MINISTRY OF FOOD PROCESSING INDUSTRIES
GOVERNMENT OF INDIA

NIFTEM
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PROCESSING OF PEANUT OIL

AATMANIRBHAR BHARAT

PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME Scheme)

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INTRODUCTION

- Groundnut is an important Oilseed crop in the world with over 100 cultivating countries.
- The Groundnut or Peanuts species belongs to the family of *Fabaceae* (commonly known as bean, legume or pea family).
- Originated in South America eventually was introduced to southern India by Portuguese in 16th century.
- The oil extracted from groundnut/peanuts is also known as Arachis Oil, which is a mild tasting vegetable oil with a light-yellow transparency, clear colour and lustre, mild pleasant fragrance accompanied by a good taste and relatively easy to digest.

- The kernel of groundnut contains approximately 45%-55% of oil.
- The groundnut oil comprises of more than 80 % UFA (unsaturated fatty acids with around 42 % Oleic Acid, 38% Linoleic Acid and around 20% Palmitic acid, Steric acid, Arachidic acid along with some other unsaturated fatty acids in trace amounts.
- It is a rich source of all B vitamin except B12, minerals, phosphorus, calcium, iron. The biological value of groundnut protein is the highest among all vegetable proteins.
- Peanuts are proven to be an excellent source of vitamin E various fatty acids, good quality proteins (approx. 28%) and carbohydrates.

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AREAS UNDER CULTIVATION

Table 1: State wise area under groundnut in India

State	2018-19		2019-20	
	Area (lakh ha)	% to total area	Area (lakh ha)	% to total area
Gujarat	14.14	42.18	13.87	45.91
Rajasthan	5.81	17.33	5.25	17.38
Andhra Pradesh	3.83	11.43	2.43	8.04
Karnataka	2.6	7.76	1.93	6.39
Madhya Pradesh	2.09	6.24	1.92	6.36
Others	5.05	15.07	4.81	15.92
All India	33.52	100.00	30.21	100.00

Source: www.agricoop.com

VARIETIES OF PEANUT IN INDIA

Indian groundnuts are available in different varieties:

- Bold or Runner,
- Java or Spanish and Red Natal
- Kadiri-2, Kadiri-3
- BG-1, BG-2
- Kuber
- GAUG-1, GAUG-10
- PG-1, T-28, T-64
- Chandra,
- Chitra
- Kaushal
- Parkash
- Amber etc.

MARKET POTENTIAL & GROWTH ASPECTS

- The Indian subcontinent with its favorable climatic conditions has put India on 2nd position in world map , when it comes to production, after China.
- The peanut oil market size has an immense potential to grow by approximately USD 1.9 billion during 2020-2024.
- The growth momentum will probably accelerate progressing at a CAGR of 3% during the forecast period.
- The report on peanut oil market provides a wholistic approach and analysis in market size, forecast, trends, growth drivers and challenges as well as vendor analysis covering around 25 major global vendors.
- India has exported 6,64,442.93 MT of groundnuts to the world for the worth of Rs. 5,096.34 crores/ 711.38 USD Millions during the year 2019-20.

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EXPORT OF PEANUT OIL

- The total **exports**, **groundnut oil** shipments more than doubled to 38,225 tonnes in **2019-20**, from **15,532** tonnes last year.
- Exports of Groundnut increased **to 2,55,917.64** tons during April-October 2020-21 from **1,89,813.35** tons during April-October 2019-20.
- In value terms Groundnut exports increased to Rs. **2226.65** crores from Rs. **1512.59** crores.
- The export of Groundnut oil during April-October 2020-21 was **63,776.47** tons with a value of **Rs.809.69** crores in comparison to **9,875.53** tons during April-October 2019-20 with a value of Rs**. 101.57** crores.

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HEALTH BENEFITS OF PEANUT OIL

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- Helps in Improving Blood Flow
- Helps in Lowering High Blood Pressure
- Helps to get rid of acne and black-heads
- Used in Aromatherapy
- Used for Body Massage
- Helps in Improving Heart Health
- Provides skin care
- Helps to prevent stomach problem
- Helps in Improving Hair Health
- Helps in maintaining low cholesterol Level

PRE-TREATMENT PROCESSES

CLEANING

- Inorganic Impurities: - Dust, Sand, Metal, Plastic Chips etc
- Organic Impurities: - Stem, leaves, hemp, shell, twigs etc
- Oil bearing Impurities: - Kernel infested with mould, worms, weevils and unsound kernels etc.

CLEANING METHODS

- Screening
- Winnowing
- Magnetic Separation
- Gravity Separation

EFFECT OF IMPURITIES

- The stated impurities affect the oil yielding capacity and also distort the quality of fat and residual cake.
- They may also hamper the equipment's and machinery causing breakage and even production accidents

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DECORTICATION:-

- Raw peanuts need to be deshelled or decorticated either by manual shelling or mechanical shelling.
- Manual shelling is generally done for peanuts meant for exporting but this is a labour-intensive method.
- Mechanical shelling saves time and labour but may cause minor mechanical to damage to the peanuts.
- This process is highly suitable for oil production and hence its is preferred in industrial application.

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GRADING AND SORTING:-

- Grading process is adopted to remove the impurity and unsound kernel from the lot and ensure that the kernel size is not damaged, uniform, free from weevil, mould o worm infestation.
- The introduction of colour sorting process adds to the efficiency of the process by effectively eliminating the aflatoxin contaminated peanuts (efficiency above 99%).

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DRYING OF PEANUTS :-

- Peanuts are subjected to drying followed by air cooling in order to lower the water content of the kernels
- This enables the red skin of the kernels, crisp and easy to peel.
- The drying process is temperature controlled and lies in the range of 40-80 C
- Below 5 % water content of the peanut kernels, peeling efficiency is relatively high.

PEANUT OIL PRESSING PROCESS

- Peanuts obtained from pre-treatment methods is subjected to pressing techniques to extract oil from peanuts.
- The oil from the peanuts is extracted mainly by two pressing methods: -

➢ High temperature pressing method

➢ Cold pressing method

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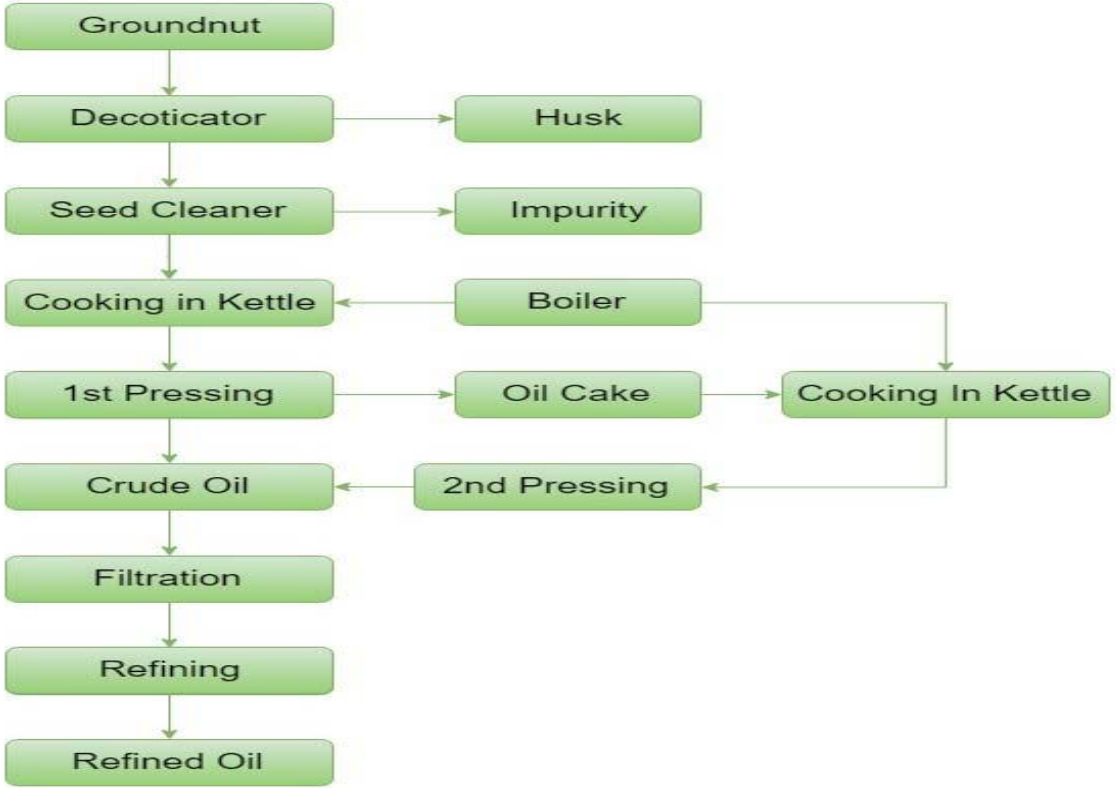
PEANUT OIL MANUFACTURING PROCESS



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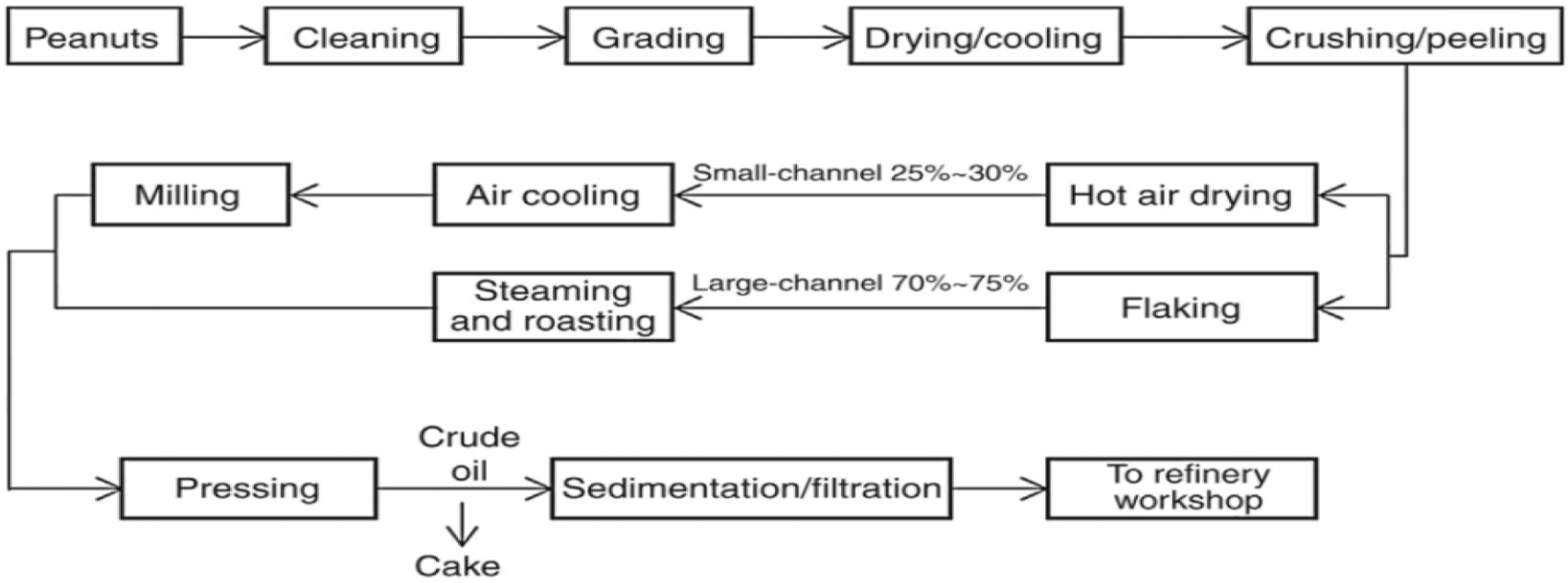
HIGH TEMPERATURE PRESSING METHOD FLOWCHART



High-temperature peanut oil production flow chart.

HIGH TEMPERATURE PRESSED PEANUT OIL

Temperature

The small-channel kernels are again subjected to 180-200℃ in a stir-fry furnace.

Moisture content

Hot air dryer is used repeatedly to bring down the water content in the range of 5-6%

Residual cake

The large-channel kernels are pressed into flakes known as uncooked flakes.

Acceptability

Strong fragrant flavour leading to mass acceptability by consumers

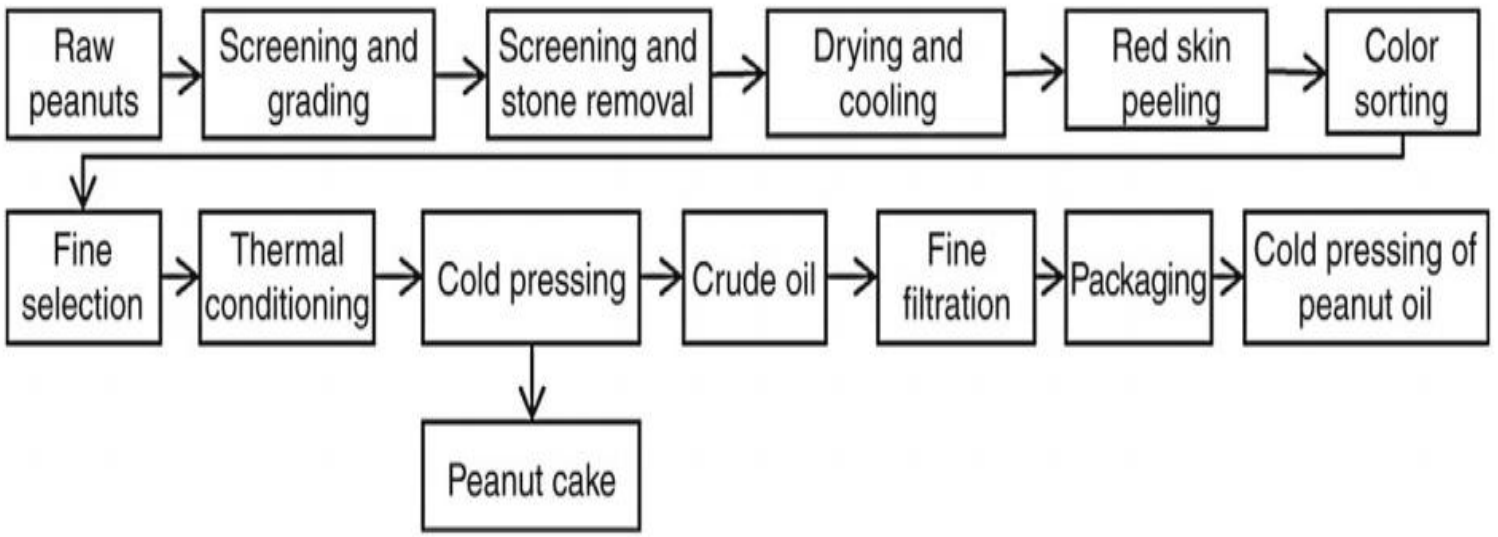
Organoleptic properties

Destroyed in the process due to high temperature

Nutrients

Heavy loss of Vitamin E, sterol, wheat germ phenol, phospholipids and other nutritional factors

COLD PRESSING FLOWCHART



Flow chart of cold pressing of peanut oil.

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COLD PRESED PEANUT OIL

Temperature

In cold press techniques the conducted temperature lies in the range of 60-70 ℃.

Moisture content

Hot air dryer is used repeatedly to bring down the water content in the range of 5-6%

Residual cake

The large-channel kernels are pressed into flakes using flaking machine but residual cake does not take shape

Acceptability

Better nutritional properties and subtle flavour leading to mass acceptability by consumers.

Profit

Peanut protein powder with low variability are produced with greater quality and high profit value.

Problems

Premature oil exudation making material difficult to be fed into the pres.

PEANUT OIL EXTRACTION METHOD

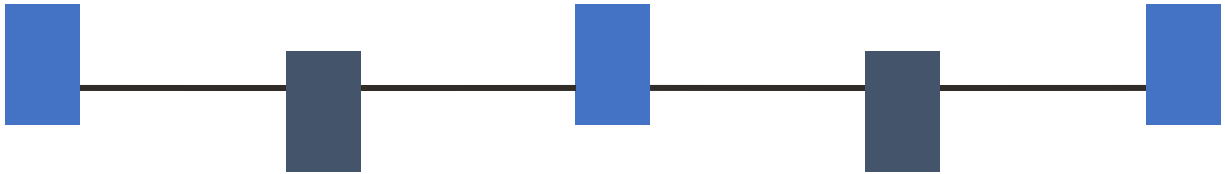
Also known as leaching method, that employs organic solvent to dissolve fats, spray and immerse the oil-bearing materials in order to eventually separate the fat from material.

ADVANTAGES & DISADVANTAGE OF LEACHING

High oil yield & low residual oil ratio of peanut meal

Low production cost

Larger production scale



DISADVANTAGES

Leaching agents/organic solvents are highly flammable and explosive toxic substances

High Capital investment

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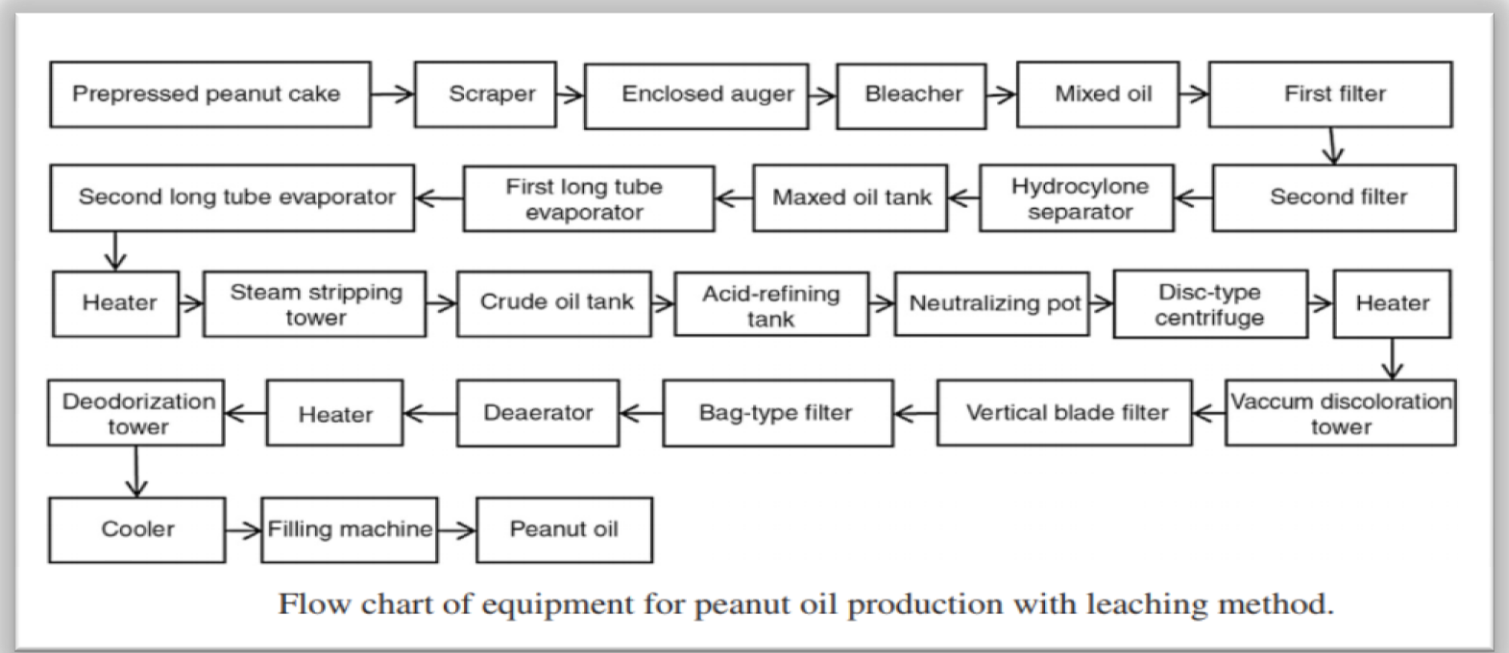
LEACHING / SOLVENT EXTRACTION FLOWCHART



Flow chart of equipment for peanut oil production with leaching method.

OIL REFINING PROCESS

1. Degumming	2.De-acidification	3. Bleaching	4.Deodorisation
Mainly done to remove the colloidal impurities from the oil and the process include ❖ Hydration degumming ❖ Acid Degumming	To remove the free fatty acid from the oil. The main deacidification method include includes: - ❖ Distillation ❖ Alkali Refining	❖ To remove the unwanted pigments from oil. To ensure the stability of oil and physical appearance. ❖ The common bleaching method adopted in industry is *Absorption* bleaching method.	❖ Elimination of unpleasant odour from the oil ❖ Improving the smoke point of the oil ❖ Increasing the shelf life/stability of oil ❖ Improving the colour and overall quality of oil

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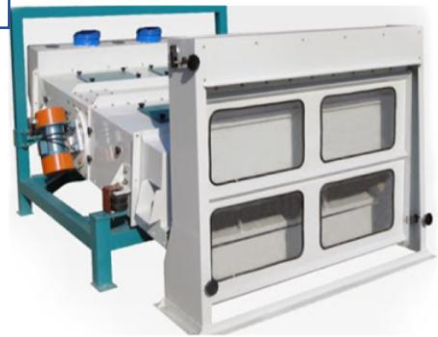
MACHINERIES AND EQUIPMENTS

1. Vibratory pre-cleaner machine
2. Groundnut decorticator machine
3. Cross tube boiler
4. Oil expeller
5. Oil filter press
6. Bottle filling machine
7. Screw conveyor
8. Silos / tanks

1



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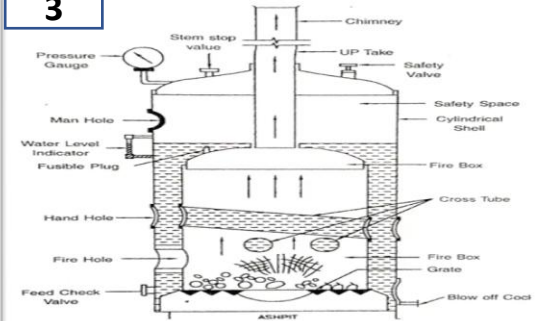

Chimney
Stem stop valve
Pressure Gauge
UP Take
Safety Valve
Safety Space
Man Hole
Cylindrical Shell
Water Level Indicator
Fusible Plug
Fire Box
Cross Tube
Hand Hole
Fire Hole
Fire Box Grate
Feed Check Valve
Blow off Cock
ASHPIT

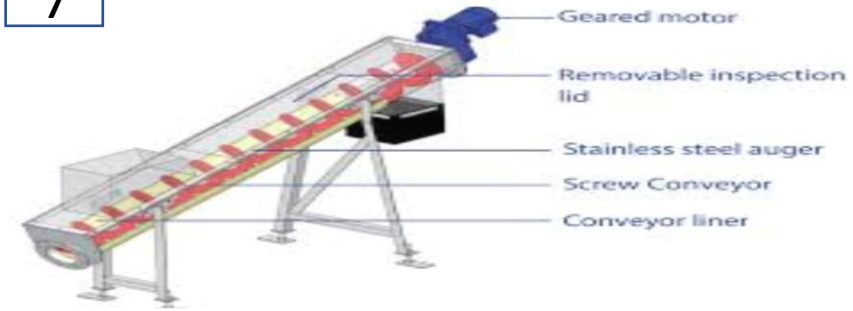
4

5


TINYTECH

6

7


Geared motor
Removable inspection lid
Stainless steel auger
Screw Conveyor
Conveyor liner

8

NUTRITIVE VALUES OF RAW PEANUT

S.NO.	Parameters	Content
1	Moisture	6.5 g
2	Energy	567Kcal
3	Protein	25.8 g
4	Fat	45.24 g
5	Carbohydrate	16.13 g
6	Crude fibre	8.5 g
7	Sugar	3.97 g
8	Calcium	93.0 mg
9	Phosphorus	376.0 mg
10	Iron	4.58 mg
11	Sodium	18 mg
12	Potassium	705 mg
13	Zinc	3.27 mg
14	Copper	11.44 mg
15	Manganese	1.934 mg

NUTRITIVE VALUES OF PEANUT OIL

Parameters	Amount
Calories	899 kcal
Total fat	100gm
Saturated Fat	22gm
Mono Unsaturated Fat	44gm
Poly Unsaturated Fat	34 gm
Trans Fat	0 gm
Total Carbohydrate	0 gm
Sodium	9 mg
Dietary Fibre	0 gm
Sugar	0 gm
Protien	0 gm
Iron	
Vitamin E	

PHYSICO-CHEMICAL PROPERTIES OF PEANUT OIL

Properties	Characteristics
Physical State at Room temperature	Liquid
Colour	Yellow
Melting Point (℃)	3.00
Relative Density (25℃)	0.913
Saponification Value (mg KOH/kg of Oil)	187.80
Iodine Value	118.20
Peroxide Value (meq O_2/kg Oil	2.09

CONTACT DETAILS

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