

**‘Ban on blending of mustard oil will benefit farmers, lead to more production of healthier alternative’**

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by **Anju Agnihotri Chaba** | Chandigarh |

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After the outbreak of dropsy (due to adulteration of mustard oil) in the late 1990s, the government pushed for blending mustard oil with other edible oils. (Representational Image)

THE FOOD Safety Standards Authority of India (FSSAI) has banned blending of mustard oil with any other oil. Blending of edible oils was first permitted by the Indian government in the 1990s. After the outbreak of dropsy (due to adulteration of mustard oil) in the late 1990s, the government pushed for blending mustard oil with other edible oils.

Experts see the FSSAI’s decision as a big opportunity for mustard growers in India and replacing traditional rapeseed-mustard oil varieties with Canola rapeseed-mustard to provide a healthy oil for human consumption and decrease India’s dependence on oil import.

VIRENDER SARDANA, principal agronomist and in-charge, oilseeds section, department of plant breeding and genetics, Punjab Agriculture University (PAU), Ludhiana, speaks to ANJU

AGNIHOTRI CHABA on what makes canola rapeseed-mustard oil the healthiest oil for human consumption.

### **What are the benefits of vegetable oils?**

Daily intake of a certain minimum amount of fats is necessary for physical and mental well-being. The nutritional guidelines of Food and Agricultural Organization (FAO), World Health Organization (WHO) suggest consumption of 30g of visible (vegetable oil or animal fat) and invisible (obtained from cereals, millets, pulses, vegetables etc.) fat per person per day.

One gram of vegetable oils provides 9 kcal (kilocalories) energy compared to 4 kcal energy obtained from one gram of cereals or legumes.

These fats are also carriers of fat soluble vitamins such as A, D, E and K to various parts of the body. These vegetable oils are also primary sources of antioxidants (tocopherols) and phytosterol and suppliers of several minerals such as calcium, magnesium, potassium.

Soybean, rapeseed-mustard, groundnut, sunflower, sesame/til, safflower and niger crops are the primary sources of edible oils. Oil extracted from rice bran, corn or maize, cottonseed and from several tree borne oilseed (TBO) crops such as coconut, palm and olive is also used for edible purposes, directly or after blending with traditional edible oils.

### **What are the quality parameters of edible oils?**

Quality of any oil is determined by its fatty acid composition, which differs from oil to oil. There are three types of fatty acids in any oil including saturated fatty acids (SFAs), mono-unsaturated fatty acids (MUFAs) and polyunsaturated fatty acids (PUFAs).

The PUFAs are also known as essential fatty acids. The proportion of SFAs in plant-derived oils is generally low, except in coconut oil and palm oil. Higher consumption of SFAs is known to increase low density lipoprotein (LDL), bad cholesterol, which is associated with increased risk of cardiovascular diseases.

WHO recommends that the total consumption of saturated fats should be less than 10 per cent of total energy intake. The MUFA acts as a cholesterol scavenger and generates high density lipoprotein (HDL/good cholesterol). The PUFAs are known to reduce blood cholesterol, especially the harmful LDL and elevate HDL, which plays a role in transporting excess blood cholesterol back to the liver for degradation and excretion.

Vegetable oils are the main source of PUFAs such as omega 6 and omega 3. However, an oil rich in PUFAs is unstable at very high temperature and gets converted into trans fats and therefore is not recommended for cooking or frying. The intake of trans-fats should not be

more than 1 per cent of total energy intake. Generally speaking, however, good quality oil should be taken in moderation only.

### **What is the ideal edible oil?**

An ideal cooking oil is one that contains healthy fats and nutrients, and does not break down on heating.

Which oil meets this quality?

Among various sources of vegetable oils, rapeseed-mustard oil is used mainly for cooking and frying as it meets most of the characteristics sought in dietary fats and oils. It has a high smoke point (240-250 degrees celcius), is low in saturated fatty acids (less than 10 per cent) and contains a relatively balanced proportion of essential fatty acids such as omega 6 and omega 3.

This is in contrast to very high levels of saturated fatty acids in coconut (91 per cent), palm (51 per cent) oils, groundnut, soybean, corn and cottonseed oils (15 per cent). Rapeseed-mustard oil contains about 20-35 per cent PUFAs which are higher than those present in olive, coconut, palm or corn oils (usually 10 per cent or less). Sesame, niger, soybean, sunflower, safflower, corn and cottonseed oils contain 45-70 per cent PUFA. Rapeseed-mustard oil has a better ratio of Omega 3 to Omega 6 (1:2) as compared to soybean oil (1:8). A balanced proportion of omega 6 to Omega 3 is effective in reducing the risk of heart diseases. Rapeseed-mustard oil is also a rich source of plant sterols and vitamin E, which protects the body from cardiovascular diseases and contains higher levels of plant sterols and Vitamin E than soybean, and corn oil. It contains higher plant sterols than sunflowers, which are rich sources of Vitamin E.

Meanwhile, rapeseed-mustard is a group of crops which includes Indian mustard/raya/laha, Indian rapeseed/toria, yellow sarson, brown sarson, oilseed rape/gobhisarson and Ethiopian mustard/African sarson and taramira which are used as edible oil. Black mustard/Banarasi rai (mainly used as condiment in preparation of pickles etc.) and cauliflower/cabbage/broccoli are also members of the rapeseed-mustard family.

### **Is rapeseed-mustard oil the best for consumption then?**

Not really, because rapeseed-mustard oil derived from conventional (traditional) varieties contains a high proportion (40-50 per cent) of erucic fatty acid (monounsaturated fatty acids) and low proportion of omega 9. Regular consumption of oil with more than 20 per cent erucic acid in the diet can cause thickening of arteries, which may lead to diseases like myocardial fibrosis in adults and lipidosis in children.

### **Can erucic acid be reduced from rapeseed-mustard oil?**

Need to lower harmful erucic acid in oil has led to the development of low erucic acid varieties in rapeseed-mustard crops. Rapeseed-mustard varieties with 'low erucic' (less than 2 per cent) or 'zero erucic' have been termed as 'canola' varieties.

The term 'canola', which literally means 'Canadian oil, low acid' was coined in Canada by the Western Canadian Oilseeds Crushers Association, where the first such variety was developed.

Decrease in erucic acid in canola oil is also associated with corresponding increase in nutritionally desirable MUFA. Canola rapeseed-mustard oil contains higher levels (upto 67 per cent) of Omega 9 than conventional rapeseed-mustard.

Other commonly used edible oils as olive oil contain (about 70-75 per cent) Omega 9, groundnut (50 per cent), rice bran, corn, cottonseed, palm, safflower, soybean, sesame and sunflower (less than 50 per cent), coconut oil (8 per cent). Canola oil makes it even better than olive oil which although contains highest proportion of omega 9 but also has higher amounts of SFAs (15 per cent) and much lower Omega-6 (8-10 per cent) and negligible amount of Omega -3 (1-3 per cent) as compared to canola oil which contains 7-8 per cent, 18-22, 8-12, respectively.

Oils from groundnut, soybean, corn, sunflower, sesame, niger and safflower contain higher proportion (32-75 per cent) of omega 6, but higher proportion of PUFA makes the oil unstable at higher temperatures and potentially more prone to the production of trans-fats. Going by all these comparable qualities with other oils, Canola rapeseed-mustard oil is now a preferred cooking oil and is the most soughtafter across the world. Nutrition studies have shown that the unique fatty acid profile of canola helps mitigate factors associated with coronary heart disease including high blood cholesterol and thrombosis.

In advanced countries including the USA, Canada, Europe, Japan, Australia, New Zealand etc., rapeseed-mustard conforming to canola norms can only be used as edible oil and oil from non-canola varieties is used for energy production (biofuel) or industrial purposes. They do not allow consumption of rapeseed-mustard oil with more than 2 per cent erucic acid.

Canola quality rapeseed-mustard cultivars make the meal much safer for dairy animals and poultry where it is used as a preferred source of protein.

### **What is the status of canola cultivation in India?**

Canola varieties are being grown in various parts of the country. In Punjab, farmers are by and large cultivating only canola quality rapeseed-mustard (mainly gobhisarson). Canola varieties are also being grown in Himachal Pradesh, Jammu and Rajasthan. But traditional varieties are also grown in large areas.

PAU has developed and released three varieties — GSC 5 (2004), GSC 6 (2007) and GSC 7 (2014) and one hybrid PGSH 1707 (2020) — of canola quality (double low) gobhisarson for commercial cultivation. PAU also released a canola variety RLC 3 (2015) and a hybrid RCH 1 (2019) of canola raya. Besides these, one hybrid of canola gobhisarson developed by a private sector company has also been recommended for cultivation in the state.

The ICAR – Indian Agricultural Research Institute (IARI), New Delhi, has also developed one canola quality variety PDZ 1 of raya (2015).

In the past PAU and ICAR IARI have also developed a number of low erucic acid varieties of raya namely RLC 1 and RLC 2 (by PAU) and PusaKrishma, Pusa Mustard 21, Pusa Mustard 22, Pusa Mustard 24, Pusa Mustard 28, Pusa Mustard 29, Pusa Mustard 30 and Pusa Mustard 32 (by ICAR IARI). Cultivation of these varieties is becoming popular in different mustard growing areas of the country.