

POST-HARVEST PROFILE OF SESAME

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1.0 INTRODUCTION

Sesame (*Sesamum indicum* L.), commonly known as **Til or Gingely or Sim sim** is the oldest oil crop cultivated in the world. It has been believed that Sesame probably originated in Africa. Sesame was introduced into India by the earliest human migrants from Africa. Charred remains of sesame at Harappa excavations (c.3600-1750 B.C) indicate that sesame was in cultivation during the Indus Valley civilization. It is rich source of food, nutrition, edible oil, health care and bio-medicine. Gujarat, West Bengal, Rajasthan, Tamil Nadu, Andhra Pradesh, Madhya Pradesh and Maharashtra are major growing states in the country.



1.1 ORIGIN

It has been observed that Sesame is cultivated in India since ancient times. It is **one of the earliest domesticated plants**. India ranks **first** in the area and production of sesame seeds in the world. De Candolle (1886) and several other investigators were of the view that sesame originated in South-Western Africa, where all the wild and cultivated species of the genus *sesamum* are found to occur. It is assumed that it might have come into India through Malayan and Indonesian regions probably before the Aryans came into this country.



Through the ages, the seeds have been a source of food and oil. Sesame seed oil is still the main source of fat used in cooking in the near and far east. Sesame oil has many medicinal values as it is good for respiratory disorders, eye-infections and digestive ailments.

Table No. 1: Nutritional value of Sesame seed (edible portion per 100 g.)

Food	Energy calorie	Protein g	Fat g	Calcium mg	Iron mg	Thiamin mg	Riboflavin mg	Niacin mg	Vit. C mg	Vit. A mcg
1. Sesame seed (Til)	563	18.3	43	1450	10.5	1.01	0.34	4.4	0	60

Source: Nutritive value of Indian foods, by Gopalan, C., et al, Indian Council of Medical Research Publication, 1971, PP. 60-114.

Botanical description:

Sesame (***Sesamum indicum* L.**) is a short duration crop grown throughout the year which belongs to the **family Pedaliaceae**. The *sesamum* plant produces a much branched, bushy type of root system. The stem is erect and may vary in height from 1.5 to 2 meters. The seeds of the plant yield an edible and bulk of seed production is utilized for the extraction of oil. Two distinct types of seed are recognized, the white and black. There is also an intermediate coloured varieties varying from red to rose or from brown or grey. The lighter coloured varieties yield more oil than the dark coloured one. The oil obtained from the lighter coloured seed is cleaned and therefore, considered superior. Commercial sesame oil varies in colour from light to deep reddish yellow depending on the colour of the seed processed and the method of milling.

Crop	: Sesame	Class	: Dicotyledonae
Genus	: Sesamum	Sub class	: Gamopetalae
Species	: Indicum	Series	: Bicarpellatae
Division	: Phanerogams	Order	: Persoriales

Source: Taxonomy, Genetics and Breeding of Oilseed Crops, TNAU, Coimbatore, pp-56.

India produces a wide range of sesame varieties with different grades each peculiar to the region. Sesame is harvested twice a year and is available around the year. The sesame has been classified in different colour as below :

- ☛ **White seed**
- ☛ **Yellow seed**
- ☛ **Red seed**
- ☛ **Brown seed**
- ☛ **Black seed**

Sesame or Gingelli (*Sesamum indicum* L.) is commonly known as *Til* (Hindi), *Tili* (Punjabi), *Tal* (Gujarati), *Nuvvulu* (Telugu), *Ellu* (Tamil) and *Rasi* (Oriya) in different parts of India.

1.2 IMPORTANCE

Sesame seed provides excellent food, nutrition, health care, edible oil and biomedicine. It is digestive, rejuvenative, anti-aging and rich source of quality oil. It is rich of vitamins E, A, B complex, Niccin and Minerals like Calcium, Phosphorous, Iron, Copper, Magnesium, Zinc and Potassium. Sesame oil is used in manufacturing of soaps, cosmetics, perfumes, insecticides and pharmaceutical products.

Sesame cake is by-product of the oil milling industry and valued as livestock feed because of its high methane content. It has been observed that the international market of sesame has been increasing in the recent past due to high demand and various uses.

2.0 PRODUCTION

2.1 MAJOR PRODUCING COUNTRIES IN THE WORLD

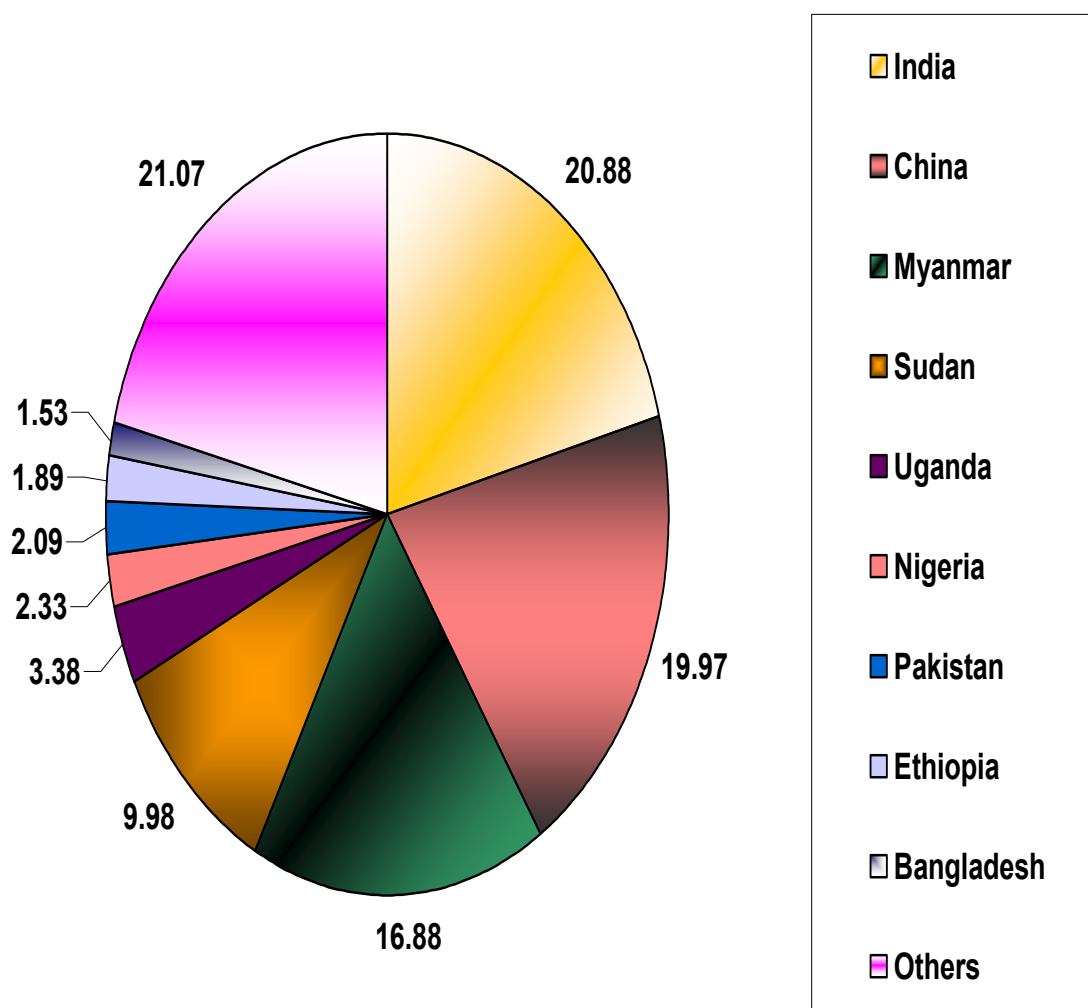
India is the largest producer of Sesame in the world. During 2004, India contributed 27.75 percent of the total area under Sesame seed and 20.88 percent of total world production. Major sesame producing countries were India followed by China (19.97 percent), Myanmar (16.88 percent), Sudan (9.98 percent), Uganda (3.38 percent), Nigeria (2.33 percent), Pakistan (2.09 percent), Ethiopia (1.89 percent) and Bangladesh (1.53 percent) during the same period, with the world's total production of about 3.25 million tonnes. It has been observed that the productivity of Sesame in India was 3676 kg per hectare as compared to the world average of 4887 kg per hectare in the year 2004.

Table No. 2: Area, Production and Average Yield of Sesame during 2002 to 2004

Country	Area (Hectare)				Production (Tonnes)				Yield (Kg/ Ha)		
	2002	2003	2004	% to Area	2002	2003	2004	% to Production	2002	2003	2004
India	1,385,000	2,000,000	1,850,000	27.75	430,900	800,000	680,000	20.88	3,111	4,000	3,676
China	759,476	688,059	651,100	9.77	895,759	593,594	650,620	19.97	11,794	8,627	9,993
Myanmar	1,159,000	1,230,000	1,370,000	20.55	399,284	501,000	550,000	16.88	3,445	4,073	4,015
Sudan	1,174,320	850,000	850,000	12.75	122,000	325,000	325,000	9.98	1,039	3,824	3,824
Uganda	211,000	211,000	211,000	3.17	106,000	110,000	110,000	3.38	5,024	5,213	5,213
Nigeria	166,000	167,000	165,000	2.48	75,000	75,000	76,000	2.33	4,518	4,491	4,606
Pakistan	120,000	135,000	135,000	2.03	61,600	68,000	68,000	2.09	5,133	5,037	5,037
Ethiopia	58,835	57,716	91,527	1.37	38,900	36,272	61,462	1.89	6,612	6,285	6,715
Bangladesh	79,000	79,000	79,000	1.19	49,000	49,000	50,000	1.53	6,203	6,203	6,250
Others	1,120,384	1,186,283	1,263,160	18.95	623,477	651,667	686,366	21.07	-	-	-
World	6,233,015	6,604,058	6,665,787	100.0	2,801,920	3,209,533	3,257,448	100.0	4,495	4,860	4,887

Source: FAO Website: www.fao.org

Percent share of major Sesame producing countries during 2004



2.2 MAJOR PRODUCING STATES IN INDIA

It has been noticed that during the year 2003-2004, Gujarat alone contributed 30 percent of total production followed by West Bengal (17.8 percent), Rajasthan (17.6 percent), Tamil Nadu (7.6 percent), Andhra Pradesh (5.4 percent) and Madhya Pradesh (5.2 percent). In case of area, Gujarat stood first with 22.7 percent followed by Rajasthan (17.6 percent), West Bengal (9.2 percent), Andhra Pradesh (9 percent) and Madhya Pradesh (7.4 percent). However, in productivity, West Bengal ranked first with 876 kg per hectare followed by Gujarat 598 kg per hectare and Rajasthan 453 kg per hectare. Area, production and average yield of major Sesame seed producing states during 2001-2002 to 2003-2004 are as in Table No. 3

Percentage share of Sesame seeds in Major Producing States during 2001-02 to 2003-2004

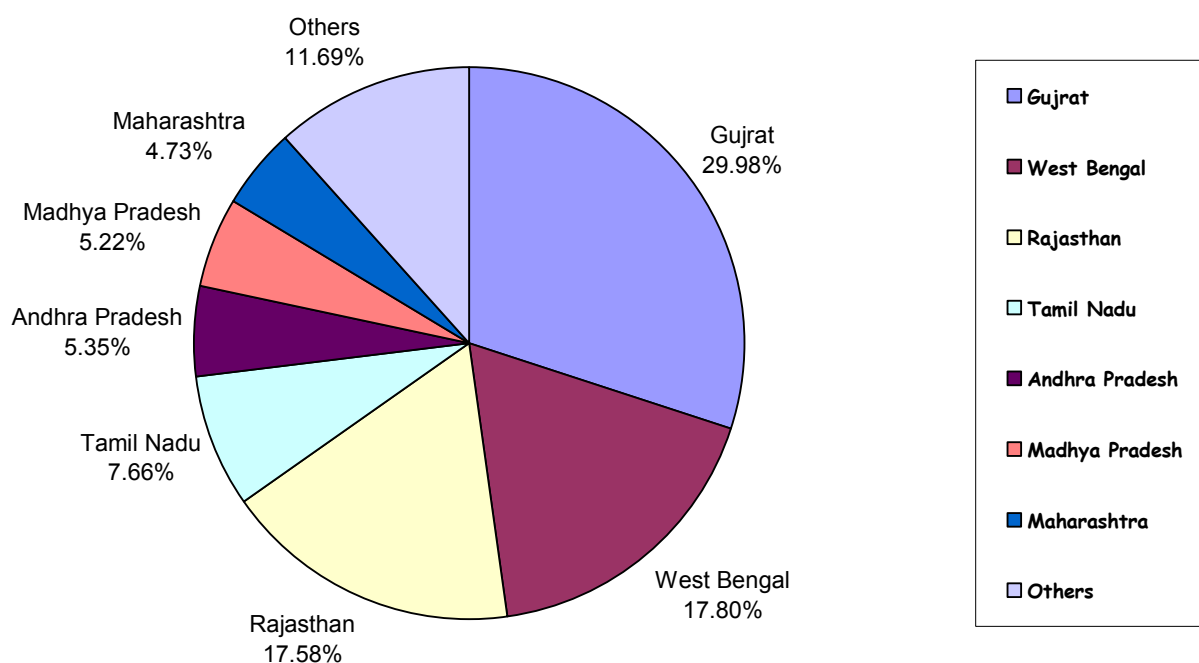


Table No. 3: Area, Production and Yield of Sesame in major producing states from 2001-02 to 2003-2004

Major States	Area (000 Hectares)				Production (000Tonnes)				Yield (Kg/Hectare)		
	2001-2002	2002-2003	2003-2004		2001-2002	2002-2003	2003-2004		2001-2002	2002-2003	2003-2004
				%				%			
1	2	3	4	5	6	7	8	9	10	11	12
Gujrat	379.6	344.1	402.4	22.7	236.6	123.2	240.8	30.0	597	358	598
West Bengal	107.0	110.8	163.3	9.2	90.8	89.5	143.0	17.8	849	807	876
Rajasthan	318.4	190.5	311.8	17.6	103.3	11.4	141.2	17.6	326	60	453
Tamil Nadu	84.0	64.5	118.0	6.7	46.0	28.0	61.5	7.6	548	434	521
Andhra Pradesh	132.3	115.0	161.0	9.0	26.7	18.0	43.0	5.4	202	157	267
Madhya Pradesh	132.2	126.7	131.2	7.4	40.4	29.4	41.9	5.2	306	232	319
Maharashtra	117.0	115.0	123.0	7.0	37.4	38.0	38.0	4.7	317	313	308
Others	600.3	377.8	363.1	20.1	126.6	103.8	93.9	11.7	--	--	--
All India	1870.8	1444.4	1773.8	100.00	707.8	441.3	830.3	100.00	418	206	453

Source: Department of Agriculture and Cooperation, New Delhi.

2.3 STATE- WISE MAJOR COMMERCIAL VARIETIES

I) Varieties recommended for different states

S/No.	State	Variety
1.	Gujarat	Guj-Til-1, Guj-Til-2, Purva-1, GT-10
2.	Madhya Pradesh	JT-7, N-32, TKG-21, TKG-22, TKG-55, JTS-8, RT-54, Uma
3.	Rajasthan	RT-46, RT-54, RT-103, RT-125, RT-127, Pratap
4.	Maharashtra	Phule Til-1, N-8, Tapi, Padma, T-85, AKT-64, AKT-101
5.	Uttar Pradesh	T-4, T-12, T-13, T-78, Sekhar, Pragti
6.	Tamil Nadu	Co-1, TMV-3, TMV-4, TMV-5, TMV-6, TSS-6, VRI-1, Paiyur-1
7.	West Bengal	Tilottoma and Rama
8.	Orissa	Vinayak, Kanaka, Kalika, Uma, Usha, Nirmala, Prachi
9.	Andhra Pradesh	Gouri, Madhavi, Rajeshvari, Varaha (YLM-1), Gautam (YLM-2), Swetha, Chandan
10.	Kerala	Kayamkulam-1, Kayamkulam-2, Soma, Surya, Thilothama, Thilothara
11.	Karnataka	E-8 and DS-1
12.	Punjab	Punjab Til-1, TC-25 and TC-289
13.	Bihar	B-67 and Krishna
14.	Haryana	Haryana Til-1
15.	Himachal Pradesh	Brijeshwari
16.	J & K	RT 46
17.	NEH region	TKG-21 and TKG-22

II) The important varieties for specific situations

S/No.	Salient features	Variety
1.	White bold seeded, export quality	Nirmala, Gujarat Til-2, JTS-8, HT-1, Tapi and Phule Til-1
2.	White seeded multi-capsuled, early	Gujarat Til-1
3.	Black seeded for domestic/ medicinal use	TMV-3, CO-1 and GT-10
4.	High oil content	TKG-21, JT-27, TKG-22, Gautam, E-8, Kayamkulam-1 Thilothama, and TSS-6
5.	Suitable for semi-rabi	N-8, AKT-101
6.	Suitable for summer	TMV-4, Uma, Rama, Gouri, RT-54, TKG-21 and TKG-22
7.	Non-shattering habit	Uma
8.	Resistant to drought	T-78, RT-46, RT-54, RT-125, Swetha and YLM-11
9.	Suitable for heavy soils	Pratap
10.	For lowland and upland rice fallow	Soma, Surya and Thilothama

11. a)	Resistant/tolerant to diseases Macrophomina stem and root rot	RT-46 and Rajeshwari
b)	Alternaria leaf spot	Vinayak
c)	Phytophthora blight	TKG-22
d)	Phyllody and leaf curl	T-78, HT-1 and JTS-8
e)	Bacterial and Cercospora leaf spots	TKG-21
12. a)	Resistant/tolerant to pests Antigastra and gall fly	RT-46, RT-103, TKG-21, Usha
b)	Cyst nematode	G.T.-2 and Uma
c)	Leaf miner and mites	TMV-3

Source: All India Co-ordinated Research Project (Sesame & Niger)- A Profile, Indian Council of Agricultural Research, JNKVV Campus, Jabalpur.

III) Growing seasons in India:

Sesame is cultivated in all seasons namely kharif, pre-rabi, rabi and summer. It is grown in more than one season in some parts and in all the seasons in other parts of the country. It is a short duration crop and fits well in a number of multiple cropping systems either as a catch crop or a sequence crop. The details furnished are as under;

Season	Planting Time	Harvesting Time	Condition	Area (%)	Name of states
1. Rainy (Kharif)	June - July	Oct. - Nov.	Rainfed	70	Madhya Pradesh, Uttar Pradesh, Andhra Pradesh, Rajasthan, Gujarat, Maharashtra, Orissa, Karnataka and Tamil Nadu.
2. Mid-rainy (pre-Rabi)	Aug. - Sept.	Dec. - Jan.	Rainfed	20	Madhya Pradesh, Maharashtra, Gujarat and Andhra Pradesh.
3. Winter (Rabi)	Oct. - Nov.	Feb.- March	Irrigated	Rare	Orissa, West Bengal and Tamil Nadu.
4. Summer (pre-Kharif)	Jan. - March	April - June	Irrigated	10	West Bengal, Bihar, Orissa, Andhra Pradesh, Tamil Nadu and Kerala.

Source: Sesame (Technology for Increasing Production), JNKVV, Jabalpur.

3.0 POST-HARVEST MANAGEMENT

3.1 POST-HARVEST LOSSES

It has been noticed that there is about 5 to 10 percent loss from the time of harvest to cleaning and storing. The losses noticed are mainly contributed to the factor of un-uniform maturity. The capsules in the primary branches mature earlier than the secondary branches and the capsules in the lower portion of the plant, mature earlier than those in the upper portion. This results in poor filling of the seeds in the capsules of the secondary branches and in the upper portion of the plant. The poorly filled seeds have lesser weight and they are lost while winnowing.



Following measures should be taken to avoid post-harvest losses.

- Timely harvest.
- Use of proper method of harvesting.
- Adopt modern mechanical methods of threshing and winnowing.
- Use of improved technique of processing.
- Proper cleaning and grading of produce.
- Use of efficient and good packaging for storage as well as for transportation.
- Use of proper technique in storage.
- Use of pest control measures in storage.
- Proper care in handling (loading and unloading) of packages.



3.2 HARVESTING CARE

Harvest the crop, when leaves and capsules turn yellow and defoliation starts. The capsules at base of plants mature first and then start maturing upwards. Plants should be harvested as and when they are yellowish–brown. After harvest, stock the bundles erect on the threshing floor for five to seven days for drying and then thresh.

Following care should be taken during harvesting.

A) When to harvest:

- ✱ Observe the crop, considering the average duration of the crop.
- ✱ Twenty five percent of the leaves from the bottom are shed and the top leaves loose their colour and turn yellow at maturity.
- ✱ The colour of the stem turns yellow.
- ✱ The colour of the capsules turns yellow upto the middle.

- * Harvest before the bottom capsules turn brown.
- * Examine the 10th capsule from the bottom by opening. If the seeds turn black, harvest may be taken up for the black seeded varieties.
- * The capsules will dehisce resulting in yield reduction, if harvest is delayed.

B) Harvest:

- * Timely harvesting ensures optimum quality and consumer acceptance.
- * Harvest the seed crop at its physiological maturity as delayed harvesting may result in shattering of seeds in the field.
- * Pull out the plants from the bottom.
- * Stack in the open, one over the other in circle with the stem pointing out and the top portion pointing inside.
- * Cover the top with straw, so that humidity and temperature increases. Cure like this for three days.
- * Shake the plants. About 75% of the seeds will fall off.
- * Dry the plants in the sun for 2 more days. Shake the plants once again. All the mature seeds will fall off.
- * Winnow the seeds and dry in the sun for 3 days. Stir once in 3 hours to give uniform drying.
- * Tag the bundles properly and keep at proper place.
- * Collect the seeds and store in gunny bags.
- * Take utmost care to clean cloths/bags/containers/equipments used in harvesting, threshing and processing.
- * Avoid harvesting during adverse weather conditions.

3.3 GRADING

Grading and marking of agricultural produce as per accepted quality standard helps farmers, marketing functionaries, processors, traders and consumers in efficient marketing.

Benefits:



- ◆ It enables the farmer to get higher price of the produce.
- ◆ It facilitates competitive marketing.
- ◆ It widens the marketing process as buying and selling can take place between two parties at distant places, by quoting standard grades.
- ◆ It reduces the cost of marketing and minimise storage losses.

- ◆ It facilitates in maintaining quality of the produce.
- ◆ It helps the consumers to get standard quality of produce at reasonable prices.
- ◆ It facilitates the futures trading and thus helps in price stabilization.

3.3.1 Grade specifications

I. AGMARK specifications under Agricultural Produce (Grading & Marking) Act, 1937

i) Grade specifications (quality) of Sesame Seed under Agmark

A) General Characteristics:

The Sesame seeds shall be-

- (a) The seeds obtained from the plant *Sesamum indicum* linn. Sya,
- (b) It belongs to the family Pedaliaceae.
- (c) free from fungus and insect attack, live insects obnoxious smell, rodent contamination, excreta non edible oil seeds, artificial coloration and all other impurities except to the extent specified.

B) Special Characteristics:

Grade designation	Definition of quality					
	Special characteristics					
	Foreign Matter per cent by weight (maximum)	Immature, shriveled and dead seeds, per cent by weight (maximum)	Damaged & Discoloured seeds per cent by weight (maximum)	Total impurities (total of col.2 to 4), per cent by weight (maximum)	Admixture of other varieties/ types per cent by weight (maximum)	Moisture content per cent by weight (maximum)
	1	2	3	4	5	6
Special	0.5	1	Nil	1.5	5.0	5.0
Good	1.0	2.0	1.0	3.0	10.0	6.0
General	2.0	3.0	2.0	5.0	15.0	7.0

C) Definitions:

- (1) Foreign matter : means dust, lumps of earth, dirt, stones, stems, straw or any other impurity and/ or any other edible/non edible seeds.
- (2) Damaged and discolored seeds : are the seeds that are materially or internally damaged or discolored materially affecting the quality :
- (3) Immature shrivelled & dead seeds : are the seeds which are imperfectly developed and or shrunken. Dead seeds are those seeds

which are duds and can be easily crushed by finger.

- (4) Admixture of other types/varieties :means admixture of brown/black and other colored sesame seeds in white and vice versa.

ii) Agmark grade designations and definition of quality for Sesame (Til or Gingelly Oil)

A) General Requirements:

The oil shall have natural characteristic sweet smell and acceptable taste. It shall be clear and free from rancidity, obnoxious odour, added colouring matter and flavouring agents. The oil shall also be free from admixture of any other oil, substances, adulterants, mineral oil, sediments and suspended matter. The oil may contain permitted antioxidant not exceeding in concentration as specified under Prevention of Food Adulteration Rules, 1955.

B) Special Characteristics:

Definition of Quality									
Grade designation	Moisture and insoluble impurities percent by weight (not more than)	Colour on lovibond scale* in 1/4 inch cell expressed as Y ± 5 R (not deeper than)	Specific gravity at 30°C/30°C	Refractive Index at 40°C	Saponification value	Iodine value (Wij's method)	Unsaponifiable matter percent by weight (not more than)	Acid value (not more than)	Bellier's Turbidity Temperature by Ever's acetic acid method (not more than °C)
1	2	3	4	5	6	7	8	9	10
Refined	0.10	2	0.915 to 0.919	1.4646 to 1.4665	188 to 193	105 to 115	1.5	0.5	22
Grade-I	0.25	10	0.915 to 0.919	1.4646 to 1.4665	188 to 193	105 to 115	1.5	4.0	22
Grade-II	0.25	20	0.915 to 0.919	1.4646 to 1.4665	188 to 193	105 to 115	1.5	6.0	22

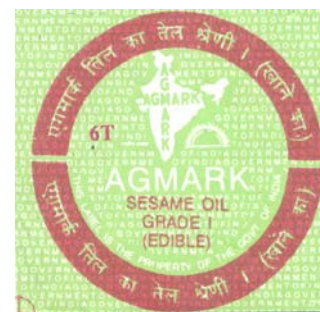
C) Description:

i) Refined

Sesame oil shall be obtained by a process of expression of clean and sound Sesame (Til or gingelly) seeds (Sesamum orientale) belonging to black, brown or white varieties or mixture thereof or by a process of solvent extraction** of good quality of sesame oil cake or sound seeds. The oil shall be refined by neutralisation with alkali and/or-physical refining or by miscella refining using permitted food grade solvents followed by bleaching with adsorbant earth and/or activated carbon and deodourisation with steam. No other chemical agent shall be used.

ii) Grade-I and Grade-II

Sesame oil shall be obtained by a process of expressing clean and sound Sesame (Til or Gingelly) seeds (*Seasum orientale*) belonging to black, brown or white varieties or mixtures thereof.



* In the absence of Lovi-bond Tintometer, the colour shall be matched against standard colour comparators.

** In case of solvent extracted oil, the flash point by Pensky-Martens (closed cup) method shall not be less than 250°C and the container shall be marked "Solvent Extracted"

iii) Agmark grade designations and definition of quality for Sesame (Til or Gingelly) Oil from white seeds grown in eastern parts of the country

A) General Requirements:

The oil shall have natural characteristic sweet smell and acceptable taste. It shall be clear and free from rancidity, obnoxious odour, added colouring matter and flavouring agents. The oil shall also be free from admixture of any other oil, substances, adulterants, mineral oil, sediments and suspended matter. The oil may contain permitted antioxidant not exceeding in concentration as specified under Prevention of Food Adulteration Rules, 1955.

B) Special Characteristics:

Definition of Quality

Grade designation	Moisture and insoluble impurities percent by weight (not more than)	Colour on lovibond scale* in 1/4 inch cell expressed as Y ± 5 R (not deeper than)	Specific gravity at 30°C/30°C	Refractive Index at 40°C	Saponification value	Iodine value (Wij's method)	Unsaponifiable matter percent by weight (not more than)	Acid value (not more than)	Bellier's Turbidity Temperature by Ever's acetic acid method (not more than °C)
1	2	3	4	5	6	7	8	9	10
Refined (E.R.)	0.10	2	0.916 to 0.923	1.4662 to 1.4694	185 to 190	115 to 120	2.5	0.5	22
Grade-I (E.R.)	0.25	10	0.916 to 0.923	1.4662 to 1.4694	185 to 190	115 to 120	2.5	4.0	22
Grade-II (E.R.)	0.25	20	0.916 to 0.923	1.4662 to 1.4694	185 to 190	115 to 120	1.5	6.0	22

C) Description:

i) Refined (E.R)

Sesame oil shall be obtained by a process of expression of clean and sound Sesame (Til or gingelly) seeds (*Sesamum indicum* linn) belonging to the white varieties grown in Tripura, Assam and West-Bengal or by a process of solvent extraction** of good quality of sesame oil cake of the same variety or sound seeds. The oil shall be refined by neutralisation with alkali and/or physical refining or by miscella refining using permitted food grade solvents followed by bleaching with adsorbent earth or activated carbon and deodourisation with steam. No other chemical agent shall be used.

ii) Grade-I (E.R) and Grade-II (E.R)

Sesame oil shall be obtained by a process of expressing clean and sound Sesame (Til or Gingelly) seeds (*Sesamum indicum* linn) belonging to white varieties grown in Tripura, Assam and West-Bengal.

* In the absence of Lovi-bond Tintometer, the colour shall be matched against standard colour comparators.

** In case of solvent extracted oil, the flash point by Pensky-Martens (closed cup) method shall not be less than 250⁰C and the container shall be marked "Solvent Extracted"

II. Grade specifications under the Prevention of Food Adulteration Act, 1954

A) **Grade specifications and definition of quality of Til Oil**

(Gingelly or sesame oil) means the oil expressed from clean and sound seeds of Til (*Sesamum indicum*), black, brown, white, or mixed. It shall be clear, free from rancidity, suspended or other foreign matter, separated water, added colouring or flavouring substances, or mineral oil. It shall conform to the following standards:-

(a) (Butyro-refractometer reading at 40 ⁰ C	58.0 to 61.0
OR	
Refractive Index at 40 ⁰ C	1,4646-1.4665
(b) Saponification value	188 to 193
(c) Iodine value	(103 to 120)
(d) Unsaponifiable matter	Not more than 1.5 per cent
(e) Acid value	Not more than 6.0
(f) Bellier test (Turbidity temperature) -Acetic acid method)	Not more than 22 ⁰ C

(Provided that the oil obtained from white sesame seeds grown in Tripura,

Assam and West Bengal shall conform to the following standards:-

- | | | |
|----|---|----------------------------------|
| a) | (Butyro-refractometer reading at 40 ⁰ C | 60.5 to 65.4 |
| | OR | |
| | Refractive Index at 40 ⁰ C | 1.4662 -1.4694 |
| b) | Saponification value | 185 to 190 |
| c) | Iodine value | 115 to 120 |
| d) | Acid value | Not more than 6.0 |
| e) | Unsaponifiable matter | Not more than 2.5 per cent |
| f) | Bellier test (Turbidity temperature
-- Acetic acid method) | Not more than 22 ⁰ C) |
- (Test for aragemone oil shall be negative.)

B) Grade specifications and definition of Solvent Extracted Sesame Flour

Sesame Flour means the product obtained by pressing, clean, sound healthy and decuticled sesame seeds followed by solvent extraction with food grade hexane or by direct extraction of kernels. It shall be in the form of flour of white or pale creamy white colour, of uniform composition and free from rancid and objectionable odour, extraneous matter, insects, fungus, rodent hair and excreta. It shall be free from added colour and flavour. It shall conform to the following standards, namely:-

- | | | |
|-----|--------------------------------|--|
| (a) | Moisture | Not more than 9.0 per cent by weight |
| (b) | Total ash | Not more than 6.0 per cent by weight on dry basis |
| (c) | Ash insoluble in dilute
HCL | Not more than 0.15 per cent by weight on dry basis |
| (d) | Protein (N x 625) | Not less than 47 per cent by weight on dry basis |
| (e) | Crude fibre | Not more than 6.0 per cent by weight on dry basis |
| (f) | Fat | Not more than 1.5 per cent by weight on dry basis |
| (g) | Total bacterial count | Not more than 50,000 per gm |
| (h) | Coliform bacteria | Not more than 10 per gm |
| (i) | Salmonella bacteria | Nil in 25 gm |
| (j) | Oxalic Acid content | Not more than 0.5 per cent by weight on dry basis |
| (k) | Hexane (Food grade) | Not more than 10.00 ppm. |

Source:- The Prevention of Food Adulteration Act, 1954.

III. Grade specifications of NAFED :

The National Agricultural Cooperative Marketing Federation of India Limited (NAFED), a central nodal agency of Government of India arranges procurement of oilseeds and pulses as per the Grade specification for Fair Average Quality (FAQ) for procurement of Sesame seeds under the Price Support Scheme (PSS).

GRADE SPECIFICATIONS OF SESAMUM SEEDS FOR PRICE SUPPORT OPERATIONS DURING 2003 – 2004 (MARKETING SEASON)

Sr. No.	Special characteristics	Maximum limits of tolerance (% by weight per qtl.)
		FAQ
1.	Foreign matter	2
2.	Shrivelled & immature	3
3.	Damaged & discoloured	2
4.	Admixture of other varieties	10
5.	Moisture contents	7

DEFINITIONS:

1. Foreign matters means dust, dirt, stones, lumps of earth, chaff, stem straw or any other impurity.
2. Damaged and discoloured seeds are the seeds that are materially or internally damaged or discoloured materially affecting the quality.
3. Shrivelled and immature and dead are the seeds which are imperfectly developed and/or shrunken. Dead seeds are those seeds which are duds and can be easily crushed by fingers.
4. Admixture of other types/varieties: Means admixture of brown/black and other coloured sesame seeds in white and vice versa.

Source: Action Plan and Operational Arrangements for Price Support Scheme in Kharif - 2003.

IV) CODEX STANDARDS

CX-STAN 210-1999

The Appendix to this Standard is intended for voluntary application by commercial partners and not for application by governments.

1. SCOPE:

This Standard applies to the vegetable oils described in Section 2.1 presented in a state for human consumption.

2. DESCRIPTION:

2.1 Product definitions:

2.1.16 Sesameseed oil (sesame oil; gingely oil; benne oil; till oil; tillie oil) is derived from sesame seeds (seeds of *Sesamum indicum* L.).

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS:

3.1 GLC ranges of fatty acid composition (expressed as percentages):

Samples falling within the appropriate ranges specified in Table No. 1 are in compliance with this Standard. Supplementary criteria, for example national geographical and/or climatic variations, may be considered, as necessary, to confirm that a sample is in compliance with the Standard.

3.3 Slip point:

Palm olein	not more than 24°C
Palm stearin	not less than 44°C

4. FOOD ADDITIVES:

4.1 No food additives are permitted in virgin or cold pressed oils.

4.2 Flavours:

Natural flavours and their identical synthetic equivalents, and other synthetic flavours, except those which are known to represent a toxic hazard.

4.3 Antioxidants:

			Maximum Level
304	Ascorbyl palmitate	}	500 mg/kg
305	Ascorbyl stearate		individually or in combination
306	Mixed tocopherols concentrate		GMP
307	Alpha-tocopherol		GMP
308	Synthetic gamma-tocopherol		GMP
309	Synthetic delta-tocopherol		GMP

310	Propyl gallate	100 mg/kg
319	Tertiary butyl hydroquinone (TBHQ)	120 mg/kg
320	Butylated hydroxyanisole (BHA)	175 mg/kg
321	Butylated hydroxytoluene (BHT)	75 mg/kg
Any combination of gallates, BHA and BHT and/or TBHQ		200 mg/kg but limits above not to be exceeded
389	Dilauryl thiodipropionate	200 mg/kg

4.4 Antioxidant synergists:

330	Citric acid	GMP
331	Sodium citrates	GMP
384	Isopropyl citrates	} 100 mg/kg individually or in combination
	Monoglyceride citrate	

4.5 Anti-foaming agents (oils for deepfrying):

900a	Polydimethylsiloxane	10 mg/kg
------	----------------------	----------

5. CONTAMINANTS:

5.1 Heavy metals:

The products covered by the provisions of this Standard shall comply with maximum limits being established by the Codex Alimentarius Commission but in the meantime the following limits will apply:

<u>Maximum permissible concentration</u>	
Lead (Pb)	0.1 mg/kg
Arsenic (As)	0.1 mg/kg

5.2 Pesticide residues:

The products covered by the provisions of this Standard shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

6. HYGIENE:

6.1 It is recommended that the products covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 3-1997), and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

6.2 The products should comply with any microbiological criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria for Foods (CAC/GL 21-1997).

7. LABELLING:

7.1 Name of the Food

The product shall be labelled in accordance with the Codex General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985, Rev. 1-1991). The name of the oil shall conform to the descriptions given in Section 2 of this Standard.

Where more than one name is given for a product in Section 2.1, the labelling of that product must include one of those names acceptable in the country of use.

7.2 Labelling of Non-retail Containers

Information on the above labelling requirements shall be given either on the container or in accompanying documents, except that the name of the food, lot identification and the name and address of the manufacturer or packer shall appear on the container.

However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING:

8.1 Determination of GLC Ranges of Fatty Acid Composition

According to IUPAC 2.301, 2.302 and 2.304 or ISO 5508: 1990 and 5509: 2000; or AOCS Ce 2-66, Ce 1e-91 or Ce 1f-96.

8.2 Determination of Slip Point

According to ISO 6321: 1991 and Amendment 1: 1998 for all oils, or AOCS Cc 3b-92 or Ce 3-25 (97) for palm oils only.

8.3 Determination of Arsenic

According to AOAC 952.13, IUPAC 3.316, AOAC 942.17, or AOAC 985.16.

8.4 Determination of Lead

According to IUPAC 2.632, AOAC 994.02, or ISO 12193: 1994 or AOCS Ca 18c-91.

Table No.A: Fatty acid composition of vegetable oils as determined by gas liquid chromatography from authentic samples (expressed as percentage of total fatty acids)

Fatty acid	Sesameseed oil
C6:0	ND
C8:0	ND
C10:0	ND
C12:0	ND
C14:0	ND-0.1
C16:0	7.9-12.0
C16:1	0.1-0.2
C17:0	ND-0.2
C17:1	ND-0.1
C18:0	4.8-6.1
C18:1	35.9-42.3
C18:2	41.5-47.9
C18:3	0.3-0.4
C20:0	0.3-0.6
C20:1	ND-0.3
C20:2	ND
C22:0	ND-0.3
C22:1	ND
C22:2	ND
C24:0	ND-0.3
C24:1	ND

ND - non detectable, defined as $\leq 0.05\%$

APPENDIX

OTHER QUALITY AND COMPOSITION FACTORS

This text is intended for voluntary application by commercial partners and not for application by governments.

1. QUALITY CHARACTERISTICS:

1.1 The colour, odour and taste of each product shall be characteristic of the designated product. It shall be free from foreign and rancid odour and taste.

Maximum level	
1.2 Matter volatile at 105°C	0.2 % m/m
1.3 Insoluble impurities	0.05 % m/m
1.4 Soap content	0.005 % m/m
1.5 Iron (Fe):	
Refined oils	1.5 mg/kg
Virgin oils	5.0 mg/kg
1.6 Copper (Cu)	
Refined oils	0.1 mg/kg
Virgin oils	0.4 mg/kg
1.7 Acid value	
Refined oils	0.6 mg KOH/g Oil
Cold pressed and virgin oils	4.0 mg KOH/g Oil
Virgin palm oils	10.0 mg KOH/g Oil
1.8 Peroxide value:	
Refined oils	up to 10 milliequivalents of active oxygen/kg oil
Cold pressed and virgin oils	up to 15 milliequivalents of active oxygen/kg oil

2. COMPOSITION CHARACTERISTICS

2.9 The **Baudouin test** should be positive for sesameseed oil.

3. CHEMICAL AND PHYSICAL CHARACTERISTICS

Chemical and Physical Characteristics are given in Table No. B

4. IDENTITY CHARACTERISTICS:

4.1 Levels of desmethylsterols in vegetable oils as a percentage of total sterols are given in Table No. C

4.2 Levels of tocopherols and tocotrienols in vegetable oils are given in Table No. D

5. METHODS OF ANALYSIS AND SAMPLING:

5.1 Determination of Matter Volatile at 105°C
According to IUPAC 2.601 or ISO 662: 1998.

5.2 Determination of Insoluble Impurities
According to IUPAC 2.604 or ISO 663: 2000.

5.3 Determination of Soap Content
According to BS 684 Section 2.5.

5.4 Determination of Copper and Iron
According to ISO 8294: 1994, IUPAC 2.631 or AOAC 990.05; or AOCS Ca 18b-91.

5.5 Determination of Relative Density

According to IUPAC 2.101, with the appropriate conversion factor.

5.6 Determination of Apparent Density

According to ISO 6883: 2000, with the appropriate conversion factor or AOCS Cc 10c-95.

5.7 Determination of Refractive Index

According to IUPAC 2.102 or ISO 6320: 2000 or AOCS Ce 7-25.

5.8 Determination of Saponification Value (SV)

According to IUPAC 2.202 or ISO 3657: 1998.

5.9 Determination of Iodine Value (IV)

Wijs – according to IUPAC 2.205/1, ISO 3961: 1996, AOAC 993.20, or AOCS Cd 1d-92 (97), or by calculation – AOCS Cd 1b-87 (97). The method to be used for specific named vegetable oils is stipulated in the Standard.

5.10 Determination of Unsaponifiable Matter

According to IUPAC 2.401 (part1-5) or ISO 3596: 2000 or ISO 18609: 2000.

5.11 Determination of Peroxide Value (PV)

According to IUPAC 2.501 (as amended), AOCS Cd 8b-90 (97) or ISO 3961: 1998.

5.12 Determination of Total Carotenoids

According to BS 684 Section 2.20.

5.13 Determination of Acidity

According to IUPAC 2.201 or ISO 660: 1996 or AOCS Cd 3d-63.

5.14 Determination of Sterol Content

According to ISO 12228: 1999, or IUPAC 2.403.

5.15 Determination of Tocopherol Content

According to IUPAC 2.432 or ISO 9936: 1997 or AOCS Ce 8-89.

5.16 Halphen Test

According to AOCS Cb 1-25 (97).

5.17 Crismer Value

According to AOCS Cb 4-35 (97) and AOCS Ca 5a-40 (97).

5.18 Baudouin Test (modified Villavecchia test or sesameseed oil test)

According to AOCS Cb 2-40 (97).

5.19 Reichert Value and Polenske Value

According to IUPAC 2.204.

Table No. B : Chemical and physical characteristics of crude vegetable oils

	Sesameseed oil
Relative density (x° C/water at 20°C)	0.915-0.924 x=20°C
Apparent density (g/ml)	--
Refractive index (ND 40°C)	1.465- 1.469

Saponification value (mg KOH/g oil)	186-195
Iodine value	104-120
Unsaponifiable matter (g/kg)	≤ 20

Table No. C: Levels of desmethylsterols in crude vegetable oils from authentic samples as a percentage of total sterols

	Sesame seed oil
Cholesterol	0.1-0.5
Brassicasterol	0.1-0.2
Campesterol	10.1-20.0
Stigmasterol	3.4-12.0
Beta-sitosterol	57.7-61.9
Delta-5-avenasterol	6.2-7.8
Delta-7-stigmastanol	0.5-7.6
Delta-7-avenasterol	1.2-5.6
Others	0.7-9.2
Total sterols (mg/kg)	4500-19000

ND - Non-detectable, defined as ≤ 0.05%

Table No.D: Levels of tocopherols and tocotrienols in crude vegetable oils from authentic samples (mg/kg)

	Sesame seed oil
Alpha-tocopherol	ND-3.3
Beta-tocopherol	ND
Gamma-tocopherol	521-983
Delta-tocopherol	4-21
Alpha-tocotrienol	ND
Gamma-tocotrienol	ND-20
Delta-tocotrienol	ND
Total (mg/kg)	330-1010

ND - Non-detectable

Source: www.codexalimentarius.net

3.3.2 ADULTERANTS AND TOXINS

It has been reported that there are rare occurrence of aflatoxins in sesame seeds. The sesame oil is always high priced edible oil and hence adulterated with a wide varieties of non-edible oils like crude castor oil, mineral oils, cheap edible oils such as linseed, cotton seed, watermelon seed, rubber seed, tea seed etc. The sesame contains polyphenols, chlorogenic acid and caffeic acid which is anti nutritional and toxic and cause serious problem for human food.

3.3.3 Grading at producers' level and under Agmark:

There is an increasing recognition to grade the produce before sale to get better price and adequate returns. Directorate of Marketing and Inspection introduced the scheme of "Grading at Producers' level" in 1962-63. The main objective of this scheme is to subject the produce to simple tests of quality and assign a grade before sale. As on 31-03-2005, total 1079 approved grading laboratories were functioning in different states and Union territories of the country. State-wise number of producers' level grading units as on 31-03-2005 was 1968. 55295.2 M.T of Sesame valued at 13411.66 lakh was graded at producers' level during 2004-05.

Table No. 4: Grading of Sesame seed at producers' level

Year	Quantity (M.T)	Value (Rs. Lakh)
2003-2004	55090	11842.79
2004-2005	55295.2	13411.66

Source: Agmark Grading Statistics 2004-05, Directorate of Marketing & Inspection, Faridabad.

3.4 PACKAGING

Packaging provides physical protection against contamination, damage or handling losses during transportation of Sesame seed. The produce is handled many times between production and consumption. Hence, it plays an important role in marketing of produce. More care is to be taken in packaging of Sesame seeds meant for export.

Qualities of good packaging material:

- * The packaging material shall be made of substances which are safe and suitable for intended use.
- * The packaging material must preserve the quality of Sesame seeds.
- * It must be cheap and convenient in handling.
- * It must be convenient to store.
- * It must prevent spoilage during transit and storage.
- * It must be clean and attractive.
- * It must help in reducing the marketing cost.
- * It must be biodegradable.
- * It must be free from chemical residue.
- * Packing material should be useful after the main use.

- * It must be free from undesirable odour or flavour or contamination of any toxicity to the product.

Sesame seeds are available in different packings. NAFED packs sesame seed in 80 Kg. Net in new A.Twill bags. The package must meet handling and marketing requirements in terms of weight, size and shape.

3.5 TRANSPORTATION

Sesame is generally transported in bags at farm level as well as market level. Inadequate and inefficient transportation system increases the qualitative and quantitative losses resulting in increase in cost of marketing.

Means of transportation used at different stages of marketing.

Stage of Marketing	Transportation by	Means of Transport
1. From field to the village market or primary market.	Farmer	By Head load, Pack animal, Bullock cart or Tractor's trolley.
2. From primary market to secondary whole sale market and miller	Traders / Millers	By Trucks, Railway wagons.
3. From miller and wholesale markets to retailer	Millers / Retailers	By Trucks, Railway wagons, Mini trucks.
4. From retailer to consumer	Consumer	By Head loads, Pack animal, Bullock / Hand cart, Rickshaw.
5. For Export	Exporter/Trader	By Ship, Air Cargo

Availability of cheaper and convenient modes of transport:

Road and rail transport are normally used for internal markets, whereas, for export markets, the mode of transport is by Air and Sea.

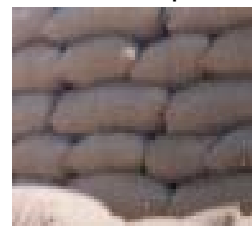
Selection of Mode of Transportation:

Following points should be considered while selecting mode of transportation.

- The mode of transportation should be cheaper among available alternatives.
- It should be convenient during loading and unloading.
- It must protect the produce during transportation from adverse weather conditions i.e. rain, floods etc.
- Insurance is desirable to meet any accidental loss.
- It must deliver the product to consignee in stipulated time.
- It should be easily available particularly during post- harvest period.
- It should be a single mode of transport and cost-effective.
- Distances should be considered.

3.6 STORAGE

Storage protects the quality of seed from deterioration and helps in stabilization of prices by balancing demand and supply. Storage provides protection against weather, moisture, insects, micro-organisms, rats, birds and any type of infestation and contamination. Usually, farmers sellout their produce immediately after harvest. Some farmers store sesame seed for longer period to get remunerative price.


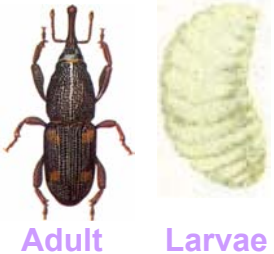



Requirements for safe and scientific storage:

For safe and scientific storage of Sesame seed, the following requirements should be followed.

- i) Selection of site** : The storage structure should be located on a raised well-drained site. The site should be protected from humidity (moisture), excessive heat, insect, rodents and bad weather conditions. It should be easily accessible.
- ii) Selection of storage structure** : The storage structure should be selected according to quantity to be stored. Sufficient space should be provided between two stacks for proper aeration.
- iii) Cleaning and fumigation** : Storage structure should be properly cleaned and there should be no left over of seeds, cracks, holes and crevices in structure. The structure should be fumigated before storage.
- iv) Drying and cleaning** : Sesame seed should be properly dried and cleaned to avoid quality deterioration before storage.
- v) Cleaning of bags** : Only new and dry gunny bags should be used.
- vi) Separate storage of new and old stock** : To check infestation and to maintain hygienic condition, the new and old stocks should be stored separately.
- vii) Use of dunnage** : Bags of Sesame seed should be kept on wooden crates or bamboo mats along with a cover of polythene sheet to avoid absorption of moisture from the floor.
- viii) Proper aeration** : There should be proper aeration during clean weather condition. Aeration in rainy season should be avoided.
- ix) Cleaning of vehicles** : The vehicles used for transportation of sesame seed should be cleaned by disinfectant to avoid infestation.
- x) Regular inspection** : To maintain proper health and hygiene of stock, regular inspection of stored seed is essential.

3.6.1 Major storage pests and their control :

Name of pest	Figure of pest	Damage	Control measures
1. Rice moth <i>Corcyra cephalonica</i>		Larvae contaminate the seeds with dense webbing, excreta and hairs. Whole seeds are bound into lumps.	<ol style="list-style-type: none"> Careful sanitation is the best method to avoid stored pests. Dispose off heavily infested seeds in wrapped, strong, plastic bags or in sealed containers. Maintenance of optimum moisture content (not >5%) is always critical in preventing the development of storage pests.
2. Rice weevil <i>Sitophilus oryzae</i> (Linn.)	 <p style="text-align: center;">Adult Larvae</p>	Adults and larvae both bore into seeds and feed on the seeds.	<ol style="list-style-type: none"> Broken seeds should not be stored for long periods. Dusting with an inert substance such as attapulgate-based clay dust (ABCD) helps to minimize storage insect problems.
3. Rodents		Rodents eat whole and broken seeds. They spill more seeds than they consume. Rodents also contaminate by hair, urine and feces, which deteriorate the quality of Sesame and cause many diseases, like cholera, ringworm, rabbies etc.	<p>Rat cage: Different types of rat cages are available in the market. Caught rats can be killed by dipping into water.</p> <p>Poison baits: Anti-coagulant pesticide like Zinc phosphide is mixed with bread or any other food stuff used as bait. Keep baits for a week.</p> <p>Rat burrow fumigation: Put tablets of Aluminium Phosphide in each hole / burrow and block that hole by mud mixture to make it airtight.</p>

3.6.2 Storage structures:

- 1. Metal drums** : Made up with iron sheets in cylindrical and square shape with various sizes.
- 2. Improved bins** : Different organizations developed and designed improved storage structures for scientific storage, which are moisture resistant and rodent-proof. These are:
 - a) Pusa Kothi
 - b) PAU bins
 - c) Nanda bins
 - d) Hapur Kothi
 - e) PKV bins
 - f) Chittore stone bins etc.
- 3. Pucca godown** : These are made by brick-walls with cemented flooring for storing.

3.6.3 Storage facilities

i) At producers' level :

Producers' store sesame seeds in various types of traditional and improved storage structures. Generally, these storage structures are used for short period. Different organizations / institutions have developed improved structures with varying capacities and shapes like Hapur Kothi, Pusa Bin, PKV Bin, etc. Some producers also store Sesame in jute gunny bags or in gunny bags lined with polythene stacked in the room.

The storage structures must possess the following qualities.

- Construction on raised platform and at clean surrounding area.
- Humidity / moisture proof.
- Rodent and termite proof.
- Free from any contamination and chemicals.
- Re-use.
- Facilities for easy loading and unloading.

ii) Rural Godowns :

Directorate of Marketing & Inspection is implementing Rural Godown Scheme in collaboration with NABARD and NCDC to construct scientific storage godowns with allied facilities in rural areas to meet the requirements of farmers for storing farm produce and to prevent distress sale immediately after harvest. Its objective is to construct scientific storage godowns with allied facilities in rural areas and to establish a network of rural godowns in the States and Union Territories. The main objectives of Rural Godown Scheme are as follows:

- i) Creation of scientific storage capacity with allied facilities in rural areas to meet the requirements of farmers for storing farm produce, processed farm produce, consumer articles and agricultural inputs;
- ii) Promotion of grading, standardization and quality control of agricultural produce to improve their marketability;

- iii) Prevention of distress sale immediately after harvest by providing the facility of pledge financing and marketing credit;
- iv) Reverse the declining trend of investment in the agriculture sector by encouraging the private and co-operative sectors to invest in the creation of storage infrastructure in the country;
- v) To reduce quantitative and qualitative losses arising out by storing grains in faulty or sub-standard storage system; and
- vi) To reduce pressure on transport system in the post-harvest period.

Table No. 5: The year-wise physical performance under the Rural Godown Scheme

Year	Physical capacity (Lakh tonnes)	
	Target	Achievement
2001-03	20	67.35
2003-04	27	37.57
2004-05	38	36.91
2005-06	26	--
2006-07	10	--
Total	121	141.83

Source: www.agmarknet.nic.in

iii) Mandi/APMC godowns:

Generally, sesame seeds are being taken to the mandi after the harvest in gunny bags. The APMCs have constructed storage godowns in market yards so that farmers should store the agricultural produce brought to the market for sale. The CWC, SWC and Co-operative societies have also constructed godowns in the market yards.

In most of the secondary and terminal regulated markets, Central and State Warehousing Corporations also provide scientific storage facilities at prescribed storage charges and issue warehousing receipt against pledge of produce, which is a negotiable document for obtaining finance from the Scheduled Banks.

iv) CWC and SWC Warehouses:

a) Central Warehousing Corporation (CWC):

CWC was established during 1957 and today, it is the largest public warehouse operator in the country. At the end of 31st March, 2005, CWC was operating 484 warehouses. It has 25 regions covering with a total storage capacity of 10.18 million tonnes. State-wise storage capacity with CWCs as on 31-03-2005 is given in Table No. 6

Apart from storage, CWC also offers services in the area of clearing and forwarding, handling and transportation, procurement and distribution, disinfestation services, fumigation services and other ancillary activities i.e. safety and security, insurance, standardisation and documentation.

Table No. 6: State-wise storage capacity with CWC as on 31-03-2005

Sl. No.	Name of State	No. of Warehouses	Total capacity (Tonnes)
1.	Assam	6	64200
2.	Andhra Pradesh	50	1439916
3.	Bihar	13	97179
4.	Chandigarh	1	13602
5.	Chhattisgarh	10	236826
6.	Delhi	11	181342
7.	Goa	2	103847
8.	Gujarat	29	622886
9.	Haryana	25	439517
10.	Himachal Pradesh	3	7040
11.	Jammu & Kashmir	1	21150
12.	Jharkhand	3	35913
13.	Karnataka	32	453332
14.	Kerala	9	129452
15.	Madhya Pradesh	31	674748
16.	Maharashtra	63	1564146
17.	Nagaland	1	13000
18.	Orissa	11	188206
19.	Pondicherry	1	8940
20.	Punjab	30	773999
21.	Rajasthan	27	375347
22.	Tamil Nadu	26	801127
23.	Tripura	2	24000
24.	Uttaranchal	7	75490
25.	Uttar Pradesh	50	1155926
26.	West Bengal	40	685264
TOTAL		484	10186395

Source: Central Warehousing Corporation, New Delhi.

b) State Warehousing Corporation (SWCs) :

The area of operation of the State Warehousing Corporations is district places of the State. The SWCs are under the dual control of the State Government and the CWC. The total share capital of the State Warehousing Corporations is contributed equally by the Central Warehousing Corporation and concerned State Government. Different States have set up their own warehouses in the country. As on 1st April 2005, SWCs were operating 1599 warehouse centers in the country with the total capacity of 195.20 lakh tonnes. The State-wise storage capacities with SWCs as on 01-04-2005 are given in Table No. 7

Table No. 7: State-wise storage capacity with State Warehousing Corporations as on 01-04-2005

Name of SWC	Total capacity (in lakh tonnes)
1. Andhra Pradesh	22.82
2. Assam	2.48
3. Bihar	2.03
4. Chhattisgarh	6.07
5. Gujarat	2.27
6. Haryana	16.07
7. Karnataka	8.98
8. Kerala	1.92
9. Madhya Pradesh	11.38
10. Maharashtra	12.20
11. Meghalaya	0.11
12. Orissa	4.05
13. Punjab	60.12
14. Rajasthan	7.19
15. Tamil Nadu	6.36
16. Uttar Pradesh	28.88
17. West Bengal	2.27
Grand Total	195.20

Source: Central Warehousing Corporation, New Delhi.

v) Co-operative storage:

Co-operative societies provide storage facilities to producers to store their produce immediately after harvest and sell it when the prices are favourable. Co-operative storage is the best option for producers as it provides storage facilities in bulk at cheaper rates, reducing storage cost per unit. Pledge finance to producers against their stored produce is also provided by co-operatives. The co-operative storages are more scientific than individual storage system.

The National Co-operative Development Corporation (NCDC) has been making systematic and sustained efforts to assist in the construction of scientific storage facilities at co-operative level. The NCDC has also been implementing storage programme through different schemes i.e. centrally sponsored scheme, corporation sponsored scheme and other internationally aided projects.

The storage capacity of 141.19 lakh tonnes has been established by NCDC upto 31-03-2004. Data regarding state-wise number and capacity of co-operative godowns available in the country by NCDC are given in Table No. 8

Table No. 8: State-wise co-operative storage facilities available with NCDC as on 31- 03-2004

Name of State	Rural level (No.)	Market level (No.)	Capacity (Tonnes)
1. Andhra Pradesh	4003	571	690470
2. Assam	770	264	298900
3. Bihar	2455	496	557600
4. Gujarat	1815	401	372100
5. Haryana	1454	376	693960
6. Himachal Pradesh	1640	209	204800
7. Karnataka	4958	930	963590
8. Kerala	1959	133	323335
9. Madhya Pradesh	5166	1024	1305900
10. Maharashtra	3852	1492	2010920
11. Orissa	1951	595	486780
12. Punjab	3884	830	1986690
13. Rajasthan	4308	378	496120
14. Tamil Nadu	4757	469	956578
15. Uttar Pradesh	9244	762	1913450
16. West Bengal	2834	469	483060
17. Other States	1046	263	374830
Total	56096	9602	14119083

Source: National Co-operative Development Corporation, New Delhi.

3.6.4 Pledge finance

The farmers are often compelled to sell their produce immediately after harvest when the prices are low. The solution for this problem lies in providing them access to safe and scientific storage of their produce and availing easy marketing credit facilities against their stored produce. To avoid such distress sale, Government of India, promoted Pledge Finance Scheme through a network of rural godowns and negotiable warehouse receipt system. Through this scheme, small and marginal farmers can get immediate financial support to meet their requirements and retain the produce till they get remunerative price.

According to the RBI guidelines, loan/advances upto 75 percent of the value of produce kept in the godown can be given to farmers against pledge/hypothecation of agricultural produce (including warehouse receipts) subject to a ceiling of Rs. 5 lakhs per borrower. Such loan shall be for a period of 6 months, which can be extended upto 12 months, based on financing banks commercial judgement. The rate of interest on such loans is charged as per RBI guidelines. The banking institutions accept the godown receipt on its being duly endorsed and delivered to bank for pledge loan against hypothecation of produce as per RBI guidelines. Farmers are given freedom to take back their produce once the pledge loan is repaid. Facility of pledge finance is extended to all farmers, whether they are the borrowing members of Primary Agricultural Credit

Societies (PACS) or not. The District Central Co-operative Banks (DCCBs) directly finance individual farmers on the strength of the pledge.

Benefits:

- i) It minimises the farmers' dependence on the commission agents, as the pledge finance provides a sense of security to the farmers even if their produce is not sold out in the market yard immediately.
- ii) It increases the retention capacity of the small farmers for longer period.
- iii) Participation of the farmers, irrespective of their land holding size, increases the arrivals in market yards.
- iv) To boost the bargaining power of the farmers in selling their produce to the commission agent and wholesaler, in the market.

4.0 MARKETING PRACTICES AND CONSTRAINTS

4.1 ASSEMBLING

Assembling includes the operation of collecting sesame seeds from small producers scattered over a wide area to a central place for its further movement to its destination i.e the ultimate consumers. Some important assembling markets of different states for sesame are given below.

Important assembling markets of Sesame seeds in different states

Name of State	Important Markets
1. Andhra Pradesh	Hiramandalam, Rajam, Vizianagaram, Narasipatanam, Narasaraopet, Guduru, Gudur, Kadapa, Chennur, Warangal, Tirumalagiri, Khamman
2. Bihar	Patna City, Muzaffarpur, Gaya, Betiah
3. Gujarat	Rajkot, Amreli, Bhavnagar, Bhuj, Jamnagar, Junagadh, Surendranagar
4. Karnataka	Bangalore, Chitradurga, Harapanahalli, Mysore, Kadur, Arsikere, Kottur, Lingasugur, Kusthagi, Raichur, Bellary, Bidar, Bijapur.
5. Madhya Pradesh	Sehore, Harda, Indore, Bhikangaon, Burhanpur, Khargone, Sabalgarh, Seopurkala, Ajaygarh, Tikamgarh, Chhatarpur, Damoh, Raipur
6. Maharashtra	Jalgaon, Bodwad, Yawal, Khamgaon, Chopda, Pachora, Dhule, Ahmedpur, Chalisgaon, Dharagaon
7. Orissa	Jalewar, Balasore, Baripada, Cuttack, Bolangir, Berhampur
8. Rajasthan	Hanumangarh, Ganganagar, Alwar, Bharatpur, Pali
9. Tamil Nadu	Erode, Salem, Villupuram, Virdhachalam, Tiruchirapalli, Cuddalore
10. Uttar Pradesh	Ghaziabad, Hapur, Agra, Kanpur, Mahoba, Sitapur, Madhoganj, Hardoi, Gorakhpur, Jalalabad
11. West Bengal	Bishnupur, Tamluk, Arambag, Karimpur, Kalna, Katwa, Islampur, Bongaon, Baduria, Shantipur, Nalhati, Rampurhat, Burdwan

Source: Sub-Office, Directorate of Marketing and Inspection.

4.1.1 Arrivals

It has been noticed that during the year 2002-2003, the total arrivals of Sesame seed in 8 markets of Gujarat was 45370 tonnes followed by 11 markets of Maharashtra with 30407 tonnes and 5 markets of Tamil Nadu with 21151 tonnes. Andhra Pradesh, Uttar Pradesh and Madhya Pradesh recorded arrivals of 19074, 14197 and 13306 tonnes of Sesame seed from 22 markets, 12 markets and 12 markets respectively are given in Table No. 9

Table No. 9: Arrivals of Sesame seed in different states during 2000-01 to 2002-2003

Name of the major producing State	Arrivals (in Tonnes)		
	2000-01	2001-2002	2002-03
1. Gujarat (8 Markets)	64869	56152	45370
2. Maharashtra (11 Markets)	29786	27299	30407
3. Tamil Nadu (5 Markets)	42654	30928	21151
4. Andhra Pradesh (22 Markets)	20371	18071	19074
5. Uttar Pradesh (12 Markets)	20083	17818	14197
6. Madhya Pradesh (12 Markets)	3095	2558	13306
7. Karnataka (10 Markets)	13272	9527	8133
Total (80 Markets)	194130	162353	151638

Source: Sub-office, Directorate of Marketing & Inspection.

4.1.2 Despatches

The Sesame seed from 22 markets of Andhra Pradesh were mostly despatched to the markets of Tamil Nadu, Kerala, Maharashtra, Gujarat and Rajasthan. Uttar Pradesh despatched mainly to the markets of Gujarat, Maharashtra, West Bengal, Delhi, Haryana and Punjab. The Gujarat, Maharashtra and Uttar Pradesh were the main dispatch centers of Sesame seed from Madhya Pradesh. In the state of Tamil Nadu and West Bengal, the Sesame seed despatched mainly to internal consumer markets within the state.

4.2 DISTRIBUTION

Assembling and distribution systems both are related to each other. The assembling deals with the movement of sesame from the farm to the assembling centers, while the distribution deals with its further movement to the consumers. Various agencies perform the task of assembling and distribution. The purchase of sesame for processing unit is mainly done by the commission agents in all the major assembling markets. The agencies involved in distribution of sesame are:

1. Producers
2. Village traders
3. Wholesale merchants
4. Commission agents
5. Retailers
6. millers/processors
7. Co-operatives organisations
8. Government organisations
9. Exporters and importers

4.2.1 Inter-state movement :

During the year 2002-2003, the inter-state movement of Sesame seed was about 34349 tonnes mainly from Maharashtra, Andhra Pradesh and Uttar Pradesh in which Maharashtra contribution was 30407 tonnes. The main states where Sesame seed exported from these three states were Rajasthan, Gujarat, Tamil Nadu, Kerala, Maharashtra, Delhi, Punjab and Haryana.

The inter-state movement of Sesame seed during 2000-01 to 2002-2003 is given below.

Inter-state movement of Sesame seed during the year 2000-01 to 2002-03

Sl. No.	States from where despatched	2000-01 (in tonnes)	2001-02 (in tonnes)	2002-03 (in tonnes)	States to which despatched
1.	Maharashtra	29786	27299	30407	Rajasthan, Gujarat and internal markets.
2.	Andhra Pradesh	2900	3450	3350	Tamil Nadu, Maharashtra and Kerala.
3.	Uttar Pradesh	600	510	592	West Bengal, Delhi, Gujarat, Punjab, Haryana.
4.	Gujarat	NA	NA	NA	Mumbai (Maharashtra), Delhi, etc. for Export/ consumption
5.	Karnataka	NA	NA	NA	Andhra Pradesh, Tamil Nadu, Kerala, Maharashtra.
6.	Madhya Pradesh	NA	NA	NA	Gujarat, Uttar Pradesh, Maharashtra.
7.	Tamil Nadu	NA	NA	NA	All consumer markets within the state.
8.	West Bengal	NA	NA	NA	Consumer markets within the state.
Total		33286	31259	34349	---

Source: Sub-office, Directorate of Marketing & Inspection.

4.3 EXPORT AND IMPORT

Sesame seed is exported mainly to Taiwan, Germany, USA, Netherland, Greece, Korea RP, Turkey, Poland, Russia, Saudi Arab, etc. The total quantity exported during 2004-2005 was 110259182 kg. worth Rs. 458.81crore against 140280941 kg of Sesame seed worth Rs. 520.37 crore during the year 2003-2004. The details are furnished in Table No. 10

Table No. 10: INDIA'S EXPORT OF SESAME SEED (W/N BROKEN OF SEED)

Countries	2004 - 2005		2003 - 2004	
	Quantity (In K.G)	Value (In Rupees)	Quantity (In K.G)	Value (In Rupees)
Taiwan	16023651	434963805	11505900	310212179
Germany	7985523	401543277	5155555	224005534
USA	7998641	390654135	11141678	417158603
Netherland	7674111	353064540	8346366	334376481
Greece	5918500	271795591	4259058	178187159
Korea RP	5337600	216656772	6761000	291181229
Turkey	5268000	197068010	4431294	146814144

Poland	4221600	181514868	1980318	77134005
Russia	2983300	146278771	1595548	69843092
Saudi Arab	2866302	124720389	2222721	78261453
Others	43981954	1869839987	82881503	3076547591
Total	110259182	4588100145	140280941	5203721470

Source: Director General of Commercial Intelligence and Statistics, Kolkata.

The total export of Sesame seed W/N Broken was 156664046 kg. valued at Rs. 662.44 crore during 2004-2005. The major importing countries were USA, Taiwan, Mexico, Greece, Netherland, Malaysia, Indonesia, China PRP, Germany, Turkey, etc. Indian Sesame seed have good demand in international markets for their unique taste. Country-wise export is shown in Table No. 11

Table No. 11: EXPORT OF OTHER SESAME SEEDS W/N BROKEN

Countries	April 2004 to March 2005		April 2003 to March 2004	
	Quantity (In K.G)	Value (In Rupees)	Quantity (In K.G)	Value (In Rupees)
U S A	4869016	253068111	3953528	167141081
Taiwan	6397620	229181371	-----	----
Mexico	4094700	178771161	3753100	155404443
Greece	3370660	168565782	2796880	120809506
Netherland	2840053	134903814	2133304	85353897
Malaysia	2437000	93036770	1454374	48378815
Indonesia	1693000	84426553	896214	35375632
China P RP	2051010	74743480	9120310	316318270
Germany	1483200	74352783	2790414	122126472
Turkey	2000000	73317222	2105476	73943329
Others	125427787	5260099936	160109080	5964010916
Grand Total	156664046	6624466983	189112680	7088862361

Source: Director General of Commercial Intelligence and Statistics, Kolkata.

White sesame seeds from Gujarat are widely preferred due to uniform colour and bold size. Jet black sesame seeds are also available. Export of hulled sesame seeds have been going on with premium price and major countries of export are Europe, China, Turkey, Holland, USA, Greece, Hong Kong, Israel, U.K, UAE, South Korea and Japan.

India also imports small quantity of Sesame seed as per domestic requirement from Sudan, China, Singapore, etc. During 2004-2005, 1486000 kg. of Sesame seed worth Rs. 5.80 crore was imported as mentioned in Table No. 12

Table No.12: IMPORT OF SESAME SEED (W/N BROKEN)

Countries	April 2004—March 2005		April 2003—March 2004	
	Quantity (In K.G)	Value (In Rupees)	Quantity (In K.G)	Value (In Rupees)
Sudan	1224000	49023920	576000	23274790
China P RP	96000	3445476	---	---
Singapore	71000	2376950	---	---

Somalia	---	---	302000	10098842
OTHERS	95000	3163199	---	---
TOTAL	1486000	58009545	878000	33373632

The country imported 188875 kg of sesame seed (W/N Broken) from Indonesia, Ethiopia, China PRP worth Rs. 0.68 crore during the year 2003-2004 as given in Table No. 13

Table No. 13: IMPORT OF OTHER SESAME SEED (W/N BROKEN)

Countries	April 2003—March 2004	
	Quantity (In K.G)	Value (In Rupees)
Indonesia	114000	4231376
Ethiopia	57000	2086079
CHINA P RP	17875	535546
TOTAL	188875	6853001

Source: Director General of Commercial Intelligence and Statistics, Kolkata.

4.3.1 Sanitary & Phyto-sanitary Requirements :

The Sanitary and phyto-sanitary (SPS) measures are an integral part of export trade as per agreement made under GATT (General Agreement on Trade and Tariffs), 1994. As per provisions made under this agreement, the standards framed should be such that the minimum level of protection required by an importing country may be fulfilled. In order to achieve this objective, the agreement to set up international standards and guidelines under the aegis of Codex Alimentarius Commission (Codex), which was earlier set up in 1963 by the Food and Agriculture Organisation (FAO) and World Health Organisation (WHO) to develop food standards, by laying down guidelines and related texts such as Codex of tactics under the joint aegis of FAO/WHO. Food standard programme are aimed at protecting health of the consumers and ensuring fair trade practices in the food trade as well as to promote co-ordination of all food standards work undertaken by international governmental and non-governmental organisation.

The SPS agreement applies to all Sanitary and Phyto-sanitary measures, which may directly or indirectly, affect international trade. Sanitary relates to human and animal health and Phyto-Sanitary measures are related to plant life/health. SPS measures are applied in four situations for the protection of human, animal or plant health :

- Risks arising from the entry, establishment or spread of pests, diseases, disease- carrying organisms or disease causing organisms.
- Risks coming from additives, contaminants, toning or disease-causing organisms in foods, beverages or feedstuffs.
- Risks arising from diseases carried by animals, plants or products thereof or from the entry, establishment or spread of pests.
- Prevention or limitation of damage caused by the entry, establishment or spread of pests.

The SPS standards commonly applied by Governments as they affect imports are:

- (i) **Import ban** (total/partial) is generally applied when there is a significant rate of risk about a hazard.
- (ii) **Technical specifications** (Process standards/Technical standards) are the most widely applied measures and permit import subject to compliance with pre-determined specifications.
- (iii) **Information requirements** (Labelling requirements/control on voluntary claims) permit imports provided they are appropriately labelled.

Procedure for issue of SPS certificate for export:

In order to make plant materials free from quarantine and other injurious pests to conform with the prevailing Phyto-Sanitary regulations of the importing country, the exporter needs to give a suitable disinfestation / disinfection treatment without affecting the viability for sowing / edibility of the plants/seeds.

For plant materials (seed, meal, extraction etc.) meant for export, Government of India has authorised some private Pest Control Operators (PCO) who have the expertise, men and materials for treating the agricultural export cargo / produce. The exporter has to apply to the officer in charge of Plant Protection and Quarantine Department under the Department of Agriculture and Cooperation for Phyto-Sanitary Certificate (PSC) in prescribed application form at least 7 to 10 days in advance of the export. This certificate is issued under the provision of "Plants, Fruit, and Seeds order" of 1989. Before submitting the application for issue of PSC, it should be ensured that the cargo is treated properly by the licensed PCO.

4.3.2 Export Procedures:

The exporter should keep in mind about the following laid down procedure during the export of sesame from India: -

1. Registration with RBI. (Apply in prescribed form (CNX) to obtain code number. This code number is to be quoted on all export papers).
2. Importer-Exporter code (IE code) number is to be obtained from the Director General of Foreign Trade (DGFT).
3. Register with Agricultural and Processed Food Products Export Development Authority (APEDA) to obtain registration cum membership certificate. This is required to obtain permissible benefits from the Government.
4. Exporter can then procure their export orders.
5. Quality of the produce is to be assessed by the inspecting agency and a certificate is issued to this effect.
6. Produce is then shifted to port.
7. Obtain marine insurance cover from any insurance company.

8. Contact the clearing and forwarding (C&F) agent for sorting the produce in godowns and to get the shipping bill for allowing shipment by the Custom Authority.
9. Shipping Bill is submitted by C & F agent to custom house for verification and verified shipping bill is given to the shed superintendent to obtain carting order for export.
10. The C&F agent presents shipping bill to preventive officer for loading into ship.
11. After loading into ship, a mate's receipt is issued by captain of ship to the superintendent of the port, who calculates port charges and collects the same from the C&F agent.
12. After the payments, C&F agent takes mate's receipt and requests port authority to prepare bill of lading to the respective exporter.
13. Then C&F agent sends the bill of lading to the respective exporter.
14. After receiving the documents, exporter obtains a certificate of origin from chamber of commerce, stating that the produce is of Indian origin.
15. Importer is informed by exporter regarding date of shipment, name of vessel, bill of lading, customer's invoice, packing list, etc.
16. Exporter submits all documents to his bank for verification and bank verifies the papers against original letter of credit.
17. After verification, bank sends documents to foreign importer to enable him to take delivery of produce.
18. After receiving papers, importer makes payment through bank and sends the GR form to RBI, an evidence of realization of export proceeds.
19. Exporter then applies for various benefits from duty drawback schemes.

4.4 MARKETING CONSTRAINTS

The following are the main marketing constraints in Sesame:

- **Marketing information** : Due to lack of market information regarding prevailing prices, arrivals etc., most of the producers market the Sesame in the village itself, which deprives them of getting remunerative returns.
- **Adoption of grading** : Grading of Sesame at producers' level ensures better prices to producers and better quality to consumers. However, most of the markets are lagging behind in providing grading service at producers' level.
- **Inadequate storage facilities** : To avoid the distress sale, storage facilities in villages are found to be inadequate. Due to lack of storage facilities at rural stage, substantial quantity is lost.

- ☛ **Transportation facilities** : Due to inadequate facilities of transportation at village level in most of the states of the country, producers are forced to sell Sesame in the village itself to itinerant merchants or traders directly at low prices.
- ☛ **Training producers to** : The farmers are not trained in marketing system. Training shall improve their skill for better marketing of their produce.
- ☛ **Malpractices in the markets** : Many malpractices prevail in the markets of Sesame i.e. excess weightment, delay in payment, high commission charges, delay in weighing and auction, different kinds of arbitrary deductions for religious and charitable purposes etc.
- ☛ **Financial problem** : Lack of market finance is one of the major marketing problems in the smooth running of marketing chain.
- ☛ **Inadequate Infra-structure facilities** : Due to inadequate marketing infra-structural facilities with producers, traders, millers and at market level, the marketing efficiency is affected adversely.
- ☛ **Superfluous middlemen** : The existence of a long chain of middlemen reduces the producer's share in consumer's rupee.
- ☛ **Processing** : There is a need of improved equipments/machines and technologies for sesame processing.
- ☛ **Improved Technology** : Producers were not using improved technologies in producing Sesame right from the selection of improved high yielding seeds to use of improved equipments and post-harvest operational techniques.

5.0 MARKETING CHANNELS, COSTS AND MARGINS

5.1 MARKETING CHANNELS

The marketing of produce is complete only when it reaches the hands of consumers. Marketing channels are the routes through which agricultural products move from producers to consumers. The important marketing channels prevailing in private and institutional sectors of marketing of Sesame are as under:

Private:

1. Farmer → Consumer
2. Farmer → Retailer → Consumer
3. Producer → Commission Agent → Wholesaler → Retailer → Consumer
4. Producer → Commission Agent → Wholesaler → Oil Miller/Processor
5. Producer → Commission Agent → Oil Miller → Wholesaler → Retailer → Consumer
6. Producer → Commission Agent → Oil Miller → Retailer → Consumer

Common Institutional Channels:

Sesame seed is also purchased by the public and co-operative sector agencies. It plays a very significant role in the procurement and distribution of Sesame. National Agricultural Co-operative Marketing Federation of India Limited (NAFED) is the nodal agency for procurement of Sesame seed. The main institutional marketing channel for Sesame is as under;

1. Producer → Village Co-operative Society → Processing Units → Co-operative Retail Stores → Consumers.
2. State Co-operative Marketing → Oil Miller (Private/Co-operative) → Co-operative Retail Store → Consumer.
3. Producer → Village Co-operative Society → Oil Miller → Oil Wholesaler → Retailer → Consumer.

❑ **Criteria for selection of channel:** Selection of channel by buyer and seller judged on the basis of efficiency in providing services at minimum cost and time in completing the transaction. But many times, small and marginal farmers are not having alternatives to opt for other channels. Some organizations and cooperatives purchase directly from the farmers or through their own network. In this case the farmers get their maximum share. There are many marketing channels involved in marketing of Sesame. The following are the criteria for the selection of efficient marketing channels.

- Ⓚ The channel, which ensures the highest share to producer and also provides commodities at the cheapest price to consumer, is considered as the most efficient channel.
- Ⓚ Selection should be for shorter channel having lesser market cost.

- Ⓚ Longer channel having more intermediaries causing higher marketing costs and less producers' share.
- Ⓚ Financial conditions of the producers.

5.2 MARKETING COSTS AND MARGINS

Marketing costs : Marketing costs are the actual expenses incurred in flow of goods and services from the producer to the consumers. The marketing costs normally include;

- (i) handling charges at local points
- (ii) assembling charges
- (iii) transport and storage costs
- (iv) handling charges by wholesaler and retailer
- (v) expenses on secondary services like financing, risk taking and market intelligence, and
- (vi) profit margins taken out by different agencies.

Marketing margins : Margin refers to the difference between the price paid and received by a specific marketing agency or by a combination of marketing agencies in the marketing system as a whole.

Total marketing margin includes cost involved in moving the Sesame from producer to consumer and profits of various market functionaries.



The absolute value of the total marketing margin varies from market to market, channel to channel and time to time.

- i) Market fee** : It is charged either on the basis of weight or on the basis of the value of the produce. It is usually collected from the buyers. The market fee differs from state to state and market to market. It varies from 0.5 percent to 2.0 percent ad valorem.
- ii) Commission** : The charges are usually made in cash and vary from market to market. It is paid to the commission agents and may be payable either by seller or by the buyer or sometimes by both.
- iii) Taxes** : Different taxes are charged in different markets such as toll tax, terminal tax, sales tax, octroi etc. These taxes differ from market to market in the same state as also from state to state. These taxes are usually payable by the seller.

iv) Miscellaneous charges : Those include handling, weighing, loading, unloading, cleaning, charity contribution in cash and kind etc. These charges may be payable either by the seller or by the buyer.

Market fees, commission charges, taxes and miscellaneous charges on Sesame seeds in major producing states

State	Market fee	Commission charges	Sales tax	License fee Rs. per annum	Other charges
1.Andhra Pradesh	1%	nil	4%	C.A-cum-traders A-3000/- (For 5 Years) B-2000/- C-1000/-	---
2. Gujarat	0.5%	1.0%	4%	A – type traders cum C. A. – Rs. 100-125/-	---
3. Karnataka	1%	2%	Nil	Trader/C. A. – Rs.200/-	---
4.Madhya Pradesh	2%	Nil	Nil	Traders– Rs.1000/- (For 5 Years) Processor– Rs.1000/-	---
5. Maharashtra	1.05% (0.05% surcharge)	1.75%	4%	C.A, Adtiya - Rs. 200/- A-Grade merchant wholesaler-Rs.200/ B-Grade merchant wholesaler- Rs.100/	---
6.Tamil Nadu	1%	Nil	Nil	Wholesaler – Rs.100/- Other trader – Rs. 75/-	---
7.Uttar Pradesh	2.5% (2% Fee+ 0.5% D.C)	2.0% (1.5%+ 0.5% Dalali)	4%	Wholesaler cum C.A. / Wholesaler / Arhatia / Dalal – Rs.250/-	---
8. West Bengal	1% (advalorum)	Nil	Nil	Wholesaler/Traders --- Rs. 200/-	---

Note : The charges for weighing, unloading, loading, cleaning, hamal, etc. vary from market to market.

Source: Sub-Offices of Directorate of Marketing and Inspection.

6.0 MARKETING INFORMATION AND EXTENSION

6.1 MARKETING INFORMATION:

Marketing Information is essential for producers in planning market led production. It is equally important for other market participants for trading. Farmers need to be fully familiarized in different areas of agricultural marketing in order to improve price realization. Marketing information is important at all the stages of marketing right from farm level to ultimate consumption level and simultaneously for all the participants in these stages i.e. producers, traders, millers, consumers etc. Recently, Govt. of India has launched Agricultural Marketing Information Network Scheme through Directorate of Marketing & Inspection (DMI) to bring out improvement in the present market information scenario by linking all Agricultural produce wholesale markets in the States and Union Territories. The data received from markets is being displayed on the website www.agmarknet.nic.in.

6.2 MARKETING EXTENSION:

Market extension is a vital factor enlightening the farmers about proper marketing and removal of marketing constraints and improves their awareness in various modern post harvest measures for efficient and cost effective marketability. Farmer needs to reorient their cropping pattern as per the market demand. The farmers should keep pace with fast changing technology, economic reforms, consumer awareness and new export-import policies for agricultural commodities.

Benefits:

- Provides up-to-date information on the arrivals and prices of agricultural commodities in different markets.
- Guides the producers to take right decision, when, where and how to market their produce.
- Educate the producers/traders about the post harvest management i.e.
 - a. Harvesting care
 - b. Techniques to minimise losses during post harvest period.
 - c. Value addition to the produce by proper cleaning, processing, packaging, storage and transportation.
- Orient the producers/traders about prevailing price trends, demand and supply situation etc.
- Orient the producer regarding the importance of grading, co-operative/group marketing, direct marketing, contract farming, futures trading etc.
- Provides the information about the sources of credit availability, various Govt. schemes, policies, rules and regulations etc.

Sources/ Institutions:

In our country, there are a number of sources/institutions that are directly or indirectly disseminating marketing information and providing extension services. These are summarized below.

A. Central level

Sources / Institutions	Activities for marketing information and extension
<p>1. Directorate of Marketing and Inspection (DMI), NH-IV, CGO Complex, Faridabad. Website: www.agmarknet.nic.in</p>	<ul style="list-style-type: none"> ➤ Provides information through nationwide Marketing Information Network (Agmarknet portal). ➤ Marketing extension through training to consumers, producers, graders etc. ➤ Marketing research and surveys. ➤ Publication of reports, pamphlets, leaflets, Agricultural Marketing Journal, Agmark standards etc.
<p>2. Directorate of Economics and Statistics, Shastri Bhavan, New Delhi. Website: www.agricoop.nic.in</p>	<ul style="list-style-type: none"> ➤ Compilation of agricultural data for development and planning. ➤ Dissemination of market intelligence through publication and Internet.
<p>3. Directorate General of Commercial Intelligence and Statistics (DGCIS), 1, Council House Street, Kolkata-1</p>	<ul style="list-style-type: none"> ➤ Collection, compilation and dissemination of marketing related data i.e. export-import data, inter- state movement.
<p>4. Central Warehousing Corporation (CWC) 4/1 Siri Institutional Area, Opp. Siri fort, New Delhi-110016 Website: www.fieo.com/cwc/</p>	<ul style="list-style-type: none"> ➤ Farmers Extension Service Scheme (FESS) was launched by CWC in the year 1978-79 with the following objectives : <ul style="list-style-type: none"> ◆ i) To educate farmers about the benefit of scientific storage and use of public warehouses. ◆ ii) To impart training to the farmers on the techniques of scientific storage and preservation of seeds and foodgrains. ◆ iii) To assist farmers in getting loans from the banks against pledge of warehouse receipt. ◆ iv) Demonstration of spraying and fumigation methods to control insects.

B. State level

Sources / Institutions	Activities
<p>1. State Agricultural Marketing Boards, at different state capital</p>	<ul style="list-style-type: none"> ➤ Provides marketing related information to co-ordinate all the market committees in the state. ➤ Arrange seminars, workshops and exhibitions on subject related to agricultural marketing.

2. Agricultural Produce Market Committee (APMC)	<ul style="list-style-type: none"> ➤ Provides market information on arrivals, prevailing prices, Despatches etc. ➤ Provides market information of adjoining / other market committees. ➤ Arranges training, tours / exhibitions etc.
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C. Autonomous

Sources / Institutions	Activities
Federation of Indian Export Organisations (FIEO) PHQ House(3 rd Floor) Opp. Asian Games , New Delhi-110016	<ul style="list-style-type: none"> ➤ Provide information to its members about latest developments of export and import. ➤ Organise seminars, workshops, presentation, tours, buyer-seller meets, sponsoring participation in international trade fair, exhibitions and providing advisory services with specialized divisions. ➤ Provide useful information on India's export and import with diverse database.

D) Others

1. Kisan Call Centers (New Delhi, Mumbai, Chennai, Kolkata, Hyderabad, Bangalore, Chandigarh and Luknow)	<ul style="list-style-type: none"> ➤ Provides expert advise to the farmers. ➤ These centers will operate through toll free telecom lines throughout the country. ➤ A country wide common four digit number 1551 has been allocated to these centers.
2. Mass Media Support to Agriculture Extension	<ul style="list-style-type: none"> ➤ Mass media support to agriculture extension has been augmented with three new initiatives. <ul style="list-style-type: none"> i) The first component establishes a cable satellite channel for national broadcast using the existing facilities available with Indira Gandhi National Open University (IGNOU). ii) The second component is use of low and high power transmitters of Doordarshan for providing area specific telecast. Initially, 12 locations chosen to launch broadcasting are Jalpaiguri (West Bengal), Indore (Madhya Pradesh), Sambhalpur (Orissa), Shillong (Meghalaya), Hissar (Haryana), Muzzafarpur (Bihar), Dibrugarh (Assam), Varanasi (Uttar Pradesh), Vijaywada (Andhra Pradesh), Gulbarga (Karnataka), Rajkot (Gujarat), Daltonganj (Jharkhand). iii) The third component of the mass media is use of FM transmitter network of All India Radio (AIR) to provide area specific broadcasting through 96 FM stations.

3. Agriculture-Clinics and Agri-Business by Agriculture Graduates	<ul style="list-style-type: none"> ➤ A central sector scheme “Establishment of Agriculture-Clinics and Agri-business Managed by Agriculture Graduates” is being implemented since 2001-02. ➤ The aim is to provide opportunity to all eligible agriculture graduates, to support agriculture development through economically viable ventures. ➤ The scheme is being jointly implemented by NABARD, National Institute of Agricultural Extension Management (MANAGE) and Small Farmers’ Agri-business Consortium (SFAC) in association with about 66 reputed training institutes in the country.
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E. Websites

Different Agricultural Information websites on Marketing	www.agmarknet.nic.in www.agricoop.nic.in www.fieo.com/cwc/ www.ncdc.nic.in www.nic.in/eximpol www.fmc.gov.in www.fao.org www.agrisurf.com www.agriwatch.com www.ikisan.net www.agnic.org www.indiaagronet.com www.commodityindia.com www.apeda.com www.nafed-india.com www.icar.org.in www.codexalimentarius.net
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☐ **Kisan Call Centre**



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The Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, Government of India has launched Kisan Call Centers on January 21st, 2004 throughout the country. It has the objective of affording instant solution to the problems faced by the farmers during crop cultivation under diverse challenging situations and facilitating their full comprehension by the use of local language. The call centers are acting as composite help centers, which consist of a complex tele-communication infrastructure, computer support and human resources organized to manage effectively and efficiently the queries raised by farmers instantly in local languages. The subject matter specialists using telephone and computer are used to interact with farmers to understand their problems and answer their queries as soon as possible. This is a new dimension in agricultural

extension management, which makes the full use of on-going information and communication revolution by connecting the farming community in the remotest areas of the country with the experts of agricultural field. In between 02-07-2003 and 20-05-2005 total 55,245 calls were answered by Kisan Call Centre in India with aggregate average calls per month were 2511 (approximately) and overall average calls per day were 84.

7.0 ALTERNATIVE SYSTEMS OF MARKETING

Experts say that Indian agriculture is dependent on two things – Monsoon and Marketing. Whatever the farmer produces, he should find a market for it. The farmer should be able to sell his produce at a remunerative price. A good marketing setup will increase the farmer's income, which in turn will enlarge scope for more investment in agriculture.

7.1 DIRECT MARKETING

Direct marketing is an innovative concept, which involves marketing of produce by the farmers to the consumer without any middlemen. It enables producer and other bulk buyers to economise on transportation cost and to improve price realisation considerably. It also provides incentive to large scale marketing companies to purchase directly from producing areas. Direct marketing by farmers to the consumers has been experimented in the country through *Apni Mandis* in Punjab and Haryana. The concept with certain improvements has been popularised in Andhra Pradesh through *Rythu Bazars*. At present, small and marginal producers without the help of the middlemen are selling their produce in these markets.

Benefits:

- ◆ It increases profit of the producers.
- ◆ It minimizes marketing cost.
- ◆ It increases distribution efficiency.
- ◆ It satisfies the consumers through better quality of produce at reasonable price.
- ◆ It provides better marketing techniques to producers.
- ◆ It encourages direct contact between producers and consumers.
- ◆ It minimizes the margin of the middlemen.
- ◆ It encourages the farmers to produce according to demand.

7.2 CONTRACT MARKETING

Contract marketing is a system of farming, wherein farmers grow selected crops under a 'buy back' agreement at pre-determined prices with an agency involved in trading or processing. In the wake of economic liberalization, it has gained momentum as the national and multinational companies are entering into contracts for marketing of the produce with specific stipulated quality and quantity and also provide technical guidance, finance, input supply to contract farmers. Contract marketing ensures continuous supply of quality produce (raw materials) at mutually agreed price to contracting agency, whereas it also ensures timely marketing of the produce to farmers. In this agreement, agency contributes input supply and renders technical guidance. The company also bears the entire cost of transaction and marketing. By entering in to contract, farmer's risk of price reduces and the agency reduces the risk of non-availability of raw material. The inputs and extension services provided by the agency include improved seed, credit, fertilizers,

pesticides, farm machinery, technical guidance, extension, marketing of produce etc. Contract marketing is thus, a means of allocating the distribution risk between processor and grower.

Benefits	To Producer	To Contracting agency
Risk	It minimises the price risk.	It minimises risk of raw material supply.
Price	Price stability ensuring fair price.	Price stability as per pre-agreed contract.
Quality	Use of quality seed and inputs.	Get good quality produce and control on quality.
Payment	Assured and regular payments through bank tie up.	Easy handling and better control on payment.
Post-harvest handling	Minimises risk and cost of handling.	Control and efficient handling.
New technology	Facilitates in farm management and practices.	For better and desired produce to meet consumer needs.
Fair trade practices	Minimises malpractices and no involvement of middle man.	Better control on trade practices.
Crop insurance	Reduces risk.	Reduces risk.
Mutual relationship	Strengthens.	Strengthens.
Profit	Increases.	Increases.

7.3 CO-OPERATIVE MARKETING

“Co-operative marketing” is the system of marketing in which a group of producers join together and register them under respective State Co-operative Societies Act to market their produce jointly. The members also deal in a number of co-operative marketing activities i.e. purchasing of produce, grading, packing, processing, storage, transport, finance, etc. The co-operative marketing means selling of the member’s produce directly in the market, which fetches remunerative prices. It also provides fair trade practices and protect against manipulations / malpractices. The main objectives of co-operative marketing are to ensure remunerative prices to the producers, reduction in the cost of marketing, reduces the monopoly of traders and improve the marketing system. Co-operatives are the best instrument to ensure remunerative prices to farmers for their produce and also function as an interface for stabilizing market prices. The objective of co-operative marketing is to sell the members’ produce directly in the market and get the best favourable prices.

The co-operative marketing structure consists 3-tier system:

- i) **Primary Marketing Society (PMS)** at the Village/Mandi level.
- ii) **State Co-operative Marketing Federation (MARKFED)** at the state level.
- iii) **National Agricultural Co-operative Marketing Federation of India Limited (NAFED)** at the national level.

National Co-operative Development Corporation (NCDC) and State Governments are providing financial assistance and other facilities to Co-operative Marketing Societies.

National Agricultural Co-operative Marketing Federation of India Ltd. (NAFED): The Government of India has been entrusting NAFED with the support price purchase operations of Sesame.

Benefits:

<ul style="list-style-type: none">➤ Remunerative price to producers.➤ Reduction in cost of marketing.➤ Reduction in commission charges.➤ Effective use of infrastructure.➤ Credit facilities.	<ul style="list-style-type: none">➤ Easy transportation.➤ Reduces malpractices.➤ Supply of agricultural inputs.➤ Marketing information.
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7.4 FORWARD AND FUTURES MARKETS

Forward trading means an agreement or a contract between seller and purchaser, for a certain kind and quantity of a commodity for making delivery at a specified future time, at contracted price. It provides protection against the price fluctuations. Producers and traders can utilise the future contracts to transfer the price risk. Presently, futures markets in the country are regulated through Forward Contracts (Regulation) Act, 1952. The Forward Markets Commission (FMC) performs the functions of advisory, monitoring, supervision and regulation in future and forward trading. Forward/future trading is done in exchanges owned by the associations registered under the Act. These exchanges operate independently under the guidelines issued by the FMC and their bye laws.

After the recent decision during February 2003 of the Cabinet Committee on Economic Affairs (CCEA), Government of India, futures trading has been allowed for 148 commodities including Sesame under section 15 of the Forward Contracts (Regulation) Act of 1952. Earlier Sesame was not allowed for futures trading.

Forward contracts are broadly of two types:

(a) Specific delivery contracts: Specific delivery contracts are essentially merchandising contracts, which enable producers and consumers of commodities to market their produce and cover their requirements respectively. These contracts are generally negotiated directly between parties depending on availability and requirement of produce. During negotiation, terms of quality, quantity, price, period of delivery, place of delivery, payment terms etc. are incorporated in the contracts.

Specific delivery contracts are again of two types:

- i) Transferable specific delivery contracts (**T.S.D**)
- ii) Non-transferable specific delivery contracts (**NTSD**)

In the TSD contracts, transfer of the rights or obligations under the contract is permitted while in NTSD, it is not permitted.

b) Other than specific delivery contracts: Though this contract has not been specifically defined under the act, these are called as 'futures contracts'. Futures contracts are forward contracts other than specific delivery contracts. These contracts are usually entered into under the auspices of an Exchange or Association. In the futures contracts, the quality and quantity of commodity, the time of maturity of contract, place of delivery etc. are all standardized and contracting parties have to negotiate only the rate at which contract is entered into.

Benefits :

- (i) **Producers** : They can get idea of price likely to prevail at a future point of time and therefore, can do the planning of production that suits them best.
- (ii) **Traders/ Exporters** : The future trading is very useful to the traders/exporters as it provides an advance indication of the price likely to prevail and thereby, help the traders/exporters in quoting a realistic price and secure trading/export contract in a competitive market. Having entered into a trading/export contract, it enables them to hedge their risk by operating in futures market.
- (iii) **Consumers** : Futures trading enables consumers to get an idea of the price at which the commodity would be available at a future point of time. They can do proper costing and also cover their purchases by marking forward contracts.
- (iv) **Price stabilization** : At time of violent fluctuations, futures trading reduce the price variation.
- (v) **Competition** : Futures trading encourages competition and provides competitive price to farmers, processors, traders.
- (vi) **Supply and demand** : It balances demand position throughout the year.
- (vii) **Integration of price** : Futures trading promotes an integrated price structure throughout the country.

8.0 INSTITUTIONAL FACILITIES

8.1 MARKETING SCHEMES OF GOVERNMENT/PUBLIC SECTOR

Name of the scheme/implementing organisation	Salient features
<p>1.Gramin Bhandaran Yojana (Rural Godown Scheme) Directorate of Marketing & Inspection, Head Office, N.H.-IV, Faridabad.</p>	<ul style="list-style-type: none"> ◆ It is a capital investment subsidy scheme for construction/renovation/expansion of rural godowns. The scheme is implemented by DMI in collaboration with NABARD and NCDC. The objectives of the scheme are to create scientific storage capacity with allied facilities in rural areas to meet the requirements of farmers for storing farm produce, processed farm produce, consumer articles and agricultural inputs. ◆ To prevent distress sale immediately after harvest. ◆ To promote grading, standardization and quality control of agricultural produce to improve their marketability. ◆ To promote pledge financing and marketing credit to strengthen agricultural marketing in the country for the introduction of a national system of warehouse receipt in respect of agricultural commodities stored in such godowns. ◆ The entrepreneur will be free to construct godown at any place and of any size except for restrictions that it would be outside the limits of Municipal Corporation area and be of a minimum capacity of 100 tonnes. ◆ The scheme provides credit linked back-ended capital investment subsidy @25% of the project cost with a ceiling of Rs. 37.50 lakhs per project. For the projects in North-Eastern states and hilly areas with altitude of more than 1000 m above mean sea level and SC/ST entrepreneurs, maximum subsidy admissible is Rs. 50.00 lakhs @33% of the project cost.
<p>2.Agmark Grading and Standardization Directorate of Marketing & Inspection, Head Office, N.H.-IV, Faridabad.</p>	<ul style="list-style-type: none"> ◆ Promotion of grading of agricultural and allied commodities under Agricultural Produce (Grading & Marking) Act.1937. ◆ Agmark specifications for agricultural commodities are framed based on their intrinsic quality. Food safety factors are being incorporated in the standards to compete in world trade. Standards are being harmonized with international standards keeping in view the WTO requirements. Certification of agricultural commodities is carried out for the benefit of producer and consumer.

<p>3. Agricultural Marketing Information Network</p> <p>Directorate of Marketing & Inspection, Head Office, N.H.-IV, Faridabad.</p>	<ul style="list-style-type: none"> ◆ To establish a nationwide information network for speedy collection and dissemination of market data for its efficient and timely utilization. ◆ To ensure flow of regular and reliable data to the producers, traders and consumers to derive maximum advantage out of their sales and purchases. ◆ To increase efficiency in marketing by effective improvement in the existing market information system. ◆ The scheme includes providing connectivity to 2458 nodes comprising the State Agricultural Marketing Department (SAMD) /Boards/ Markets. These concerned nodes are being provided with one computer and its peripherals. These SAMD/Boards/ Markets are to collect desired market information and pass on to respective state authorities and Head Office of the DMI for onward dissemination. The eligible markets will get 100 percent grant by Ministry of Agriculture.
<p>4. Scheme for Development/ Strengthening of Agricultural Marketing Infrastructure, Grading and Standardization</p> <p>Directorate of Marketing and Inspection, Head Office, N.H.-IV, Faridabad.</p>	<ul style="list-style-type: none"> ➤ To provide additional agricultural marketing infrastructure to cope up with the large expected marketable surpluses of agricultural and allied commodities including dairy, poultry, fishery, livestock and minor forest produce. ➤ To promote competitive alternative agricultural marketing infrastructure by inducement of private and cooperative sector investments that sustain incentives for quality and enhanced productivity thereby improving farmers' income. ➤ To strengthen existing agricultural marketing infrastructure to enhance efficiency. ➤ To promote direct marketing so as to increase market efficiency through reduction in intermediaries and handling channels thus enhancing farmers' income. ➤ To provide infrastructure facilities for grading, standardization and quality certification of agricultural produce so as to ensure price to the farmers commensurate with the quality of the produce. ➤ To promote grading, standardization and quality certification system for giving a major thrust for promotion of pledge financing and marketing credit, introduction of negotiable warehousing receipt system and promotion of forward and future markets so as to stabilize market system and increase farmers' income. ➤ To promote direct integration of processing units with producers. ➤ To create general awareness and provide education and training to farmers, entrepreneurs and market functionaries on agricultural marketing including grading, standardization and quality certification.

<p>5.Co-operative marketing, processing, storage, etc. programme in comparatively under/least developed states.</p> <p>National Co-operative Development Corporation (NCDC), Hauz Khas, New Delhi-110016</p>	<ul style="list-style-type: none"> ◆ To correct regional imbalances in the pace of development of co-operative agricultural marketing, processing, storage etc. in under/least developed states/UTs by providing financial assistance on liberal terms to augment the income of farmers and weaker sections of the community. ◆ The scheme provides for distribution of agricultural inputs, development of agro-processing including storage, marketing of foodgrains and plantation/horticulture crops, development of weaker and tribal sections, cooperatives in dairy, poultry and fisheries.
<p>6.Price Support Scheme (PSS),</p> <p>National Agricultural Cooperative Marketing Federation of India Ltd., (NAFED), Nafed House, Sidhartha Enclave, New Delhi-1100014</p>	<ul style="list-style-type: none"> ◆ NAFED is the nodal agency of Government of India to undertake procurement of Sesame under price support scheme. ◆ The objective of scheme is to provide regular marketing support to sustain and improve the production of Sesame. ◆ Purchases under PSS are undertaken when the prices of Sesame go below the declared support price for that year.

8.2 INSTITUTIONAL CREDIT FACILITIES

Institutional credit is the vital factor in agricultural development. The National Agriculture Policy targeted annual growth rate of 4 percent over the 10th plan period. During 1999-2000, the total institutional credit for agriculture was 46,268 crore against Rs. 86,981 crore during the year 2003-04. The main emphasis was laid down on adequate and timely credit support to the farmers, particularly small and marginal farmers for adoption of modern technology and improved agricultural practices.

The institutional Agriculture credit disbursed through co-operatives was 31 percent, 60 percent by Commercial Banks and 9 percent by Regional Rural Banks during 2003-2004. The institutional credit to Agriculture is offered in the form of short term, medium term and long term credit facilities:

Name of scheme	Eligibility	Facilities
1.Crop loan	All categories of farmers–	<ul style="list-style-type: none"> ➤ To meet cultivation expenses for various crops as short term loan. ➤ This loan is extended in the form of direct finance to farmers with a repayment period not exceeding 18 months.
2.Produce marketing loan (PML)	All categories of farmers	<ul style="list-style-type: none"> ➤ This loan is given to help farmers to store produce on their own to avoid distress sale. ➤ This loan also facilitates immediate renewal of crop loans for next crop. ➤ The repayment period of the loan does not exceed 6 months.
3. Kisan Credit Card Scheme	All agriculture clients having good track record for the last two years.	<ul style="list-style-type: none"> ➤ This card provides running account facilities to farmers to meet their production credit need and contingency needs. ➤ The scheme follows simplified procedure to enable the farmers to avail the crop loans as and when they need. ➤ Minimum credit limit – Rs. 3000/-. Credit limit is based on operational land holding, cropping pattern and scale of finance. ➤ Withdrawals can be made by using easy and convenient withdrawal slips. The Kisan Credit Card is valid for 3 years subject to annual review. ➤ It also covers personal insurance against death or permanent disability to a maximum amount of Rs. 50,000 and Rs. 25,000 respectively. ➤ Since inception in 1998-99, 4.84 crore cards issued.

4.National Agricultural Insurance Scheme	Scheme is available to all farmers – loanee and non-loanee both-irrespective of the size of their holding.	<ul style="list-style-type: none"> ➤ To provide insurance coverage and financial support to the farmers in the event of failure of any of the notified crops as a result of natural calamities, pests and diseases attack. ➤ To encourage the farmers to adopt progressive farming practices, high value in-puts and higher technology in agriculture. ➤ To help in stabilizing farm incomes, particularly in disaster years. ➤ General Insurance Corporation of India (GIC) is the Implementing Agency. ➤ Sum insured may extend to the value of threshold yield of the area insured. ➤ Coverage of all food crops (cereals, millets and pulses), oilseeds and annual commercial/ horticultural crops. ➤ Small and marginal farmers are provided subsidy of 50 percent of premium charged from them. The subsidy will be phased out over a period of 5 years on sunset basis.
5.Agricultural Term Loan	All categories of farmers (small/medium and agricultural labourers) are eligible, provided they have necessary experience in the activity and required area.	<ul style="list-style-type: none"> ➤ The banks extend this loan to farmers to create assets facilitating crop production/income generation. ➤ Activities covered under this scheme are land development, minor irrigation, farm mechanisation, plantation and horticulture, dairying, poultry, sericulture, dry land, waste land development schemes etc. ➤ This loan is offered in the form of direct finance to farmers with a repayment span not less than 3 years and not exceeding 15 years.

8.3 ORGANISATIONS/ AGENCIES PROVIDING MARKETING SERVICES

Organisations / Agencies	Services provided
1.Directorate of Marketing and Inspection (DMI) NH-IV, CGO Complex,	<ul style="list-style-type: none"> ➤ To integrate development of marketing of agricultural and allied produce in the country. ➤ Promotion of standardization and grading of agricultural and allied produce.

<p>Faridabad</p> <p>Website: www.agmarknet.nic.in</p>	<ul style="list-style-type: none"> ➤ Market development through regulation, planning and designing of physical markets. ➤ Promotion of Cold Storage. ➤ Liaison between the Central and State Governments through its regional offices (11) and sub-offices (26) spread all over the country.
<p>2.Agricultural and Processed Food Products Export Development Authority (APEDA) NCUI Building, 3, Siri Institutional Area, August Kranti Marg, New Delhi-110016</p> <p>Website: www.apeda.com</p>	<ul style="list-style-type: none"> ➤ Development of scheduled agriculture products related industries for export. ➤ Provides financial assistance to these industries for conducting surveys, feasibility studies, reliefs and subsidy schemes. ➤ Registration of scheduled product exporters on payment of such fees as may be prescribed. ➤ Adapting standards and specifications for the purpose of export of scheduled products. ➤ Improving the packaging of the scheduled products. ➤ Promotion of export oriented production and development of scheduled products. ➤ Collection and publication of statistics for improving marketing of scheduled products. ➤ Training in the various aspects of industries related to the scheduled products.
<p>3.National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED) Nafed House, Sidhartha Enclave, New Delhi – 110014</p> <p>Website: www.nafed-india.com</p>	<ul style="list-style-type: none"> ➤ Central nodal agency of Government of India for procurement of pulses, millets and oilseeds under price support scheme. ➤ It undertakes sale of pulses and oilseeds procured under PSS and import. ➤ Provide storage facilities. ➤ Serves the consumers in Delhi through the network of its retail outlets (NAFED BAZAR) by providing consumer items of daily need.
<p>4.Central Warehousing Corporation (CWC) 4/1 Siri Institutional Area Opp. Siri fort New Delhi-110016</p> <p>Website : www.fieo.com/cwc/</p>	<ul style="list-style-type: none"> ➤ Provides scientific storage and handling facilities. ➤ Offers consultancy services/ training for the construction of warehousing infrastructure to different agencies. ➤ Import and export warehousing facilities. ➤ Provides disinfestation services.

<p>5.National Co-operative Development Corporation (NCDC) 4, Siri Institutional Area, New Delhi-110016 Website: www.ncdc.nic.in</p>	<ul style="list-style-type: none"> ➤ Planning, promoting and financing programmes for production, processing, marketing, storage, export and import of agricultural produce. ➤ Financial support to Primary, Regional, State and National level marketing societies is provided towards: <ul style="list-style-type: none"> i) Margin money and working capital finance to augment business operations of agricultural produce ii) Strengthening the share capital base, and iii) Purchase of transport vehicles.
<p>6.Director General of Foreign Trade (DGFT) Udyog Bhavan, New Delhi. Website: www.nic.in/eximpol</p>	<ul style="list-style-type: none"> ➤ Provides guidelines / procedure of export and import of different commodities. ➤ Allot import-export code number (IEC No.) to the exporter of agricultural commodities.
<p>7.State Agricultural Marketing Board at different state's capitals.</p>	<ul style="list-style-type: none"> ➤ Implementation of the regulation of marketing in the state. ➤ Provide infrastructural facilities for the marketing of notified agricultural produce. ➤ Provide grading of agricultural produce in the markets. ➤ To co-ordinate all the market committees for information services. ➤ Provide aid to financially weak or needy market committees in the form of loans and grants. ➤ Eliminate malpractices in the marketing system. ➤ Arrange or organize seminars, workshops or exhibitions on subjects relating to agricultural marketing and farmers training programme on various aspects of agricultural marketing. ➤ Some of the Boards are also promoting agro-business, implementation of the regulation of marketing in the state.

9.0 UTILIZATION

9.1 PROCESSING

After harvesting, the sesame seeds are cleaned and hulled. The first stage of the hulling process is cleaning. The seeds pass through an air separation stage to remove any foreign particles. Next, a combination of water and friction work together as the seeds are passed against the chamber of the hulling machine to separate the hull from the seeds. Once the seeds have been hulled, they are passed through an electronic color sorting machine that rejects any discolored seeds to insure perfectly colored sesame seeds.

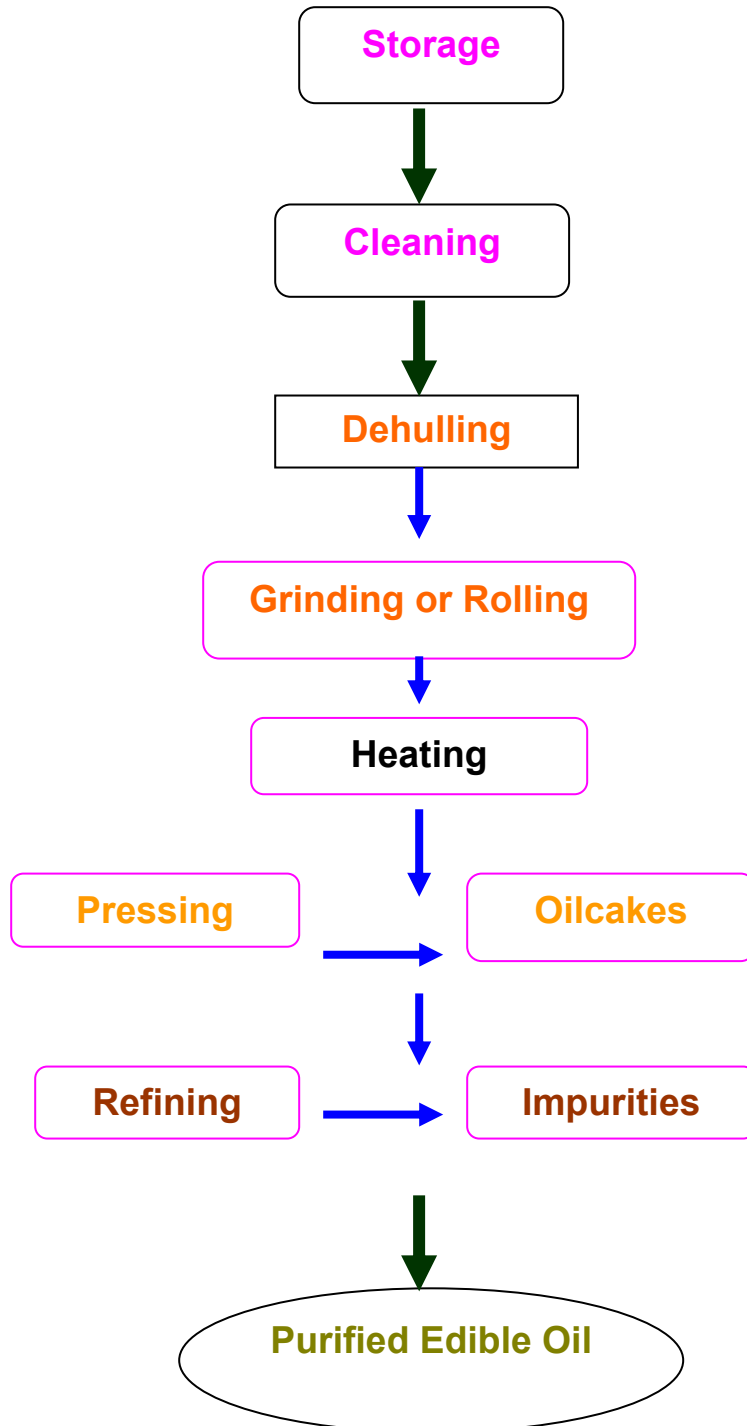
Processing is concerned with the addition of value to the product by changing its form. The oil content in Indian sesame seeds varies between 42% and 52%. The brown seeds contain about 50 per cent oil and are used mainly for crushing.

The important steps involved in processing of sesame seeds are :

Oil Extraction and Expression Methods:

In order to get high quality edible oil, various processing techniques are used. The process of obtaining oil from seeds involves the separation of oil from oil-bearing material by mechanical means, chemical means, etc. A typical oil extraction process is as follows:

OIL EXTRACTION METHOD



9.2 USES

The main uses of Sesame are as follows:

(1) Food value: The seed is perfect food as there is little possibilities of causing any allergy and known as best alternative source of food to the people with milk allergies. The white seeds are extremely rich and useful in all the cases of calcium deficiency. The red/brown seeds are exceptionally rich in iron and useful for anemic conditions.



(i) Laddoos: The people in villages of north and central India prepare laddoos of sesame, jaggery and dry fruits to keep them young, energetic, healthy and protect themselves from cold and cough related ailments. It is best diet and effective for the fast repair of wear and tear in the body of women during delivery.



(ii) Culinary purpose: Sesame seed is used for culinary purposes also and eaten in roasted, parched or raw form.

(iii) Bakery: White sesame is preferred by commercial bakers for higher quality and tasteness.

(iv) Confectionary/ Sweet meat items: It is used in many forms in preparation of sweet meals like sesame candy, cake, chakli, confectionery and for making margarine.

(v) Tahini: Sesame paste (Tahini) is popular in the middle east.

(vi) Flavouring agent: Dehulled sesame seeds are used as a nourishing food and also as flavouring agent.

(vii) Religious uses: It is also used in holy functions/yagna of Hindu ceremonies as an essential item.

(2) Sesame oil: The oil having 85% unsaturated fatty acids has reducing effect on cholesterol and prevent coronary heart diseases. Due to its numerous uses, it is known as the "green of oils". The oil has medicinal, nutritional and cosmetic properties and used in treatment of backache, dry skin ailments, migraines, chronic constipation, hemorrhoids, dysentery, receding gums, tooth decay, hair loss, weak bones and knees, osteoporosis, dry cough and cold, mouth ulcers, blood in the urine and stiff joints. It is also used as healing oil over the centuries.

(a) Cooking oil: Sesame oil is used for cooking mainly in state of Tamil Nadu in the country and most flavoured oil.

(b) Pharmaceutical Industry: It is used in manufacturing of soaps, perfumes, paints, insecticides, cosmetics and pharmaceuticals industry.

(3) Medicinal value: Sesame seeds are rich source of linoleic acid, vitamin E, A, B1 and B2; minerals including Calciums, Phosphorous and Iron. It is useful in tonifying kidney, liver, anemia, dizziness, poor vision, tinnitus etc. It is anti aging and anti cancerous for humans. Oil extracted from black seeds is best suited for medicinal purposes.



(4) Roots: It is traditionally used in treating cough, asthma and stomach pains.

(5) Leaves: Fresh leaves of sesame seeds are used in treatment of inflamed membranes of the mouth, dry cough and hair care. The leaves have been described as highly useful in nephropathy, vropathy, ophthalmopathy and dermatopathy.

Crushed leaves are considered beneficial in the treatment of dandruff and prevent premature graying of hairs and promote hair growth.

(6) Plant: Ash of roots, stems, leaves, flowers and fruits is soaked in water and extract is then given to cure dyspepsia.

(7) Livestock feed: The sesame meal/cake obtained after extraction of oil is a good source of protein supplement to feed livestock and poultry.

10.0 DO'S AND DON'TS :

DO'S	DON'TS
✓ Harvest the Sesame seed at the time of maturity.	✗ Delay in harvesting results in shattering of pods.
✓ Harvest the crop when leaves and capsules turn yellow and defoliation starts.	✗ Harvest before the pods are fully mature which results in lower yields, higher proportion of immature seeds, poor grain quality.
✓ Harvest during conducive weather condition.	✗ Harvest the crop during adverse weather condition (i.e. during rain and bad weather).
✓ Threshing and winnowing on cemented (pucca) floor.	✗ Perform threshing and winnowing on Kutcha floor.
✓ Store the Sesame during post- harvest period and sell it when the prices are higher in the market.	✗ Sell the Sesame seed during post-harvest period when the prices are low due to glut in the market.
✓ Avail the benefit of centrally sponsored GRAMIN BHANDARAN YOJANA for construction of rural godowns and store it to minimise losses.	✗ Store at unscientific place in a haphazard manner which will cause qualitative and quantitative deterioration of Sesame seed.
✓ Market the Sesame seed after AGMARK grading to get fair prices in the market.	✗ Market Sesame seed without grading which will fetch lower prices.
✓ Select the shortest and efficient marketing channel to get higher share in marketing.	✗ Adopt longer marketing channel which reduces the producers' share.
✓ Select the convenient and cheapest mode of transportation from the available alternatives.	✗ Use inconvenient mode of transportation, which requires higher transportation cost.
✓ Pack the produce properly to protect the quality and quantity during transit and storage.	✗ Use improper packaging which will cause more losses during transit and storage.
✓ Get the market information regularly from Agmarknet website, newspapers, T.V., concerned APMC offices etc.	✗ Market produce without collecting/verifying market information.
✓ Adopt improved processing techniques to get remunerative price.	✗ Use traditional and conventional techniques of processing that will cause more quantitative and qualitative losses.

<ul style="list-style-type: none">✓ Adopt the procedure of phyto-sanitary/sanitary measure during export.✓ Avail benefit of contract farming for better marketing of the produce.✓ Avail the benefit of future trading to avoid price risk arising due to wide fluctuations in commodity prices.	<ul style="list-style-type: none">✗ Export without any phyto-sanitary/sanitary measures.✗ Produce sesame without assessing and assuring its market demand for that year.✗ Sell the produce at fluctuating prices.
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