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PROCESSING METHOD AND COMPOSITION OF SESAME OIL CAKE –A REVIEW

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Abstract: Sesame is one of the oldest oil seed crops of the world. Its oil is chiefly used for cooking in South India. It is cultivated extensively in India, China, Burma and also in other parts of Asia, Africa and Latin America. The sesame seed contains about 50% oil and 20-25% protein (Vaughan, 1970). Normally the oil is used for edible purposes and also been utilized in soap, insecticide, paint and perfume manufacturing. The residue sesame seed cake has been used as an excellent protein supplement for dairy cattle. Its usage as a protein supplement for poultry has been very limited. The literatures on the availability and nutrient composition is reviewed in this article.

BOTANICAL CLASSIFICATION

Member of order	:	Tubiflorae
Family	:	Pedaliaceae
Genus	:	*Sesamum*
Species	:	*Sesamum indicum* L.
		Sesamum orientale L.

COMMON NAMES

1. Tamil and Malayalam	:	Ellu.
2. Telugu	:	Nuvvulu.
3. Gujarati	:	Tal.
4. Oriya	:	Rasi.
5. Other names	:	Sesame, Sesamum, Gingelly, Sim-Sim, Til.

SESAME SEEDS

The seeds are small in size. The weight of 1,000 seeds ranges from 2.0-3.5 g and vary in colour from white (Secunderabad), white small (Allahabad), yellow (Saurashtra), red (Jabalpur), brown to black. Dark coloured sesame seed meals are less palatable than lighter ones (Ravindran, 1990).

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Harvesting of Sesame Plants and Separation of Sesame Seeds

The crop is harvested when the leaves, stems and capsules begin to turn yellow and the lower leaves starts shedding. To prevent the shedding of grains, the crop is not allowed to become dead ripe in the field. The ripe plants are cut, carried to the threshing-yard, stacked for a week in the sun with the cut-ends downwards and well shaken or beaten to take out the grains from the dry capsules. Winnowing and cleaning complete the process (Lokeshwar, 1997).

Processing of Sesame Seeds for Extraction of Oil

The nutrient composition of sesame meal varies widely depending on the variety used, the degree of decortication and the processing method employed (Lease and Williams, 1967; Johnson *et al*., 1979). The hulls are separated from the kernel in decorticating machines or by soaking and rubbing the seed (Ravindran, 1990). Removal of the hull results in a reduction in fibre content of approximately 50% and increases the protein content, digestibility and palatability of the meal (Ravindran, 1990). The hull of the sesame seed accounts for 15 to 29 per cent of the whole seed (Robert Swick, 2001). Occasionally, the seed is milled without decortication to improve the efficiency of oil extraction (Ravindran, 1990). The decorticated or undecorticated sesame seeds are processed for extraction of oil by ghani, rotary, expeller or solvent extraction methods.

Effect of method of processing of sesame oil cake on nutrient quality

Various methods of processing of sesame oil cake has been found to affect the nutrient quality. Caldwell (1958) reported that overheating (> 115.6°C) sesame meal may result in a reaction of the amino acids lysine, arginine, and tryptophan with free carbohydrates which produce compounds that are not readily absorbed in the digestive tract. Villegas *et al*. (1968) had shown that commercial sesame meal obtained by means of continuous screw-press processing at high pressure and temperature had a 13% reduction in nitrogen solubility (in 0.02 N sodium hydroxide) and 5% lower protein digestibility which they attributed to the dry heat effect on the seed during processing. They also found that lysine availability in all cases was less than 50% of the literature value for total composition (2.22% of the protein content, N.R.C. 1994), and that methionine availability was increased (15 to 22%) by heat treatment. They concluded that the commercial process for the extraction of sesame oil was responsible for the 40% reduction in lysine availability.

Hurrel (1990) reported that the oil extraction processing of sesame meal generates heat that induces carbohydrate – amino acid reactions, the Maillard browning reaction, resulting in the formation of linkages that are resistant to hydrolysis by digestive enzymes. During the

reaction process amino acids may become firmly bound and are not recovered by acid hydrolysis of the protein which may reduce digestibility and subsequent availability of amino acids.

Yen (1990) reported that the roasting process prior to oil extraction is a key step for commercial sesame oil production, as the colour, composition and quality of sesame oil depend upon the conditions of the roasting process. A higher roasting temperature can impart a stronger flavour to the sesame oil but the quality of the oil and meal is reduced.

Ravindran (1990) observed that the solvent-processed meals contained slightly higher protein (45%) and lower fat (1%) levels than those produced by expeller extraction which correlated with the findings of Mamputu and Buhr (1995), who reported that sesame meal processed by screw-press methods contained higher levels of oil and lower levels of protein than sesame meal processed by solvent-extraction.

Based on the literature the nutrient content of sesame oil cake varied due to different processing methods.

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