HI OLEIC PEANUT SUMMARY

Peanuts are considered both a nutritious and convenient food with known health benefits. Peanuts function as both an ingredient and major component of finished goods in the peanut butter, confectionery and snackfood markets.

Peanut oil chemistry stability after processing can present a limiting factor in targeting specific market sectors due to shelf life and taste / flavour instability.

The quality of edible peanuts is primarily due to the chemical composition of the oil, protein and carbohydrate fractions of the seed.

The improvement in the peanut oil quality influences not only shelf life but the nutritional quality of the manufactured peanut. There are several factors that affect the free fatty acid composition of the peanut oil: variety, seasonal variation, agronomic practices, disease and insect damage, production location and temperature conditions under which the crop is grown. Variety itself is the most consistent and controllable variable.

Peanut oil chemistry is made up of 12 free fatty acids with only 3 of these being present in amounts exceeding 5%: palmitic, oleic and linoleic. These free fatty acids comprise about 90% of the free fatty composition of the oil, with oleic and linoleic comprising about 81% $\pm$ 2%.

A reduction or elimination of the long – chain fatty acids in peanut oils would be a worthwhile objective of peanut breeding programmes since it will also increase polyunsaturated to saturated (P/S) ratio. This could increase the oleic and linoleic acid content and give a healthier peanut.

High oleic peanuts exhibit improved characteristics of oil chemistry compared to normal oleic acid cultivars. High oleic peanuts have a lower iodine value which translates to the increased oil stability and a higher ratio of unsaturated / saturated fatty acids. The main difference between a high oleic and a normal peanut are outlined in the table below:

PEANUT TYPE	OLEIC %	LINOLEIC %	PALMITIC %	TOTAL SATURATED FATTY ACID %	IODINE VALUE
Hi Oleic	79 – 82	3 – 5	9	15.4	74
Normal Peanuts	45 – 55	26 – 36	6	18.4	95

[Reference: Anderson et al, (1998)]

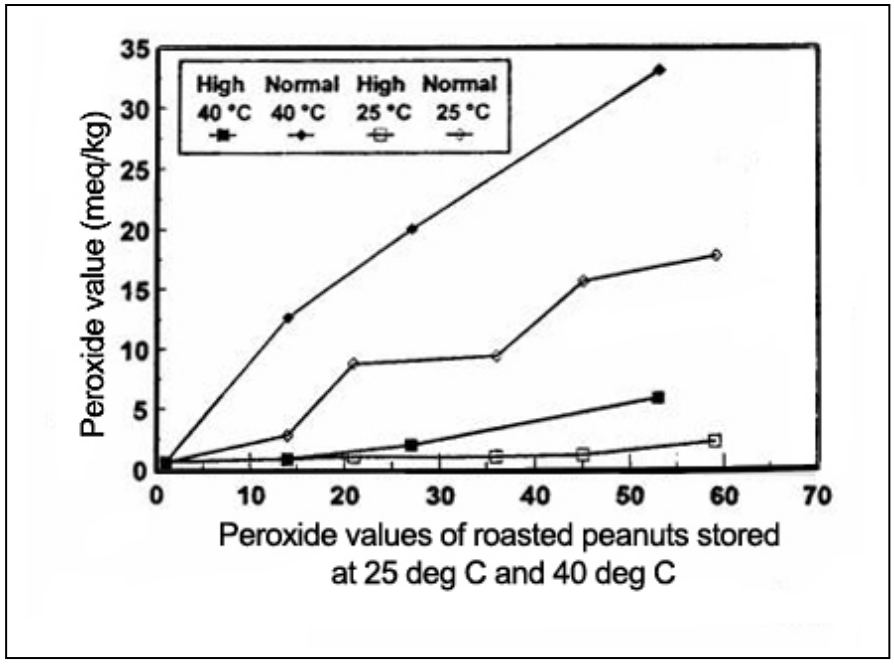
The inheritance of high oleic / low linoleic acid within a variety is achieved by simple genetic control. Moore and Knauft (1989) identified that hi oleic content is controlled by 2 recessive genes ol_1 and ol_2.

In a study completed by O'Keefe (1993) high oleic peanut oil oxidative stability was compared to normal peanut oil. The results clearly indicated superior oxidative stability of the high oleic peanut oil. The increase in oxidative stability is a direct result of the decrease in polyunsaturated fats and saturated fats.

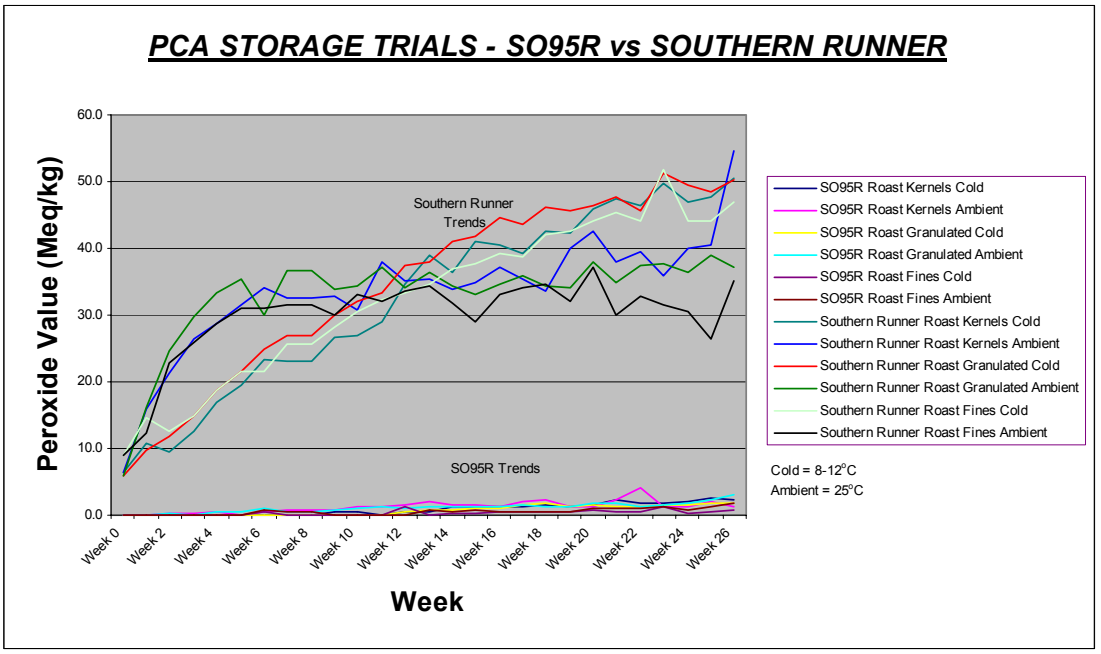
There is strong literature evidence that the oxidized flavours generated during storage are important to overall flavour and aroma of roasted peanuts. The final flavour and aroma quality are strongly influenced by oil stability and oil composition.

By increasing the oleic acid level and thus decreasing both the saturated and polyunsaturated fats, new potential for extended shelf life peanuts exist. PCA shelf life trial results are supported by international trials, such as Knauft et al (1993) and Braddock et al (1995). Braddock et al (1995) research indicated that hi oleic peanuts were shelf stable for 360 days at 25°C and 94 days at 40°C compared with normal peanuts of 32 days at 25°C and 13 days at 40°C.

It was identified that high oleic peanuts also maintained more desirable flavour attributes during storage due to the lower decline in roast flavour and less off-flavour development than normal peanuts. PCA trials of high oleic peanut varieties in the dry roasted form as kernels, granulated and roast fines all indicated a shelf stable product for a minimum of 180 days where the product continued to perform at less than 2meq/kg peroxide value.



[Reference: Braddock et al (1995), P490]



The sensory analysis as completed by Braddock also identified that the high oleic peanuts out-performed the normal peanuts in the following sensory attributes during shelf life trials: roasted peanutty, raw beany, cardboardy, painty, sweet, dark roasted / toasted and crunchiness. Increased shelf life expectancies range between 5 to 15 times greater than current peanut normal varieties.

A number of studies have shown that adding a handful (about 25 grams) of peanuts per day to a healthy diet reduces the risk of cardiovascular disease. Nutritional studies at both the University of Florida has identified that the introduction or inclusion of high oleic peanuts in a low fat diet lowered LDL cholesterol and triglycerides, whilst stabilizing HDL - the good cholesterol.

O'Bryne et al (1997) also identified that low lysine / arginine ratio of peanuts may promote serum cholesterol reduction and other physiological changes which protect against atherosclerosis. Peanuts also contain antioxidants, phytosterols, phytochemicals, such as isoflavanes and saporines which have anti-cancer and antioxidant properties, low levels of resveratrol, important vitamins (B6, B), folic acid, magnesium, copper, zinc and serlemium.

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