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# **INNOVATIVE DEVELOPMENT OF SCIENCE AND EDUCATION**



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# **INNOVATIVE DEVELOPMENT OF SCIENCE AND EDUCATION**

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СУПЕРМАРКЕТІВ

# AGRICULTURAL SCIENCES

## PROSPECTS FOR GROWING UNCOMMON OILSEEDS IN THE RIGHT-BANK FOREST-STEPPE OF UKRAINE

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**Introduction.** Traditionally, oilseeds in Ukraine are considering one of the important export groups of agricultural products and are strategically important products that ensure economic and food security of the country. They are a source of valuable food and technical products. The share of profit from the sale of oilseeds in the profit from the sale of agricultural products is constantly increasing. That is why the competitiveness of oilseeds significantly affects the profitability and competitiveness of the entire agricultural sector of the country [1].

Including soybeans, the world's sown area of oilseeds is over 100 million hectares, and world oil production is about 70 million tons per year. The world's largest sown areas are soybeans, peanuts, rapeseed, flaxseed, sunflower and sesame. Oilseeds are grow in almost every country in the world, but each country has its own leading oilseeds. Sunflowers are grow mainly in Russia, Ukraine, France, Hungary, Romania, Argentina, USA, and China. The largest producers of sunflower oil are Argentina, Russia, Ukraine and the United States. Peanuts are grow in many



countries of the subtropics and tropics. It is distributing in India, Nigeria, West Africa, Indonesia, Brazil, Argentina, USA, and China.

Rapeseed is growing in Poland, Hungary, Ukraine, Northern Europe, USA, Canada, and China. Canada is the largest exporter of rapeseed and oil [2, 3]. Cotton is cultivated in India, Pakistan, China, USA and Uzbekistan. Ukraine is one of the leading oil producers in Europe [4]. The sown area of oilseeds in our country reaches 1.8 million hectares. The largest area is occupying by sunflower (approximately 96% of all oilseeds). In Ukraine, sunflower is growing in almost the entire territory except Polissya. Rapeseed, castor oil, poppy oil, flax oil, red flax, etc. are growing on relatively small areas. [5, 6].

Vegetable oils are essential in the human diet. They are using as a food product in its natural form, as well as for the manufacture of margarine, canning, confectionery and more. The value of edible vegetable oil is due to its content of biologically active fatty acids that are not synthesizing in the human body and important substances for the human body: phosphatides, sterols, vitamins. Edible oils that can boast of their taste include sesame (sesame) and peanut oils. They are using in food, as well as for the manufacture of higher grades of margarine, in the confectionery, canning, fish industries [7, 8].

Peanut oil is using for dietary nutrition and weight normalization, as it has the ability to enhance satiety. Peanut, or peanut (*Arachis hypogaea* L.), is an annual herbaceous plant of the legume family. Peanut oil is an excellent antioxidant, lower cholesterol, improve memory, prevents blood clots, normalizes the gallbladder and kidneys, calm the nervous system.

Sesame oil can recommend for diabetes, obesity, kidney and blood diseases. This oil is used by bodybuilders to increase muscle mass [9].

The most popular edible oil in Ukraine is sunflower. Sunflower oil is using as a natural food. Its nutritional value is due to the high content of polyunsaturated fatty linoleic acid (55-60%), which has a high biological activity and accelerates the metabolism of cholesterol in the body, which has a positive effect on health. Sunflower oil is rich in vitamins (A, D, E, K). It is using in cooking, for the

manufacture of various breads and confectionery. Sunflower oil is the main component of margarine [10].

In recent years, rapeseed oil has become very popular in the food industry, especially sleeveless varieties, in which the oleic acid content have increased to 60-70%, which significantly improves the nutritional properties of rapeseed oil. In terms of taste and nutritional properties, this oil often compares to olive oil, called rapeseed northern olive. This dietary product can be stored for a long time without losing transparency and useful properties. The value of edible rapeseed oil is the presence of polyunsaturated fatty acids, which improve blood circulation and vascular condition. Rapeseed oil is useful for the prevention of atherosclerosis [11].

Less common in Ukraine are flaxseed and almost completely forgotten hemp oil. Flaxseed oil is not delicious, but it contains 2 times more polyunsaturated fatty acids than fish oil. Due to this, flaxseed oil has a rejuvenating and healing effect. It is using to treat and prevent diabetes, cardiovascular and cancer diseases, as well as to fight overweight. , helps lower blood cholesterol, improves liver function and vascular condition, prevents blood clots.

Hemp oil has a long history, but today it is extremely rare. In its properties, it is close to flaxseed, but unlike it is extremely tasty and can successfully replace butter or olive oil [12].

Hemp seed oil contains the much-needed omega-3 polyunsaturated fatty acid, as well as the full range of amino acids. Hemp oil has the most optimal ratio of two essential fatty acids omega-3 and omega-6 in a ratio of 1: 3, respectively. Fatty linoleic and alpha-linoleic acids, which are necessary for growth, are also components of hemp oil.

In addition to acids, the oil contains vitamins A, B1, B2, B6, E, K, D, as well as trace elements and minerals - calcium, zinc, iron, phosphorus, potassium, manganese, and sulfur. Scientists believe that the composition of hemp oil is uniquely balanced and ideal for the human body.

Essential for the human body omega-3 and omega-6 fatty acids contained in hemp oil, help strengthen the immune system and the normal functioning of the heart

and blood vessels. Fatty acids lower cholesterol, prevent blockage of blood vessels, reduce the risk of atherosclerosis. Vitamin E, which is part of hemp oil, maintains the elasticity of blood vessel walls and normalizes blood pressure.

There are many useful edible vegetable oils, as well as ways to use them by humans, which are not limited to their gastronomic preferences. Oils of almost all oilseeds are used in various industries (electrical, leather, metalworking, chemical, textile, pharmaceutical, perfume, etc.). However, among the great variety of oilseeds there are species of plants that are growing mainly for technical purposes (railings, lalemancia, castor oil, etc.) [13].

Castor oil is extremely widely using and belongs to the group of non-drying oils. It is obtaining from castor seeds by hot pressing. Ricin (*Ricinus communis*) belongs to the genus *Ricinus*, a family of milkweed (*Euphor-biaceae*). The genus *Ricinus* is divided into three species: small-fruited (*Ricinus microcarpus* g. Pop.), Large-fruited (*Ricinus macrocarpus* g. Pop.) Moreover, Zanzibar (*Ricinus sancibarinus* g. Pop.). The most common in Ukraine are small-fruited and large-fruited species. Each of them is dividing into subspecies and ecotypes. In Ukraine, castor bean is growing in two subspecies: Persian (*Ricinus microcarpus* ssp. *Persicus* g. Pop.) Moreover, *sanguineus* (*Ricinus macrocarpus* ssp. *Sanguineus* g. Pop.). Castor oil is extremely viscous, poorly soluble in gasoline and other organic solvents, has a wide range of operating temperatures (freezes at  $-16^{\circ}\text{C}$ ), ignites at  $275^{\circ}\text{C}$ , and is non-toxic and non-aggressive to most plastics. Due to these properties, castor oil is an ideal oil. That is why at the beginning of the development of aviation it was using to lubricate aircraft engines. However, castor oil has disadvantages that limit its use as a lubricant: it oxidizes rapidly and has low thermal conductivity.

However, earlier (before 1950) for hydraulic brakes in cars used fluids, which consisted of a mixture of equal parts of castor oil and alcohol. The liquid based on ethyl alcohol and castor oil is not use due to the low boiling point and the content of ethyl alcohol, which evaporates easily. Instead, the liquid based on butyl alcohol and castor oil is using in systems with drum brake mechanisms (trucks and cars of older models). It has high resistance, non-hygroscopic and non-aggressive to rubber parts,



has lubricating and anti-corrosion properties. Castor oil is indispensable in the home for the care of leather goods: shoes, clothes and more. It is well absorbed, does not thicken, and gives the skin flexibility and water resistance.

The well-known castor oil, which is using as a laxative, is nothing but castor oil. It irritates the receptors of the small and large intestine and causes a reflex increase in peristalsis, providing a laxative effect. However, castor oil does not cure the cause of constipation, but only helps to eliminate it. Castor oil actively promotes skin regeneration, heals wounds, ulcers on the body, relieves suffering from burns, and softens the skin. In folk medicine, a common method of treating hard calluses on the feet with castor oil [5, 14].

The shipbuilding and machine-building industries cannot do without varnishes and paints, the main component of which is railing oil. Perilla oil is extracting from railings (suzdy) - plants of the Gubotsvit family. Perilla, or sudza (Perilla L.), belongs to the family Lamiaceae. The genus Perilla L. is representing by two botanical species. Of practical importance is only the species opioids, which is dividing into two geographical groups: Korean-Chinese and Japanese. The railing of the Korean-Chinese group is more common as early ripening. When drying, perilla oil forms a film, which is second only to the film of tung oil (obtained by squeezing the seeds of the tung tree nut). The film of railing oil is resistant to water, air, high temperatures. That is why railing varnishes and paints withstand surface deformation and do not form cracks, and railing oil is using for the manufacture of waterproof and insulating materials [6, 15].

For the manufacture of waterproof fabrics, oilcloths, insulating material, as well as drying oils and varnishes, lalemancia oil is widely used. Lallemantia (Lallemantia L.) belongs to the family Labiaceae. The genus has several species, of which only one occurs in culture - Iberian (iberica). Lalemancia seeds contain from 24 to 40.5% of quick-drying oil, similar in properties to railing oil. Crop oils, which are growing mainly for the food industry, are using for technical needs [16].

Sunflower oil is using for the manufacture of varnishes, paints, stearin, linoleum, electrical fittings, oilcloth, and waterproof fabrics.

Flaxseed oil is using to make natural drying oils, varnishes, enamels and various water-resistant paints.

Safflower (*Carthamus* L.) belongs to the family Asteraceae. The genus *Carthamus* L. includes 19 species, one of which is cultivated - *S. tinctorius*. Cultivated safflower is an annual plant. Crude oil is refined due to its bitter taste. The oil obtained from the purified seeds is using as food. Crude seed oil has a bitter taste; it is using for the preparation of light drying oils, in soap making and in the production of linoleum. Refined oil looks transparent, almost tasteless [15, 17].

Poppy oil is using for the production of high quality paints and toilet soaps. There are two forms of poppy in the culture: oil and opium (medicinal). Botanical characteristics. Poppy (*Papaver* L.) belongs to the family of poppies - Papaveraceae. This is an annual herbaceous plant.

Sesame (*Sesamum* L.) belongs to the family of sesame - Pedaliaceae. The genus (*Sesamum* L.) has both annual and perennial forms. The most common type of *Sesamum indicum* L. Sesame oil is using to make carbon paper, and when burning sesame oil, soot is forming, which is using to make high-quality ink.

Mustard, or *Sinapis* (*Sinapis*) - a genus of oil plants of the Cabbage family (Brassicaceae) and *Crambe* - Abyssinian mustard, tar, Adesis cabbage (*Crambe*), a genus of plants of the Cruciferous family. Mustard oil is obtaining from them from mustard seeds by squeezing or extraction. Seeds - small, brown, obtained from long pods of the plant. The oil content in it is 35%. The oil is sweet and fragrant, despite the fact that mustard is hot and bitter [18, 19].

In Ukraine, there are six species of small-fruited red (*Camelina microcarpa* Andrzej.), Wild (*Camelina silvestris* Wallr.), Hairy (*Camelina pilosa* DC. Zing.), Naked (*Camelina glabrata* DC. Fritsch), flax (*Camelina linicola* Schim. Et Spenn. ) [4].

Of these, the most common in the culture of the so-called red sowing spring (*Camelina glabrata*), rarely red winter (*Camelina pilosia*). Red seeds contain 25 - 46% of oil, which is using in technology (for lubrication of various parts), making drying oils, varnish, for soap making, rarely - food [15].

In recent decades, the issue of biodiesel production - an environmentally friendly type of biofuel - is relevant in the world. Moreover, here we needed rapeseed oil, which is a good alternative to automotive fuel.

In animal husbandry, by-products from the processing of seeds of most oilseeds (cake and meal) are used. They are a valuable concentrated animal feed that contains 35-40% protein. Oil of oilseeds is rich in arginine (twice as much as corn or bee grain. From the cake of Sarepta mustard, produce mustard powder, which is using to make table mustard and mustard.

Of course, oilseeds are not grow only for nutritious fruits and seeds. Among them are beautiful honey plants (railings, mustard). Many oilseeds are of great agronomic importance and are good precursors for subsequent crops of colza, mustard, etc. [20].

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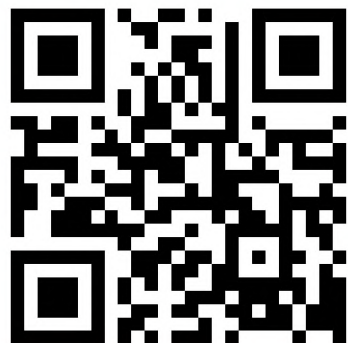
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