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BIOLOGICAL END ECOLOGICAL PROPERTIES OF OIL PLANTS

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ABSTRACT

The article delves into the biological and ecological characteristics of oilseed crops such as sunflower, olives, soybeans, and cotton, elucidating their multifaceted utility within the national economy and medicinal applications.

Keywords: Sunflower, olives, soybeans, cottonseed, arginine, histidine, lysine, tryptophan, phenylalanine, methionine, threonine, leucine, isoleucine, valine.

INTRODUCTION

The escalating global demand for vegetable oils across diverse sectors of human activity underscores their quintessential role in the production of essential food items, canned goods, livestock feed, cosmetics, pharmaceuticals, and industrial applications. Vegetable oils represent a cornerstone within the spectrum of indispensable dietary components crucial for human sustenance and industrial operations. Historically reliant on traditional butterfat oils, Uzbekistan transitioned post-independence towards cultivating diverse oilseeds such as sunflower, soybean, olive, sesame, and rapeseed as a strategic imperative to cater to the populace with cost-effective, high-quality, and health-beneficial vegetable oils. Presently, the cultivation of sunflowers spans approximately 7-8 thousand hectares, soybeans occupy 5 thousand hectares, and sorghum covers 10-12 thousand hectares within the arid regions of Uzbekistan, reflecting a varied taxonomic lineage ranging from cruciferous to leguminous families among oilseed plants.

Sunflower (Helianthus annuus L.), a prominent member of the composite flower family, serves as a ubiquitous oilseed crop globally. Characterized as an annual herbaceous plant with a tall, primarily unbranched stem reaching heights of 70-80 cm to 150-170 cm, sunflower boasts heart-shaped leaves, yellow blossoms, and flat, white, gray, or black achenes. Its blooming period typically spans from June to August, with fruiting occurring in August to September. Sunflower oil, a staple in culinary applications and margarine production, contains essential nutrients including oil content ranging from 29-59%, carbohydrates, proteins, carotenoids, phytin, chlorogenic and citric acids, among others. Medicinally, sunflower leaves and flowers are harnessed for their rich repository of biologically active substances like triterpenes, diols, flavonoids, choline, betaine, and carotenoids, enabling therapeutic usage in treating various ailments including malaria, fever, and gout. With its high unsaturated fatty acid composition, sunflower oil exhibits cholesterol-regulating properties, playing a pivotal role in combatting atherosclerosis and cardiovascular diseases.

RESEARCH METHODS AND FINDINGS:

Section 1: Olive Tree (Olea europaea)

The Oleaceae family includes the illustrious European olive, a botanical gem treasured since antiquity, known culturally as the "Olive Tree." Olea europaea, this botanical marvel, now thrives abundantly around the Mediterranean Sea, testament to its widespread cultivation in these regions. Reaching skyward with a potential height of 20 meters, the olive tree boasts a luxurious canopy emanating from its thick, robust stem, occasionally attaining a majestic 50-meter diameter. Known for its enduring nature, the olive tree's lifespan can span 300-400 years; under optimal conditions, it may surpass millennium-old milestones, with reports verifying the existence of 2000-year-old specimens. Aged olive stems possess a striking aesthetic, showcasing a time-honored beauty. Featuring opposite lanceolate leaves, tinged with a gray-green hue above and silver-toned undertones beneath, the oak sheds its leaves after spring leaf renewal in its native habitat, guaranteeing year-round verdancy. The tip of each side branch culminates in a sharp thorn, a testament to the plant's transformative metamorphoses. Come late May, delicate flowers adorning the olive tree burgeon, pollinated by the whispering winds.

Olive, a nutritional powerhouse, harbors an abundant array of vitamins and trace elements essential for human well-being. Distinctively rich in unsaturated fatty acids such as olein (75%), linoleic acid (13%), and linolenic acid (0.55%), olive oil exudes unique properties beneficial for human health. Outstripping animal fats, these fatty acids exhibit metabolically advantageous traits, regulating glycemia levels, safeguarding against cardiovascular maladies, nurturing digestive health, and fostering bodily rejuvenation. Regular consumption of olive oil heralds a shield against cardiovascular afflictions, angina pectoris, heart attacks, and cancers, underpinned by the cholesterol-lowering prowess of olive fruit-derived unsaturated fatty acids.

Section 2: Soybean (Glycine max)

Soybean, a revered member of the Fabaceae family, traverses a transformative journey within the annual cycle. Embodied by an erect, shapely structure, typically spanning 30-70 cm in stature, the soybean plant unleashes tri-foliate leaves and yields pod-clad fruits housing 1-4 seeds. A herald of flourishing bloom during July-August, soybeans bestow their harvest of ripe fruit in August, embodying a procession of seasonal abundance. Embodying a versatile, nutrient-dense character, soy embodies flour-making, semolina production, and oil extraction. Soybean seeds, with their trove of nutrients, encapsulate 17-25% oil, enriched with oxygen, sugars, organic acids, and a vitamin kaleidoscope including V1, V2, S, E, K, provitamin D, carotene, and minerals galore such as potassium, magnesium, calcium, phosphorus, iron, copper, manganese, sulfur, nickel, and cobalt.

The protein bounty inherent in soybean seeds comprises 80-90% premium vegetal protein brimming with essential amino acids paramount for life sustenance, including arginine, histidine, lysine, tryptophan, phenylalanine, methionine, threonine, leucine, isoleucine, and valine, embodying a potent nutritional panacea.

Section 3: Soy Milk, Cotton Plant, and Cottonseed Oil

Soy milk, derived from soybeans, stands as a nutritional equivalent to cow's milk, boasting comparable value in nutrients, body digestibility, physical attributes, and visual appeal.

Recommended for individuals grappling with peptic ulcer diseases, heightened gastric juice secretion, typhoid fever, and myriad acute or chronic infectious ailments, soy milk serves as a therapeutic ally. Moreover, soybeans are harnessed as a key component in crafting medicinal formulations, pivotal in addressing diabetes, light-induced maladies, and galvanizing central nervous system functions. Notably, the isolation of phytohemagglutinin (lectin) from soybean seeds has yielded compelling anti-tumor efficacy, showcased by inhibiting and potentially diminishing the growth, size, and mass of Walker tumors – a distinct type of cancerous growth – substantiated through animal experimentation.

Belonging to the Malvaceae family, cotton emerges as a perennial plant nurtured in our regions as an annual crop. Characterized by a sinewy root system, an upright stature reaching up to a meter in height, and a branching stem, cotton leaves unfurl in a tri-to-penta lobed formation. Singularly stationed in resplendent yellow hues, large five-lobed flowers grace the cotton plant. Upon ripening, the fruit manifests in ovoid, spherical, or oblong forms, disclosing 3-5 pods. Flourishing in blooming glory from June to September, the cotton plant yields fruit during the liminal period of August to September.

CONCLUSION Of pivotal significance is cottonseed oil, extracted from cottonseeds, and partially derived citric acid, sourced from cotton leaves, pivotal in culinary applications. Cottonseed oil, comprising 17-41% oil content, a protein trove of up to 36%, gossypol, essential minerals, and sundry constituents, unfolds as a culinary cornerstone. The cotton root's bark secures a repository of vitamin C, vitamin K, gossypol, and aromatic compounds. In parallel, cotton leaves house 5-7% citric acid and 3-4% malic acid. The presence of unsaturated acids, constituting the vitamin F complex, within cottonseed oil confers semi-solid attributes, orchestrating metabolic harmony within the body. Thus, cottonseed oil emerges as a sentinel against atherosclerosis in the elderly demographic.

Further, an aqueous extract derived from the cotton root's bark is deployed in scientific realms to staunch hemorrhages from the stomach and uterus. Citric acid, a mainstay in both culinary and medicinal domains, is artfully extracted from cotton leaves. Gossypol, harvested from cottonseeds, finds pivotal application in synthesizing a diverse array of invaluable pharmaceutical compounds. Given the indispensable role oil crops play in our quotidian life, the imperative to create novel crop varieties, advance high-yield agricultural practices, and unveil specialized cultivation methodologies surfaces as a paramount challenge commanding our attention.

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