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THE IMPORTANCE OF LIGNIN AND THE PROCESS OF LIGNINIZATION IN PLANT LIFE

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Abstract: The substance lignin in plants is necessary for the strength of their bodies and stems, as well as cell walls. Lignin is a valuable chemical raw material; it is with this substance that the process of wood formation in plants occurs. In this review, we summarize lignin biosynthesis and its regulation by genetic modification, as well as the main biological functions of lignin in plants.

Key words: Cellulose, lignin, polysaccharide, phenotype, gene, mosses, algae, hydrophobic, polymer.phenylalanine, trosine, amino acid, metabolite, biopolymer, biosynthesis, wood, pathogenic, energetic.

Annotatsiya:O'simliklardagi lignin moddasi ula tanasi va poyalari, shuningdek, hujayralari devorining mustahkamligi uchun zarur hisoblanadi. Lignin qimmatli kimyoviy homashyo hisoblanadi. O'simliklardagi yog'ochlashish jarayoni aynan shu modda bilan boradi. Ushbu sharhda biz lignin biosintezi va o'simliklardagi ligninning asosiy biologik funksiyalarini umumlashtiramiz.

Kalit so'zlar: Sellyuloza, lignin, polisaxarid, fenotip, gen, moxlar, suvo'tlari, gidrofob, polimer , fenilalanin, trozin, aminokislota, metabolit, biopolimer, biosintez, yog'ochlik, patogen, energetik.
Аннотация: Вещество лигнин в растениях необходимо для прочности их тел и стеблей, а также клеточных стенок. Лигнин — ценное химическое сырье, именно с этим веществом протекает процесс образования древесины у растений. В этом обзоре мы суммируем биосинтез лигнина и его регуляцию путем генетической модификации, а также основные биологические функции лигнина в растениях.

Ключевые слова: Целлюлоза, лигнин, полисахарид, фенотип, ген, мхи, водоросли, гидрофобный, полимер, фенилаланин, трозин, аминокислота, метаболит, биополимер, биосинтез, древесина, патогенный, энергетический.

Introduction: Lignin (Latin lignum - tree, wood) is a substance that describes the Woody walls of plant cells. Vascular plants, mosses and some algae are complex polymer compounds found in cells[1]. It is the most common compound after cellulose, accounting for almost a third of the dry matter of wood. It occurs up to 50% in conifers and 20-30% in other trees[2]. Lignin is one of the main components of the plant cell wall and is a natural phenolic polymer with high molecular weight, complex composition and structure. Lignin biosynthesis contributes significantly to plant growth, tissue and organ development, survival tolerance, and response to a variety of biotic and abiotic stresses. Residential hardiness prevents plant stems from bending or breaking, which is one of the most important characteristics that affect crop growth and grain yields. Many studies have shown that crop location tolerance depends on plant height, biomass, stem diameter, and the composition and

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properties of stem cell walls. The accumulation of lignin in the cell wall significantly increases the mechanical strength of plant stems. It is important for the survival resistance of crops [3,4]. The increase in lignin content in the seed of some plants ensures the strength of the seed shell and resistance to various negative consequences of the external environment [5]. Lignin is also used as a source in the energy and pharmaceutical industries. In addition, lignin is an important tool that protects plants from pests and pathogens.

Further genetic studies in a number of plants have revealed how significant lignin is to plant life processes. One of these added exogenous paclobutrazole to the winter wheat variety according to research carried out by Peng and others, and found that paclobutrazole significantly reduces the length of wheat between nodes, increases lateral growth and lignin deposition, increases the activity of the enzyme lignin biosynthesis, and increases the thickness between nodes. Another study found that crop density could significantly alter the morphological characteristics of the STEM and the biosynthesis of lignin and thus increase the mechanical strength of the stem [6, 7].

The substance Lignin is considered to have a complex chemical phenolic and hydrophobic nature, the composition of which is assumed to consist mainly of carbon, oxygen and hydrogen. Hydroxynimaldehyde, trisin, flavone, hydroxystelbine, and xenibiotic are also recognized to be subunits of the substance lignin. It is a metabolite formed in cells by the exchange of phenylalanine and trozin, the second biopolymer [8] that makes up 30% of the organic carbon in the biosphere. The biosynthesis of Lignin is complex, divided into three processes: 1) the biosynthesis of lignin monomers, 2) transport, 3) polymerization. In addition, after several processes that involve deamination, hydroxylation, methylation, and reversion, lignin monomers are formed in the cytoplasm and transported to the apoplast. The three main groups are then polymerized with monolignons[9,10,11,11,12].

Woodworking process. In the process of growth, the wall of certain cells, according to its structure, water transfer and mechanical properties, absorbs the substance lignin. As the cell wall is saturated with lignin, the plant body becomes Woody. In the process, the cellulose and pectin substances that formed the cell wall do not undergo chemical changes, only the lignin substance accumulates between the fibril fibers. Initially, the primary stem, gradually the secondary STEM, becomes Woody. Since most of the Lignin substance (61-65%) is composed of carbon dioxide, the Woody body of the plant burns well. The body and cells of a woody plant lose their elasticity , remain firm and firm. Difficulties in cell interaction and the circulation of substances come to the fore due to the fact that precipitation goes with the death of living cells. But in some plants, the process of woodworking does not affect the activity of cells. An example of this is the wooden parenchyma cells in a plant cell.

In some plants, cell wall melting is observed. For example, cells that Wood the fruit of pears, quince, are found in the flesh. Holes appear in the wall of these cells, and intercellular substances circulate through these holes. Over time, as spring comes, the wall of these cells melts and is freed from wood, that is, lignin.

Due to the conservation capacity of the substance Lignin , the risk of the decomposition of bacteria and microorganisms is taken. So is the important biological importance of woodworking.

Cells with a wooden wall are of great importance in plant life . Water-conducting tubes, tracheids, and mechanical fibers in the plant's body have specific functions. The cells that can germinate ensure

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that the plant stays upright mainly due to its occurrence on the STEM and stem. It is also possible to obtain industrially significant pure lignin and cellulose from the woody part of the plants [13].

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