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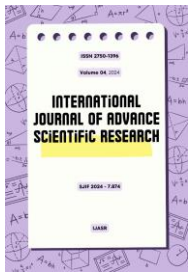

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Research Article

# STUDY OF THE COMPOSITION OF SOLUTIONS USED IN LOCAL PLANT EXTRACTS AND TANNINS

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## Abstract

In this article, tannins are substances that, when exposed, change the physicochemical and mechanical properties of leather and turn leather into leather. Vegetable tannins are commonly called tannins. Both abroad and in our country, plant extracts are mainly used to soften thick leather on shoe soles, technical leather, belt and seam leather, high boot leather and leather.

## Keywords

Plants, chemical composition, tanning, plant bark, shoes, technical leather, belt, leather, ethics, leather.

## Introduction

Tanned ones are formed as a result of plant activity. A huge number of plants on the globe contain tannins in different quantities. The plant can contain tannins in its most diverse parts: bark, wood [2]. At the same time, the chemical composition of plants of one breed is not strictly constant and varies depending on various factors: geographical habitat, growing conditions, age of plants, and sometimes the time of harvest.

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Although the tannins produced in different plants vary greatly in chemical structure, they all share some common characteristics. In the molecules of all vegetable tannins there are several benzene rings, which necessarily contain a certain [1] amount of hydroxyl groups as substituents. Thus, all tannins are derivatives of polyhydric phenols. That is, polyphenols. Concentrated tannin extracts are called herbal tanning extracts.

Extraction and extraction of tannins from tanning materials is carried out with hot water or aqueous solutions of certain chemical reagents (for example, salts of sulfurous acid) [3]. In this case, in addition to tannins, other water-soluble compounds that do not have tanning ability, called nontannins, also pass into the solution. The ratio of tannin content to total water-soluble content, multiplied by 100%, is called good quality. This indicator is important for determining the quality of tanning raw materials and tanning extracts [6].

Water extracts of vegetable tanned materials are acidic in nature. Their acidity is due to the phenolic hydroxyls of the tannide. Molecules and eight free carboxyl groups of most hydrolyzable tannins, as well as the presence of organic acids. For different tanning materials, pH and acidity values vary within the following limits: for hydrolyzed tannins pH = 3-4, acidity 250-400 meq/l, for condensed tannins pH = 4-5, acidity 3-100 mg l [7].

Tanning solutions have significant buffering capacity, especially towards acids. Which depends on the ratio of tannins and nontannides. Typically, the buffer capacity of high quality condensed tannin solutions is significantly lower than that of low quality hydrolysable tannin solutions. However, the buffering capacity is influenced not only by the amount of nontannins, but also by their different nature in individual tannins, as well as the tannins themselves, and the ability of various tannin extracts [4].

Tannides are substances with a wide range of properties, depending on their nature and partially modified as a result of certain treatments, as well as conditions of use.

Although a characteristic feature of the use of plant extracts is the availability of raw materials for industrial production, tannins are widely used throughout the world.

The use of natural tannins ensures the highest quality leather processing. It should be noted that this vegetable tanning is environmentally less dangerous than tanning with mineral salts and syntans; In addition, the use of plant extracts allows the use of skin trimmings and shavings for the production of gelatin[5]. Flora provides the leather industry with a huge range of tanning materials that have been used for several millennia. The leather industry uses only wood waste. According to available data, conventional cutting, due to the state of oak plantations, can provide an extract yield of 30-40% [8]. An additional source of oak extract raw materials can be waste from furniture and other wood processing enterprises that produce products from oak wood.

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Chestnut belongs to the same family as oak, but grows faster and reaches maturity in 30-40 years. Chestnut grows in the Caucasus, in the Black Sea and Abkhazian forests.

The tannicity of chestnut wood reaches 10% (with zero moisture content and good quality 75-80%). Chestnut extract has good tanning properties. Chestnut wood can be processed either alone or in a mixture with oak wood, increasing the tannin and good quality of the oak extract.

In plants such as willow, spruce and larch, the bulk of tannins accumulate mainly in the bark. Willow grows in various places: in forests, meadows, along the banks of rivers and lakes, and often forms continuous thickets. There are more than 200 species of willows and several hundred varieties of their hybrids, differing from each other in the appearance of bark, leaves, flowers, fruits, etc.

Willow bark is collected by hand. Mechanization of procurement has not yet been carried out and is hardly possible.

The accumulation of tannins in the bark occurs as the tree ages. Analyzes show that the cortical layer, depending on the age of the tree, contains 3.5-7%, and the cortical layer 7-17% of tannins. Therefore, until the tree is 60-80 years old, when the cortical layer is still small, tannins and good quality of the bark are maximum.

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Only in 2018, a group of scientists managed for the first time to discover a plant organelle called the tannosome, in which tannins are synthesized - tannins. It is formed in chloroplasts and, after polymerization of tannins, is isolated in a membrane shell. Once formed, the tannosome moves into the vacuole, where tannins then remain.

The molecular weight of unassociated tannins ranges from 1000 to 3000 atomic units, and in the associated form reaches 18000. The isoelectric point of most tannins is in the range pH = 2.5-3.5.

It is generally accepted that tannins in plants are formed (synthesized) from sugars through a series of intermediate products. First, phenolic substances are formed that do not have tanning properties, which, through a series of stages, are converted into more complex compounds - tannins. As a result, the tanning complex of plants is a series of polyphenolic compounds, ranging from free phenols and their simplest derivatives to high-molecular compounds of the tannide type, soluble and insoluble in water.

What is common to all catechins is their ability when, when heated in dry form and in aqueous solutions above 100°C, as well as when heated with acids and under the action of enzymes, they are converted first into amorphous, easily soluble tannins in water, and then into water-insoluble red phlobaphenes . It is assumed that the formation of phlobaphenes should be attributed to the pyran ring, since it has been proven that phenolic hydroxyls do not participate in the phlobaphenization process.

The vegetable tanning process consists of the adsorption of tannins into the dermis, the diffusion of tannins into the skin, and the binding of the tannids. Tannids are present in the skin both in free and bound states.

Depending on this, they behave differently in relation to leaching with water and alkalis.

Production tests of ultrafiltration-refined leather on the technological properties of the leather gave positive results, a result based on which Membrane technology is used for poor-quality purification of extracts.

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