



what you should know about

OILSEED CROPS

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WHAT YOU SHOULD KNOW ABOUT OILSEED CROPS

Oilseed crops are cultivated plants grown mainly for the high oil content of the seed.

Man has grown and used oilseed crops as a source of food for thousands of years. Records found in China, dating as far back as 2207 B.C., gave advice on soil preference, planting time, varieties and the purpose and uses of an important oilseed crop grown today. Through the years, the cultivation of oilseed crops has spread to many parts of the world and many new uses and farming practices have developed as a result.

PRODUCTION AND USES OF OILSEED CROPS

Seeds that yield a high percentage of edible oil are: soybean, rapeseed, peanut, corn, cottonseed, sunflower, safflower, olive, mustard, palm and cocoanut. The vegetable oil obtained from these seeds is an excellent source of food energy which is required for human health and vitality.

To obtain the oil from seeds, they must first be crushed, under great pressure, to separate crude vegetable oil from the pulp or meal. The oil obtained is then refined, or distilled, to produce a clear, almost colorless oil free from impurities or undesirable tastes. The final product is an edible vegetable oil that can be used for salads, cooking and the manufacture of foods such as margarine or shortening. The protein-rich meal, which is a secondary product, is a valuable source of nutrients for livestock feeds.

Today, a Canadian family of four uses about 60 pounds a year of vegetable oil, whereas, 100 years ago, butter, lard and other animal products were the main sources of fats and oils.

Seeds from flax, tung, cashew and castor plants also yield vegetable oils but these are not edible. They are used mainly as lubricants and for manufacturing paints, inks and other products.

CANADIAN PRODUCTION OF OILSEED CROPS

The following table shows the oil and meal contents, and the acreages planted, of Canada's main oilseed crops. Crambe and false flax (*Camelina sativa*) have been grown on a limited scale; the first for its erucic acid content and the second as a source of drying oil in paints.

Crop	Acres planted in 1972	Percentage oil content	Percentage meal content
Rapeseed	3,270,000	40	58
Soybean	405,000	18	79
Flax	1,321,000	38	60
Sunflower	217,000	40	33
Mustard*	180,000		

*Mustard has not been considered a source of oil and protein meal in North America and for this reason only the acreage planted is shown.

RAPESEED

Rapeseed was first grown commercially in Canada in 1942 because its oil could be used to lubricate ships' engines. After the war, rapeseed production declined rapidly until new uses were developed by industry. Canadian rapeseed is now a major item in the world trade in edible oils. Exports have averaged over 300,500 tons a year since 1965, more than the total exports of rapeseed from all other countries, and the average annual production is 650,000 tons. Although home consumption of rapeseed oil and meal has increased to 33 percent of production, the markets of Asia, Europe and Africa will continue to be the chief outlets. It is now the fourth most important annual crop in Canada, behind wheat, barley and oats.

Rape is a cool-season crop. It is not as drought-tolerant as the cereals and is best adapted to the northern districts of the Prairie Provinces, where it can yield up to 2,500 pounds of seed per acre under favorable conditions. A considerable acreage is grown outside the area of adaptation and on cereal stubble. Rape does well on light and heavy soils if rainfall and fertility are adequate; it gives cash returns equal to wheat and the early-maturing varieties allow extension of the busy seeding and harvest seasons.

Most of the rapeseed oil produced today is used for edible products, there has been a rapid increase in domestic consumption, about 300 percent over the period 1965-70, and further expansion is forecast. There are also industrial uses for rapeseed oil, although at present they do not represent a major outlet. The oil is an excellent lubricant for steam engines and certain delicate mechanisms. It is also used, together with tallow, as a lubricant for cold-rolling steel and in the manufacture of soft soap used in sizing cloth. Some of the oil fractions are used in the lubrication of jet engines and in the manufacture of plastic sheeting.

As marketed, rapeseed meal contains about 37 percent protein and 60 to 70 percent total digestible nutrients. The most important use of the meal is as a high



RAPSEED IS CANADA'S MOST IMPORTANT OILSEED CROP.



SEEDS MAKE UP 41-57 PERCENT OF THE ABOVE-GROUND WEIGHT OF SOYBEAN PLANTS.

protein feedstuff; however, in Japan the meal is mostly used as a high nitrogen fertilizer for citrus crops and tobacco. Low quality meals are also used as general purpose fertilizers in Europe and India.

SOYBEAN

Soybeans were introduced into Canada in 1893, but commercial production did not start here until the oil shortage occurred during World War II. Acreage of soybean in Canada increased until the mid-sixties; since then it has remained more or less constant. The growing season for soybean is long, so that it is only grown in the warm southern part of Ontario. Canada only grows about 30 percent of its soybean requirements, and imports the rest from the United States.

Methods of refining have been developed that make soybean oil very good for edible products, such as salad oils and margarine. Crude soybean oil contains from 1 to 3 percent lecithin, an antioxidant, emulsifier and softener used in food manufacturing industries. Although a large proportion of the oil is used in food some of it is used industrially, in the production of high-grade enamels, varnishes, resins, paints, inks, linoleum, pharmaceuticals, cosmetics and synthetic rubber.



MATURE FLAX BEING HARVESTED. EACH SEED CAPSULE CONTAINS UP TO 10 SEEDS.

Soybean meal has almost 10 percent more protein than linseed meal and 5 percent more protein than rapeseed meal. Over 90 percent of the Canadian soybean meal is fed to animals or exported for animal feed. Nutritionally, the protein of the soybean is similar to that of animal protein, even the amino acid analysis of soybean protein and casein are remarkably similar. Ground raw soybeans can be an economical source of protein for Ontario's large cattle population. The protein in soybean is readily soluble in water and when properly processed is also similar to casein in viscosity, adhesive strength and other characteristics. Soybean protein is used in many industrial applications such as adhesives, paper coatings, water-thinned paints, plastics, textile fibers, fire foam stabilizers and stickers for agricultural sprays. In the plywood industry, soybean glues represent the largest tonnage of any type of adhesive used. Industrial research is rapidly widening the industrial uses of the soybean and its products.

FLAX

Flax, the oldest oilcrop in Canada, is grown mainly for its seed in the Prairie Provinces. Little flax is grown here for fiber, and suitable varieties differ from those grown for seed. Flax is especially useful as a crop in rotation with wheat and other small grains, and production costs are much the same as for these other grains.

Linseed oil – the oil from flaxseed – is used in protective coatings such as paint, because it dries to a durable finish. Ability to dry quickly is a characteristic influenced by the growth environment of the seed. When grown in a cool northern area flaxseed is of better quality than when grown in a warmer area and Canadian flaxseed, therefore, is higher in quality than any other on the world market. Our export trade in flaxseed has been well sustained in recent years.

Most of the oil produced from raw linseed oil is used in industry, for paints and varnishes, including new emulsion paints that dry quickly into a tough film. It is also used in linoleum, oilcloth, printers' ink, soaps, putty, and patent and imitation leathers.

The unique feature of linseed meal, and the characteristic that has made it popular with livestock feeders, is its ability to act in a gentle regulating way upon the digestive system. The whole seed is rarely fed to livestock. Commercial preparations containing a high proportion of flax have been used in supplements to skim milk for calves.

MUSTARD SEED

Mustard production in Western Canada began in 1936 with a planting of about 100 acres in southern Alberta. It is now grown in the three Prairie Provinces.

Mustards are more drought-tolerant than rapeseed. This has made it possible to grow mustard in areas that are usually too dry for rapeseed production. Mustard tends to be of better quality when grown under the drier conditions of southern Alberta and Saskatchewan. However, the increasing demand for mustard sometimes brings the mustard and rapeseed growing areas into conflict. Practices that prevent mixing of mustard and rapeseed are beneficial to both crops.

Three kinds of mustard – yellow, oriental and brown – are grown in Canada. Yellow mustard is sown on 50 percent of the acreage, and the whole seed is exported to the USA for manufacturing prepared mustard and as a meat extender.

Most of Canada's total mustard production is exported as whole seed to countries such as the United States, Japan, Britain and West Germany.

SUNFLOWER

There are three types of sunflower. One produces large, thick-hulled, chewy seeds, which are used in the confectionary trade or in gourmet foods. Another produces medium-sized seeds with attractive black and white stripes, used in feeds for pet birds and animals. The third produces small, thin-hulled seeds with a high oil content.

The sunflower crop is one of the most important annual oilseed crops in the world. Russia with about 10 million acres annually and Argentina with 3 million acres are the largest producers. Sunflowers are grown in the Prairie Provinces. An oil-extraction plant in Manitoba and a crushing plant in Alberta assure growers of a market for their crop.

A sunflower crop seeded in early May is usually ready to harvest in October. In Canada the two most serious diseases of sunflowers are leaf mottle, or



LARGE FIELDS OF SUNFLOWERS CAN BE SEEN IN WESTERN CANADA.

verticillium wilt, and sunflower rust, both caused by fungi. Licensed varieties are available with resistance to these fungi; resistance to other diseases is present in the breeding material at research stations and can be added to commercial varieties if an increase in disease attack occurs.

Sunflower oil is a premium oil with good keeping qualities and is used as salad and cooking oil and in the manufacture of margarine and shortening.

OILSEED TRADE

Canada imports seeds and vegetable oils derived from warm-climate oilseed crops such as soybean, cottonseed and peanut, and exports cool-climate oilseeds and oils, particularly flaxseed and rapeseed. For example, in 1968, 40 million pounds of sunflower oil were imported into this country and 23 million pounds of linseed oil were exported. Canada used to be a net importer of oils, but is now a net exporter, largely owing to the increase in rapeseed production in the West.

GETTING MORE FOOD OUT OF OILSEEDS

As world population increases, techniques are being developed to make more complete use of oilseeds in the food industry. Soybeans, for example, are a good source of protein. Yet, at present, only 2 to 3 percent of North America's soybean crop is used for human consumption; the rest is fed to livestock, used in industry or disposed of as waste.

Cereal proteins are low in lysine content and the addition of 5 percent soybean protein to wheat flour makes a remarkable improvement in nutritive value.

Soybean flour is one of the cheapest foods available to man when judged by the amount of protein, minerals, vitamins and energy obtainable per unit of cost. Attempts are being made to make soybean 'steaks' that would be acceptable substitutes for meat. Large quantities of oilseed flour are used in making ice creams, whipped toppings, macaroni and noodles, low-starch health foods and coffee whiteners. Oilseeds are an important weapon in Man's fight against world hunger.



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CONVERSION FACTORS FOR METRIC SYSTEM

Imperial units	Approximate conversion factor	Results in:
LINEAR		
inch	x 25	millimetre (mm)
foot	x 30	centimetre (cm)
yard	x 0.9	metre (m)
mile	x 1.6	kilometre (km)
AREA		
square inch	x 6.5	square centimetre (cm ²)
square foot	x 0.09	square metre (m ²)
acre	x 0.40	hectare (ha)
VOLUME		
cubic inch	x 16	cubic centimetre (cm ³)
cubic foot	x 28	cubic decimetre (dm ³)
cubic yard	x 0.8	cubic metre (m ³)
fluid ounce	x 28	millilitre (mℓ)
pint	x 0.57	litre (ℓ)
quart	x 1.1	litre (ℓ)
gallon	x 4.5	litre (ℓ)
bushel	x 0.36	hectolitre (hℓ)
WEIGHT		
ounce	x 28	gram (g)
pound	x 0.45	kilogram (kg)
short ton (2000 lb)	x 0.9	tonne (t)
TEMPERATURE		
degree fahrenheit	°F-32 x 0.56 (or °F-32 x 5/9)	degree Celsius (°C)
PRESSURE		
pounds per square inch	x 6.9	kilopascal (kPa)
POWER		
horsepower	x 746	watt (W)
	x 0.75	kilowatt (kW)
SPEED		
feet per second	x 0.30	metres per second (m/s)
miles per hour	x 1.6	kilometres per hour (km/h)
AGRICULTURE		
bushels per acre	x 0.90	hectolitres per hectare (hℓ/ha)
gallons per acre	x 11.23	litres per hectare (ℓ/ha)
quarts per acre	x 2.8	litres per hectare (ℓ/ha)
pints per acre	x 1.4	litres per hectare (ℓ/ha)
fluid ounces per acre	x 70	millilitres per hectare (mℓ/ha)
tons per acre	x 2.24	tonnes per hectare (t/ha)
pounds per acre	x 1.12	kilograms per hectare (kg/ha)
ounces per acre	x 70	grams per hectare (g/ha)
plants per acre	x 2.47	plants per hectare (plants/ha)

Examples: 2 miles x 1.6 = 3.2 km; 15 bu/ac x 0.90 = 13.5 hℓ/ha

