

## Technological Properties of Rapeseed Oil

Jan GUNNERDAL

Karlshamns AB, S-374 82 Karlshamn, Sweden

Rapeseed oil (low erucic acid) is growing fast in the world trade of liquid vegetable oils. Soybean oil is by far the largest oil in the commodity trade and will therefore be used as a reference.

Vegetable oils are used in many food systems. For some the properties of the oil/fat has a major influence on the functional properties.

Examples:

- Chocolate: \* Solidification \* Gloss \* Hardness \* Melting \* Shelf life
- Cooking oils: \* Stability against rancidity \* Appearance
- Potatoe chips: \* Heat transfer \* Stability against rancidity \* Appearance
- Baked products: \* Lubricant \* Flavour \* Volume \* Prevent interfirience  
between protein/carbohydrate

The technological properties of rapeseed oil and soyabean oil will be discussed for

A: LIQUID OIL (refined)

B: SOLID FAT (refined and hydrogenated)

### LIQUID OILS

	<u>Soyabean</u>	<u>Rapeseed</u>
Cloud point	-7°C	-16°C
Rancimat (110°C)	7 h	6 h
Flavour (fresh)	Bland-"Nut"	Bland-"Green"

Liquid rapeseed oil has very similar functional properties to soyabean oil. The appearance at different temperatures is the same and the stability against oxidation is the same. The flavour profile is somewhat different (also depending on processing and harvesting conditions).

Conclusion: Liquid rapeseed oil can from a technical point of view replace soya-bean oil in all major applications.

## SOLID FATS

For many food applications the fat has to be solid. In order to make rapeseed oil solid it is hydrogenated, sometimes also combined with a fractionation process. The hydrogenation can be adjusted to achieve the desired melting characteristics/melting point. In case a steeper melting curve is wanted the hydrogenation has to be combined with a fractionation process.

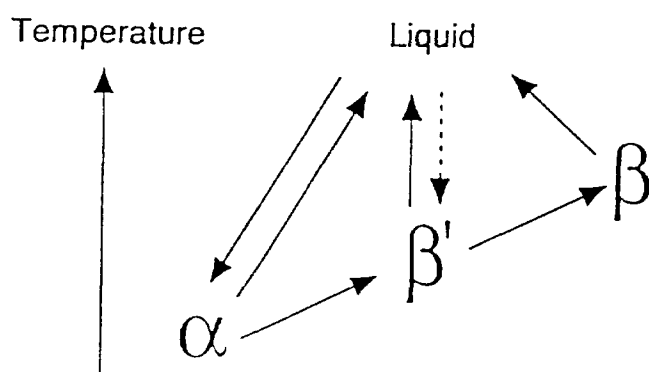
When hydrogenated the polyunsaturated fatty acids transform to less unsaturated. The transition C18:3 → C18:2 is faster than C18:2 → C18:1 which is faster than C18:1 → C18:0. This means that the C18:3 content in practice is zero for hydrogenated rapeseed and soybean oils. This also means that oxidation speed is reduced dramatically.

The trans fatty acid content (% of all unsaturated acids) =

Soyabean/Rapeseed melting point	12°C	~	21%
- " -	34°C	~	42%
- " -	40°C	~	43%

Compared to soyabean oil very similar solid fat content curves can be obtained by using rapeseed oil.

The polymorphic behaviour of hydrogenated fats can in general terms be illustrated as follows :



For hydrogenated rapeseed oil the transition time  $\beta' \rightarrow \beta$  is much faster than for hydrogenated soyabean oil. This creates problems in many applications with fat as the continuous phase or with high fat contents. The recrystallisation gives large crystals which are felt as coarse ("sandiness"). In order to solve this special processing and adjustments of the formulations have to be made when using rapeseed oil.

The semi liquid rapeseed oil is excellent for frying applications. The flavour development compared to semi liquid soyabean oil is more favourable.