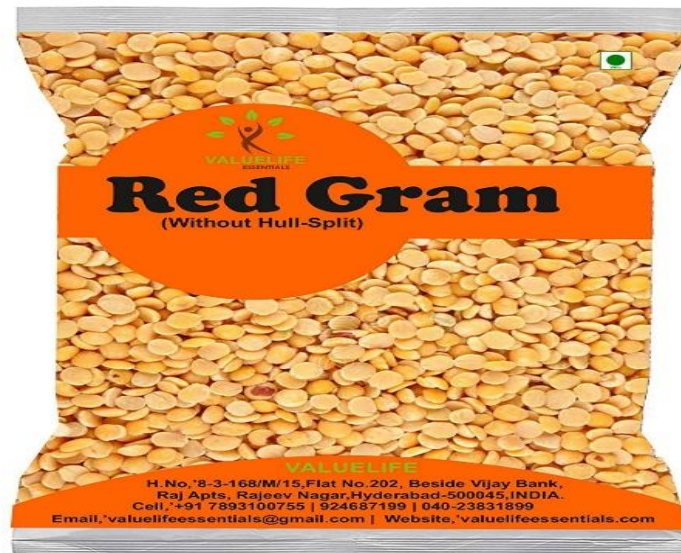


REDGRAM AND ITS PRODUCTS- PROCESSING



AATMANIRBHAR BHARAT

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

INTRODUCTION

Scientific name: *Cajanus cajan*

Family: Fabaceae

Common name: pigeon pea, red gram, tur dal, arhar dal

Origin: India/Africa



INTRODUCTION

- Red gram (Pigeon pea) is an important legume crop of rainfed agriculture in the semiarid tropics.
- The pigeon pea is the first seed legume plant to have its complete genome sequenced which is with Indian Council of Agricultural Research.
- This crop is used as a source of food, feed, fodder, green manuring, and green pasture. Green pods are delicious source of vegetables.
- Pigeon peas contain high levels of protein and the important amino acids methionine, lysine, and tryptophan.

GROWING CONDITIONS

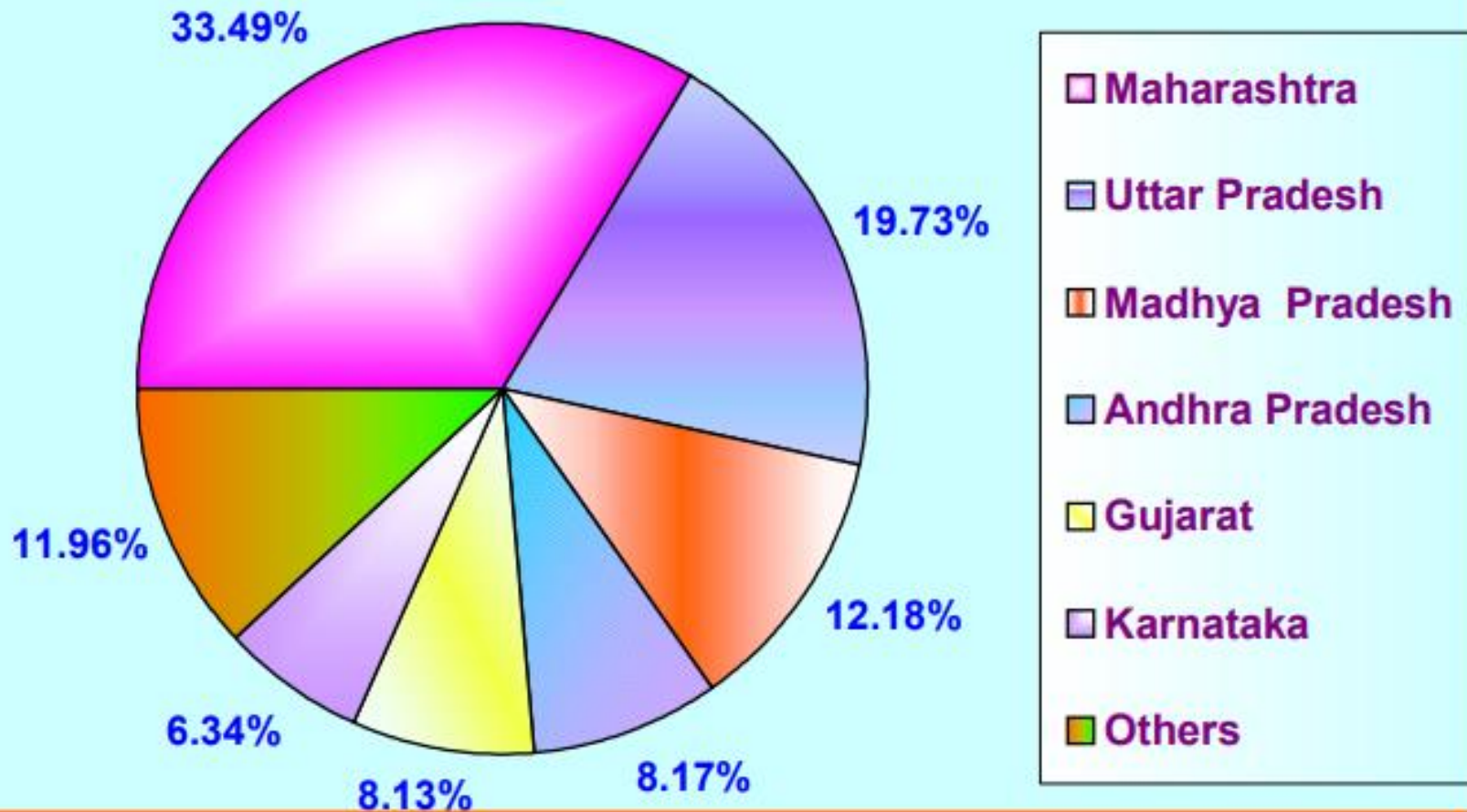
- ✓ Red Grams needs moist and warm weather i.e. 30–35°C during germination and slightly lower temperature (20-25°C) during active vegetative growth.
- ✓ During flowering and pod setting it requires 15-18°C temperature and at maturity, it needs a higher temperature of around 35-40°C.
- ✓ Hailstorm or rain at maturity damages the entire crop.
- ✓ The crop may be grown on any type of soil but sandy loam to clayey loam soils are supposed to be best. Soil must be very deep, well drained and free from soluble salts in them.

**Varieties
of Red
gram
commonly
used in
different
zones of
India.**

I. North-Western Zone: (Punjab, Haryana, Rajasthan, Himachal Pradesh, J & K)	
Early varieties	➤ 'Parbhat', 'UPAS 120', 'T 21', 'Pusa Ageti', 'Pusa 74', 'Pusa 84', 'Pant A 1', 'Pant A 2', 'HPA 1', 'TT 5', 'AL 15', 'Manak', 'H 77-216', 'Sagar' ('H 77-208'), 'BS 1'
Medium varieties	➤ 'Sharda' ('S 8'), 'Mukta' ('R 60')
Late varieties	
II. North-Eastern Zone: (Eastern Uttar Pradesh, Bihar, West Bengal, Orissa, Assam)	
Early varieties	➤ 'Parbhat', 'UPAS 120', 'T 21', 'Pusa Ageti', 'Pusa 74', 'Pusa 84', 'Pant A 1', 'TT 5', 'BS 1'
Medium varieties	183', 'C 11', '20(105)' ('Rabi')
Late varieties	
III. Central Zone: (Madhya Pradesh, Gujarat, Maharashtra)	
Early varieties	➤ 'Parbhat', 'UPAS 120', 'T 21', 'Pusa Ageti', 'Pusa 74', 'J 9-19', 'TAT 10', 'Visakha 1'('TT 6')
Medium varieties	'Khargone 2', 'T 15-15', 'PT 301', 'JA 3', 'No.84', 'No.290-21', 'Hyderabad 185'
Late varieties	
IV. Peninsular Zone: (Andhra Pradesh, Tamil Nadu, Kerala, Karnataka)	
Early varieties	➤ 'Parbhat', 'T 21', 'Pusa Ageti', 'BDN 2', 'PT 221'
Medium varieties	5', 'GS 1', 'CPDM 1', 'F 52', 'C 28', 'SA 1', 'Palanadu'
Late varieties	➤ 'SA 1'

PRODUCTION STATISTICS

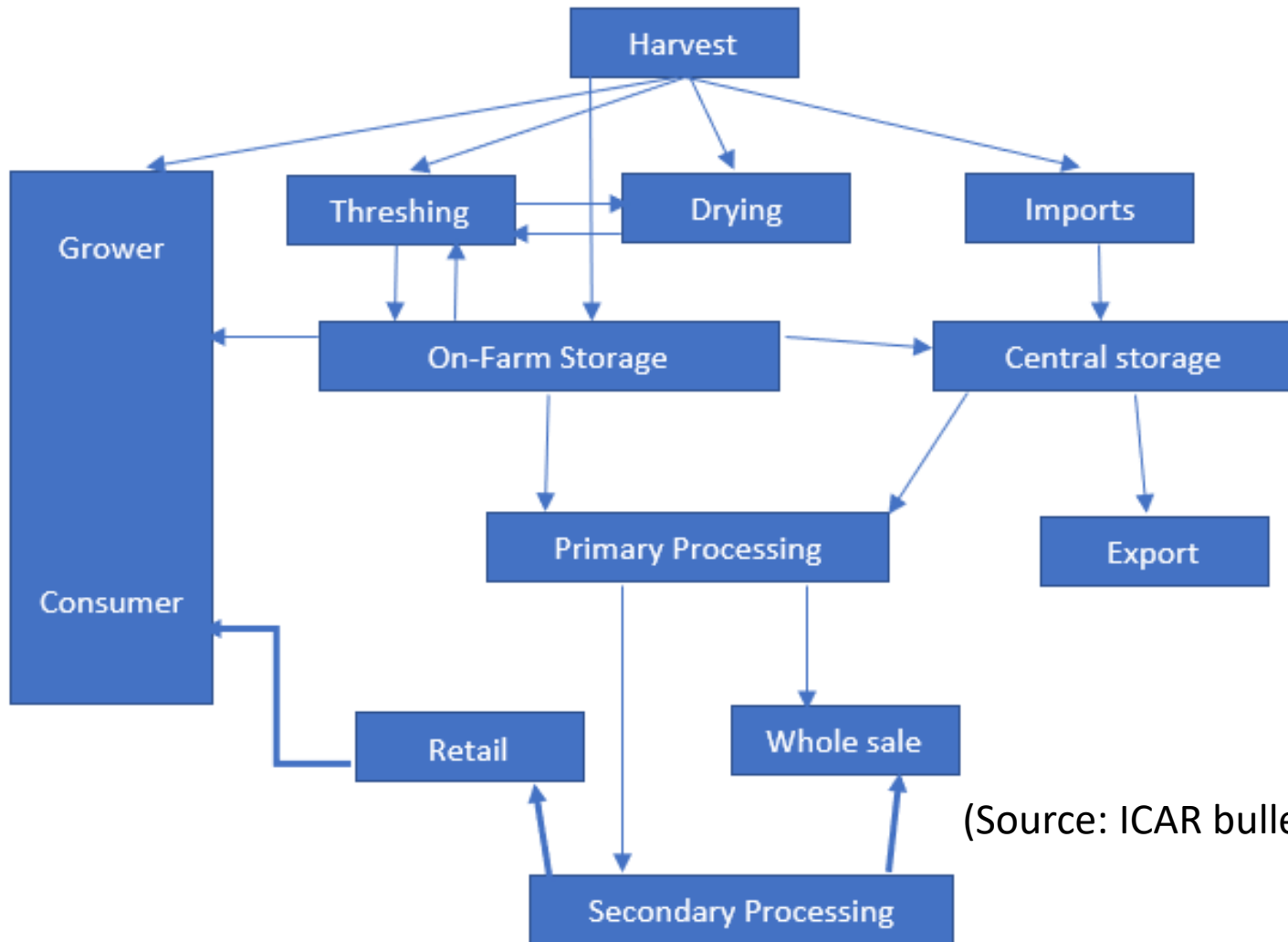
Major Red gram producing states during 2001-2002
(Percent to all India production)



NUTRITIONAL COMPOSITION OF RED GRAM

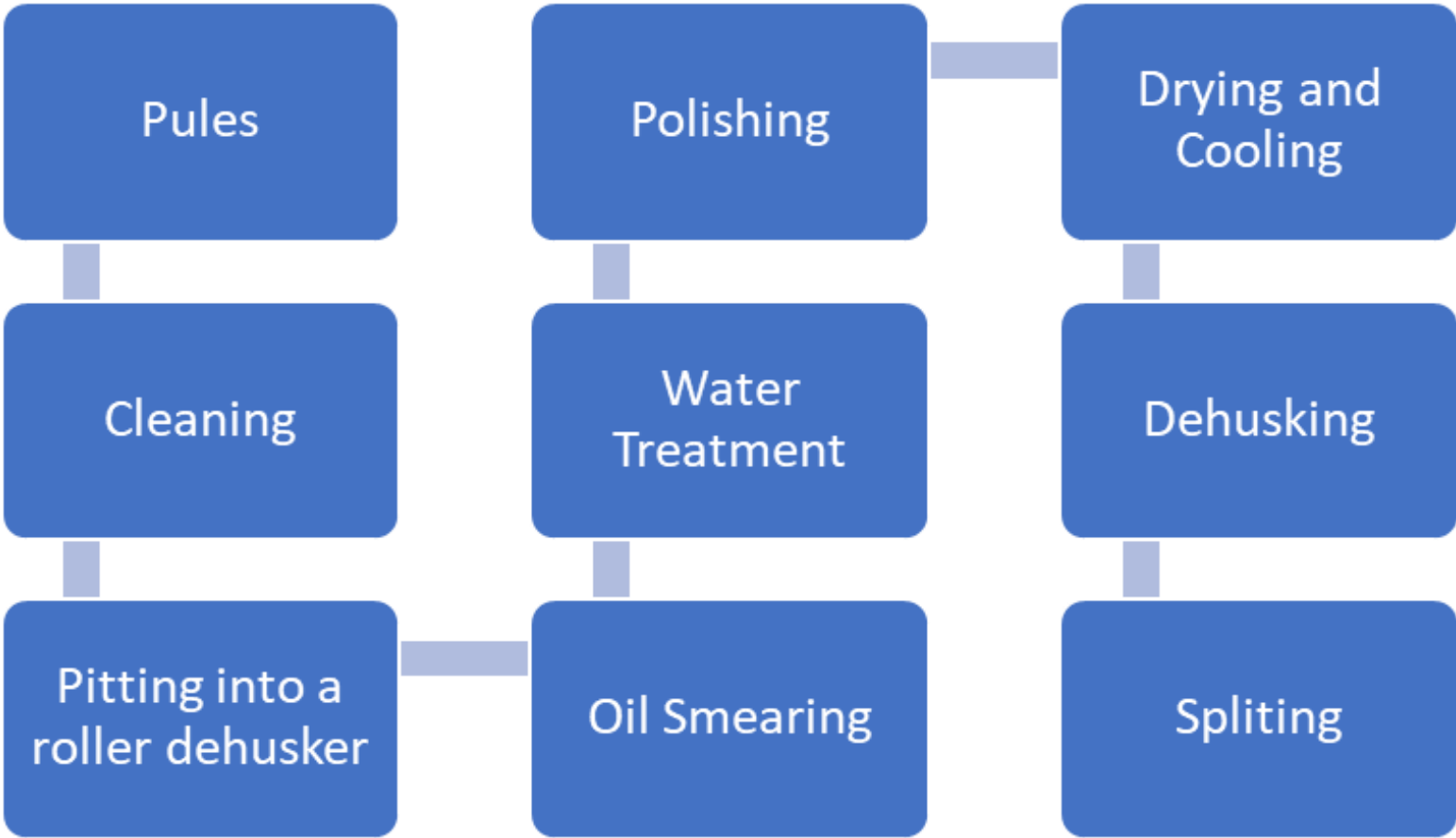
Constituent	Content (per 100g dry seed)
Energy (cal)	335
Protein (g)	22.3
Fat (g)	1.7
Mineral (mg)	13.1
Vitamin	3.6
Riboflavin (mg)	0.45
Niacin (mg)	0.19
Vitamin A. (mcg)	132

POST HARVEST MANAGEMENT OF RED GRAM

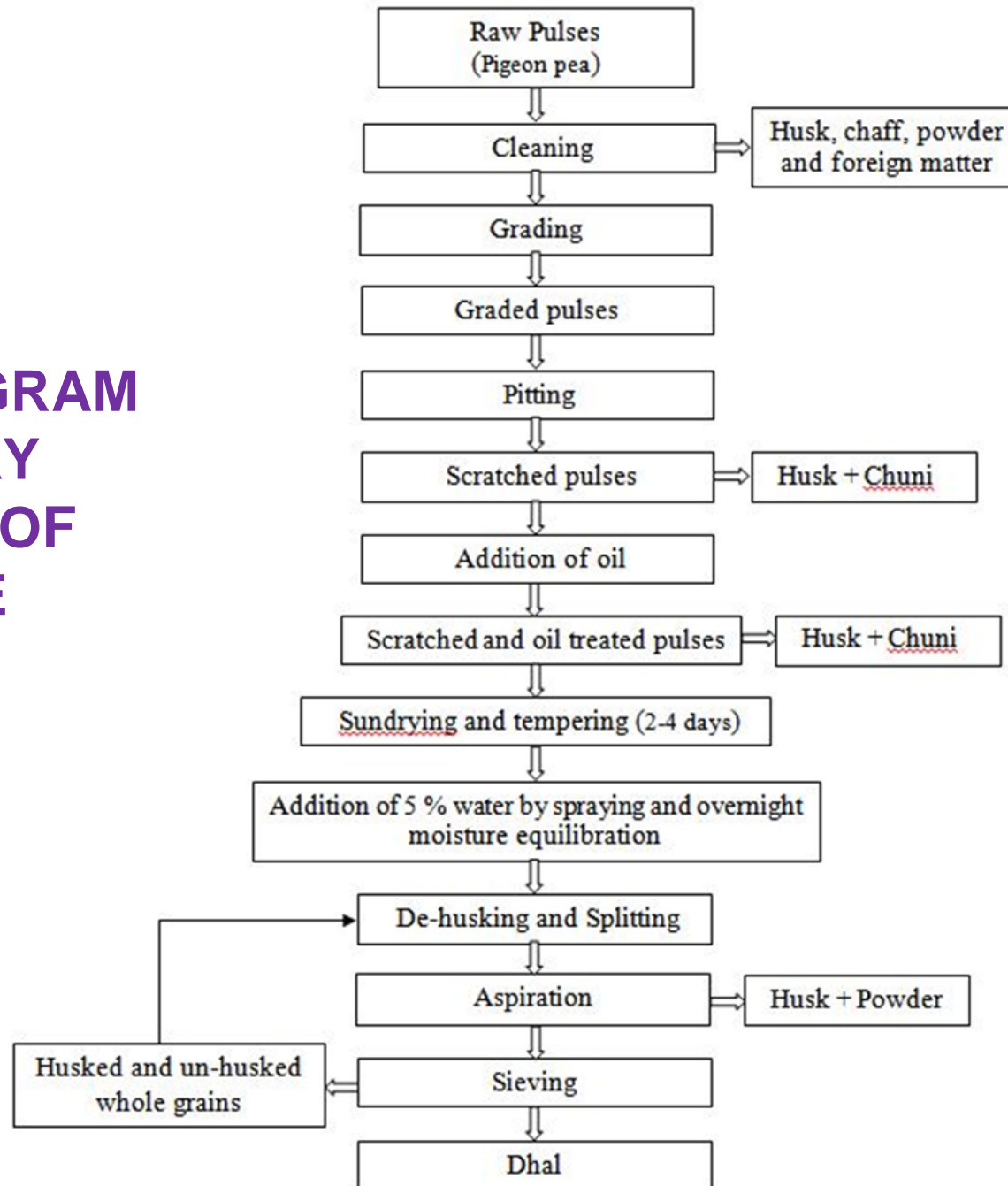


(Source: ICAR bulletin 2019)

FLOW DIAGRAM FOR WET MILLING OF PULSE



FLOW DIAGRAM FOR DRY MILLING OF PULSE



IMPORTANT UNIT OPERATION IN THE PROCESSING OF RED GRAM (PIGEON PEA)

1. Cleaning:

- Red gram are first cleaned before milling.
- Mostly reciprocating air-screen cleaners and reel screen cleaners are used.
- Reciprocating air cleaner has two screen having different size of perforation which are used for separation of lighter materials like dust, leaves, husk etc.
- In reel screen cleaner there 2-4 cylindrical compartments, having different size of perforation screen which are fitted on a 5-7.5 mm diameter shaft. The cylindrical screen drum rotates at 5-35 rpm.

IMPORTANT UNIT OPERATION IN THE PROCESSING OF RED GRAM (PIGEON PEA)

2. Drying:

- Drying of red gram is necessary to reduce the moisture content.
- The process of drying can be performed either through Sun or mechanically.
- Sun drying process usually takes 1-6 days where red gram is spread over the floor/roof in a 5 to 7.5 cm thick layer and followed by manual stirring.
- Mechanical drying is performed either batch type or continuous flow type at temperature ranges from 600 -1200°C.

IMPORTANT UNIT OPERATION IN THE PROCESSING OF RED GRAM (PIGEON PEA)

3. De-hulling:

- De-hulling operation is performed for the removal of seed coat which also helps in reducing the anti-nutritional factors like tannins and insoluble fiber thus enhancing the quality of nutrition, digestibility of protein, texture, taste etc.

IMPORTANT UNIT OPERATION IN THE PROCESSING OF RED GRAM (PIGEON PEA)

4. Splitting:

- Splitting operation involves loosening the bond between the cotyledons and splitting.
- Water at the rate of 1-5 kg/quintal is applied to dehusked pulse grain (gota) and is stored for 2-12 hours and later sun-dried for 4-8 hours.
- For splitting, machines like under-run-disc sheller (URD), impact machine (Phatphatia), roller mill, and hitting the gota against the metal sheet at discharge side of bucket elevator are used.

IMPORTANT UNIT OPERATION IN THE PROCESSING OF RED GRAM (PIGEON PEA)

5. Polishing:

- In this operation dal is imparted with a glazing appearance to improve its consumer's acceptance and market value.
- Depending upon the need, different materials like water, oil, soapstone powder and 'selkhari' powder are applied to dal surface.
- Sometimes removal of sticking powder from dal surface is considered sufficient to improve its surface glaze.

MACHINES REQUIRE FOR SMALL SCALE PROCESSING

- Hot Air Dryer
- Compact Tur Dal Milling Machine
- Pulse Grader
- Vacuum Packaging Machine
- Metal Detector



- Bins
- Racks
- Electrical Panels etc.



EQUIPMENT FOR RED GRAM PROCESSING

1. CLEANING PROCEDURE



Source: Laxmi Toordal Corporate Video Gujarati

EQUIPMENT FOR RED GRAM PROCESSING

2.GRADING PROCEDURE



Source: Laxmi Toordal Corporate Video Gujarati

EQUIPMENT FOR RED GRAM PROCESSING

3. COLOUR SORTER MACHINE:



Source: Laxmi Toordal Corporate Video Gujarati

EQUIPMENT FOR RED GRAM PROCESSING

4. WEIGHING MACHINE :

- ❑ For getting good quality of product, all the ingredients should be properly weighed with the help of digital weighing machine.



EQUIPMENT FOR RED GRAM PROCESSING

5. BAG SEWING MACHINE:

- ❑ For sewing bags after filling and weighing.



EQUIPMENT FOR RED GRAM PROCESSING

6. POUCH FILLING MACHINE:



HEALTH BENEFITS

- ✓ excellent sources of vegetarian protein (provides 39% of recommended daily values of protein).
- ✓ contains good amounts of dietary fiber (provide 39% of fiber per 100 grams).
- ✓ Total isoflavone antioxidants in red gram peas is 0.58 mg. Isoflavones have been found to reduce post-menopausal cancers and osteoporosis.
- ✓ Pigeon peas are gluten-free food items. They particularly preferred as gluten-free food alternatives in gluten-allergy and celiac disease patients.

HEALTH BENEFITS

- ✓ They compose good amounts of B-complex vitamins like folates, thiamin, pyridoxine, pantothenic acid, riboflavin and niacin. Most of these vitamins works as co-factors for the enzymes in carbohydrate, protein and fat metabolism.
- ✓ Dry seeds carry 114% of daily required value folate.
- ✓ 100 g of dry pigeonpeas hold copper-117%, iron-65%, manganese-78%, phosphorus-52%, selenium-15%, calcium-13%, and zinc-25%.
- ✓ good sources of potassium. 100 grams hold, 1392 mg or 30%. Potassium is present inside cell and body fluids.

ADULTERANTS USED IN RED GRAM DAL (SPLIT) AND THEIR DETECTION TESTS

Adulterants	Detection Test
Khesari Dal	Add 50 ml. of diluted HCl acid to a small quantity of Dal and keep on simmering water for about 15 minutes. Development of pink colour indicates the presence of Khesari Dal.
Metanil yellow	Add concentrated HCl to small quantity of Dal in a little amount of water. Immediate development of pink colour indicates the presence of metanil yellow and similar colour dyes.
Lead chromate	Shake 5 grams of Red gram Dal with 5 ml. of water and a few drops of HCl. Pink colour indicates presence of lead chromate.

Source: Central Agmark Laboratory, Directorate of Marketing and Inspection, Nagpur



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