these considerations, the aim of our study was to conduct search and create thick oak bark extract - a new, standardized national substance of natural origin.

Quercus robur (synonym Q. pedunculata) is commonly known as the English oak or pedunculate oak or French oak. It is native to most of Europe and to Anatolia to the Caucasus, and also to parts of North Africa.

Raw oak, was largely seen as the source of tannins. Oak bark contains about 20% tannins, which include both condensed and hydrolysable tannins. Oak bark also contains organic acids (Gallic, elagic), polysaccharides, proteins, flavonoids, micro-and macronutrients. Drugs from oak bark have astringent, anti-inflammatory, haemostatic and antiseptic effects. Oak bark decoction is used to treat inflammatory conditions of the mucous membranes of the mouth and upper respiratory tract. Also, it takes for internal application for treating diseases of the gastrointestinal tract, and inflammatory diseases of the genitourinary system *[2, 3].*

In the production of extracts basic technological operations are extracting the plant material. Improvement and intensification of production in order to increase the yield of the target product requires a detailed analysis of various factors that affect the extraction. Therefore, a process of extraction is necessary to consider the technological properties of herbal drug.

The main technological properties of herbal drug include: moisture, content of extractives share, volume and bulk supply of

raw materials, porosity, intercellular environment and free volume of layer materials, particle size and other plant material. The effectiveness of extraction of active substances is largely dependent on the nature of the plant material, the degree and method of grinding.

Today we know many ways of crushing plants raw materials. Most popular: breakage, cutting, sawing, impact, abrasion, crushing. The main purpose of grinding raw materials - the maximum destruction of cellular structures in order to increase the contact surface of the extracting material processed *[1].*

Depending on the method of grinding parameters change minced raw. When crushing blow and cell structure of plant material is destroyed, the surface material is uneven. When cutting and sawing cell structure remains raw, but raw pieces are given a certain size and smooth surface. When erasing the cell structure is broken, raw shredded.

Raw materials obtained by cutting and sawing will be extracting slower due to the advantages of the internal diffusion processes on leaching and external diffusion. In addition, the surface of this stuff relatively smaller *[4].*

In connection with the foregoing, we had been placed next task - to examine how the impact of grinding oak bark on its technological properties and efficiency of extraction of raw materials.

MATERIALS AND METHOD

To solve this problem oak bark crushed by different ways: cutting and machining of additional rolling.

Raw materials are crushed by cutting with optional rolling sieved and measured fractional composition. Fractional (grain) composition or distribution of material particles in size affects technological properties such as fluidity, density layer and extraction conditions, and the yield of extractives.

Prepared from these methods raw materials were evaluated by a number of process parameters. It was determination of specific and bulk mass, bulk density, average particle size, specific surface area, and porosity layer porosity raw strength, angle of repose, content of extractive substances and tannins by general method *[5, 6, 7].*

RESULTS AND DISCUSSION

The results are presented in Table 1.

Table 1 Technological parameters of oak bark

Name of process parameters, its symbols and units	Results of determination	
	Oak bark, crushed cutting and further crushed rolling	Oak bark, crushed cutting
Specific gravity (d_g,g/sm^3)	0,82±0,01	0,65±0,02
Bulk weight (d_w,g/sm^3)	0,60±0,02	0,29±0,01
Bulk density (d_d,g/sm^3)	0,54±0,05	0,67±0,08
Average particle size (d,sm)	0,049±0,02	0,29±0,10
Specific surface (F, sm^2/g)	184,60±1,60	34,40±0,30
Intercellular environment, I_e	0,34±0,01	0,17±0,01
Porosity, P_S	0,51±0,01	0,22±0,01
Strength, g/s	3,99±1,10	0,31±0,24
Water absorbtion coefficient	2,3±0,18	2,0±0,16
Angle of repose, degrees	26±2,48	32±3,79
Humidity, %	8,47±0,12	7,84±0,11
Extractives substances, %	17,10±0,34	10,23±0,20
Tannins, %	4,49±0,06	2,92±0,04

Specific gravity, bulk weight and bulk density are determined the porosity and intercellular environment that allows to detect the needed ratio between raw materials and extraction. The porosity of the particles are indicates the amount of internal space particles of raw materials and intercellular environment are determines the amount of space between particles of plant material that is needed to calculate the volume of extractant.

Strength and angle of repose are characterizing raw materials and are essential when choosing a boot device; in unload apparatus for extraction and transporting devices.

Based on the data presented in Table 1, found that additional rolling oak bark resulted in increased values of parameters which affect the efficiency of the extraction process, which is directly proportional to the weight of a filled,

specific surface area, porosity and depends on the degree of particle materials.

To study the effectiveness of additional grinding oak bark analyzed yield of biologically active substances from raw materials. Extracts obtained by maceration using as extractant purified water. All further shredded raw observed intensification of the extraction process and increases the quantity of extractive substances (from 10,23 ± 0,20% to 17,10 ± 0,34%), tannins in recalculate from pirogalol (from 2,92 ± 0,04% to 4,49 ± 0,06%).

CONCLUSION

As a result, studies proved the feasibility of using additional rolling at the stage of raw mill and studied technological parameters of oak bark, which we will take into account when choosing a method of extraction, extraction equipment, technical specifications and additional equipment.

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