



AATMANIRBHAR BHARAT

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



- Member of the onion family. *Alliaceae*.
- One of the important bulb crop among all bulbous crops grown
- Used for culinary and medicinal attributes.
- Used as a spice or a condiment.
- Rich source of Protein, phosphorus, calcium, magnesium and carbohydrates.
- Grows well under a wide range of climatic conditions. .
- Requires cool and moist climate during vegetative growth and Bulb development stages.

Garlic (*Allium sativum* L.)



- The name garlic is derived from old English word 'gar' means presumably referring to the clove.
 - Origin ... Central Asia (Rai and Yadav, 2006)
 - Spread to Mediterranean region.
 - Now grown throughout the world.
 - Herbaceous annual species, producing narrow and flat leaves.
- One of the most important commercial spice crop





Particular	Fresh peeled garlic cloves	Dehydrated garlic powder
Moisture (%)	62.80	5.20
Protein (%)	6.30	17.50
Fat (%)	0.10	0.60
Mineral matter (%)	1.00	3.20
Fibre (%)	0.80	1.90
Carbohydrates (%)	29.00	71.40
Energy K. Cal	145.00	--
Calcium (%)	0.03	5.20
Phosphorus (%)	0.30	17.50
Potassium (%)	--	0.60

NUTRITIVE COMPOSITION



Particular	Fresh peeled garlic cloves	Dehydrated garlic powder
Magnesium (mg/100 g)	71.00	--
Iron (%)	0.001	0.004
Niacin (%)	--	0.70
Sodium (%)	--	0.01
Copper (mg/100 g)	0.63	--
Manganese (mg/100 g)	0.86	--
Zinc (mg/100 g)	1.93	--
Chromium (mg/100 g)	0.02	--
Vitamin A (IU)	0.40	175.00
Nicotinic acid (mg/100 g)	0.40	--

NUTRITIVE COMPOSITION



Particular	Fresh peeled garlic cloves	Dehydrated garlic powder
Vitamin C (mg/100 g)	13.00	12.00
Vitamin B (mg/100 g)	16.00	0.68
Riboflavin B2 (mg/100 g)	0.23	0.08
Thiamin (mg/100 g)	0.06	--



NUTRITIVE COMPOSITION

Bhima Omkar

- Recommended for Delhi, Gujarat, Haryana and Rajasthan.
- Matures in 120-135 days .
- Average yield is 8-14 t/ha.
- Medium size compact white bulbs.



Bhima Purple

- Recommended for Andhra Pradesh, Bihar, Delhi, Haryana, Karnataka, Maharashtra, Punjab and Uttar Pradesh.
- Matures in 120-135 days
- Average yield is 6-7 t/ha.
- Attractive purple skinned bulbs



VARIETIES (NHRDF)



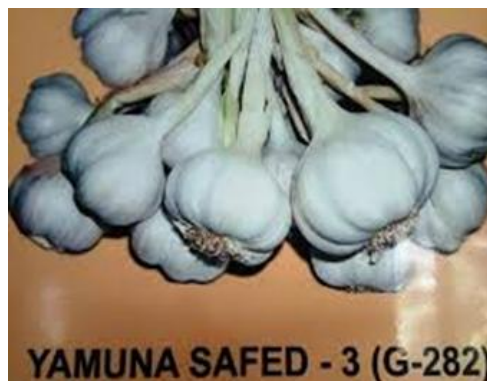
- Agrifound White
- Agrifound Parvati
- Agrifound Parvati-2
- Yamuna Safed
- Yamuna Safed-2
- Yamuna Safed-3
- Yamuna Safed-4



- Nashik
- Shweta,
- Godavari,
- Phule Baswant



- Agrifound Parvati
- Yamuna Safed-3





- India
 - Garlic harvest
 - March – April ↓
 - Stored throughout the year.
 - Fluctuations in daily environmental conditions ↓
 - Very difficult to maintain the quality and quantity ↓
 - Inadequate availability as compared to demand.



- The low productivity of garlic in India is one of the major issues of concern.
- Reasons in India.
- Sub-optimal standards of cultivation.
- Climatic fluctuations.
- Non-availability of virus-free quality planting material.
- Use of local low yielding varieties.
- Domestic availability = 8 – 10 lakh tonnes



- As Spice or Condiments
- Gives Flavour, Aroma and Taste.



Food Products

- Chutneys, Pickles, Dips, Curry Powder, Sauces, Ketchups.



- Garlic Powder, Garlic Salt, Garlic Vinegar, Garlic Bread, etc.





Medicinal Herbal products.....

Pastes

Medicines for

- Stomach disease,
- Sore eyes,
- Earache ,
- VAT, PIT cough.



Dehydrated Products

- Flakes, powder, pickles paste, canned and bottled....





WHY? ETHNIC MARKETS DEMAND INDIAN GARLIC

- Nutritional compositions
- Health benefits
- Medicinal properties.
- Nutritional quality and flavouring components...

HEALTH BENEFITS OF GARLIC



- Boosts Immune System
- Treats Athlete's Food
- Stops Toothaches
- Curbs Cold + Flu Effects
- Lowers Cholesterol
- Treat Insect Bites
- Promote Heart Health
- Clears Nasal Congestion
- Heal Cold Sores
- Kills Parasites
- Lowers Blood Pressure
- Repel Mosquitoes
- Prevent Blood Clots



GARLIC HARVESTING

- Begins when the leaf tops begins to dry, discolor and bend towards the ground.
- Reduced thickness of the sheath leaves surrounding the bulb.
- Generally, garlic matures in 130-180 days depending upon
- Early harvest results in bulbs which are immature and tend to shrivel when cured.
- Garlic bulbs along with top may be cured/dried in the field for two to three days after harvesting to increase storage life by minimizing microbial and fungal infection and water loss during storage.

POST-HARVEST HANDLING



- Curing is often accomplished in several ways. One is curing the bulbs indoors using forced air to dry them or by either placing them in slotted bins, on wired racks or on open trays in a well-ventilated building.



Curing

- Plants tied in bundles of 10 to 15 allowed to dry in a well-ventilated room for 3 or 4 weeks.
- Bulb skin turns papery.
- Cut tops one-half to one inch above main bulb, and trim roots when they are dry.

Bulb Grading

- Sizes: <2 inches, 2 to 2.5 inches, 2.5 to 3 inches, and >3 inches.
- Premium bulbs are those 2.5 inches and larger.





- Maintain bulb in unchanged sound condition
- Maintain longer self life
- Transport with minimum losses
- Marketing & Handling with minimum losses
- Remove heat and water vapour
- Check market glut
- Off – season availability
- Entrepreneurship Development
- Export

OBJECTIVE OF STORAGE TECHNOLOGY



STORAGE TIPS

- Store as cool and dry as possible.
- Relative humidity must be below 70% to prevent mold and/or root sprouting.
- The lower the temperature, the longer the storage life.
- Storage at high temperatures (e.g. room temperature) is satisfactory, but for shorter periods.



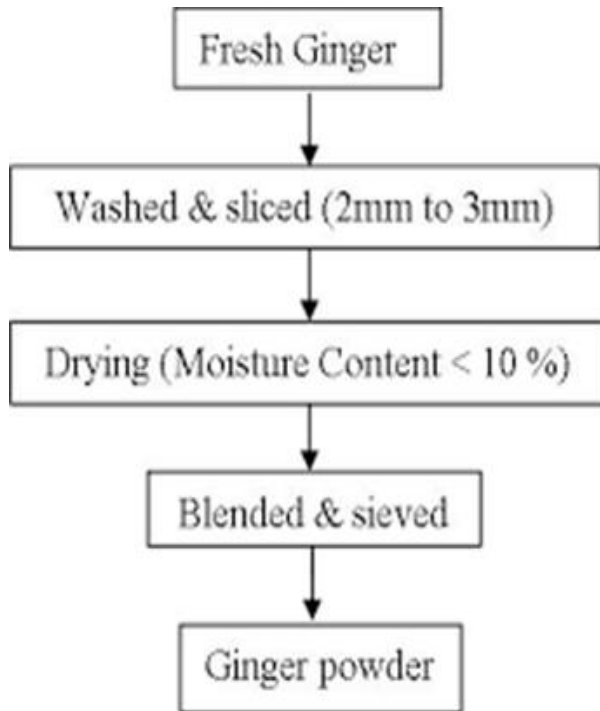


PROCESSED PRODUCTS

- Commercial Forms of Dehydrated Garlic
- Garlic Powder
- Odourless Garlic Powder
- Garlic Salt
- Oil of Garlic
- Garlic Oleoresin



- It is homogenous product,
- 95 % of which passes through a sieve of an apertures size of 250 μ m.



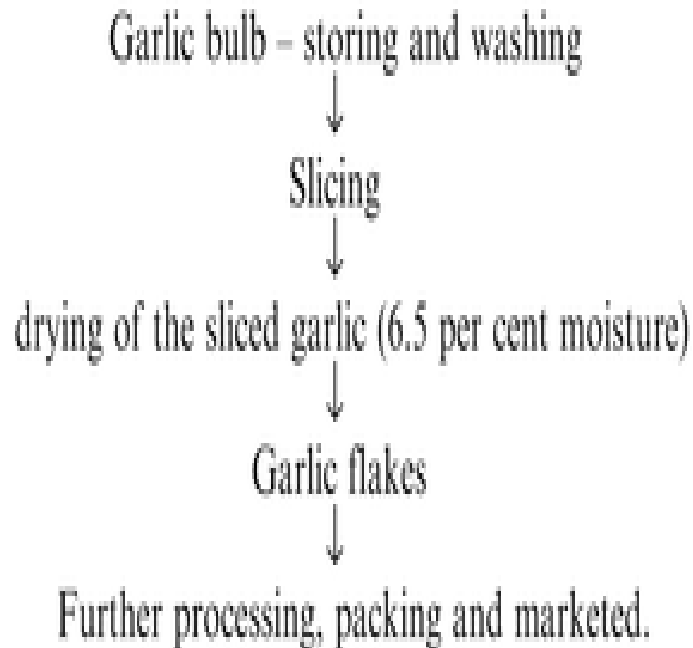
DEHYDRATOR

- Spread out the sliced garlic in a single layer on the dehydrator screens
- Dehydrate at 125°F (52°C) until the garlic is crispy and snaps when you break it, up to 12 hours.
- Rotate screens several times to dry evenly.



DEHYDRATED GARLIC FLAKES OR PIECES

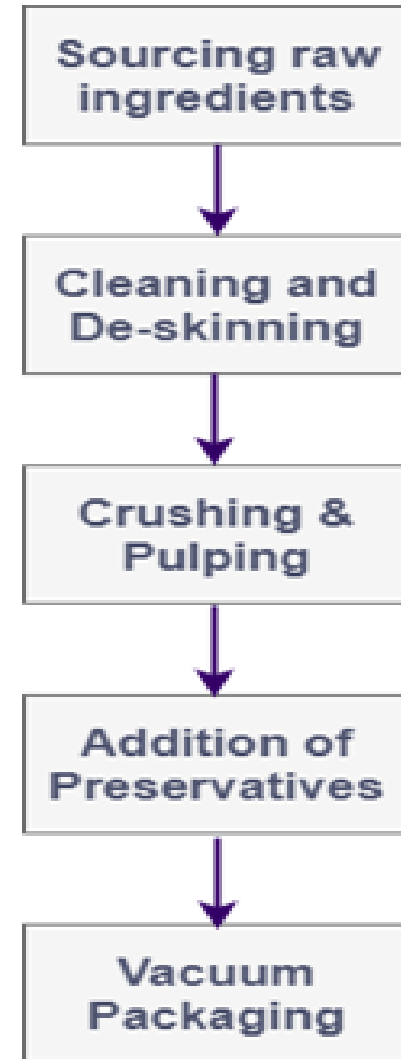
- It is a product prepared by cutting garlic cloves into slices and removing broken pieces smaller than 4 mm by sieving.
- These are products passing through a sieve apertures size from 1.25 mm to 4 mm.
- The particles have an irregular shape and size



GARLIC PASTE:



- Garlic paste with the same flavour as fresh garlic.
- The cleaned bulbs are broken into cloves, peeled and boiled carefully to obtain a homogeneous paste.
- To ensure a pleasing appearance and good shelf-life an addition of 0.1 % SO₂, 15 % NaCl and 0.05 % ascorbic acid is recommended.

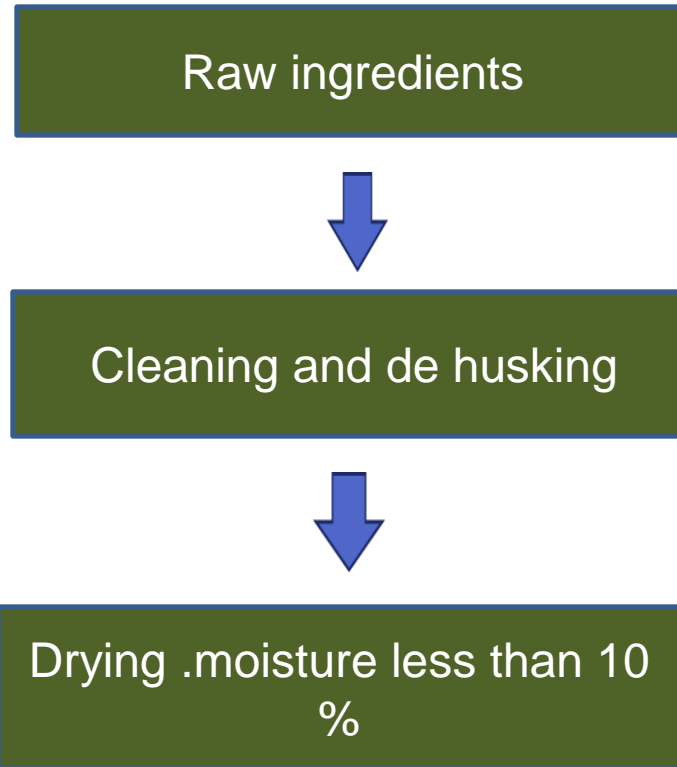


GARLIC SALT

- **Garlic salt is prepared of a free flowing, uniformly blended dry mixture of non-iodized salt.**
- **It has greater culinary latent than powder and one tablespoon is equivalent to clove of fresh garlic.**



GARLIC SALT



Ground garlic with salt , 3 parts salt and 1 part dried garlic powder by volume, or 6 parts salt and 1 part garlic powder by weight



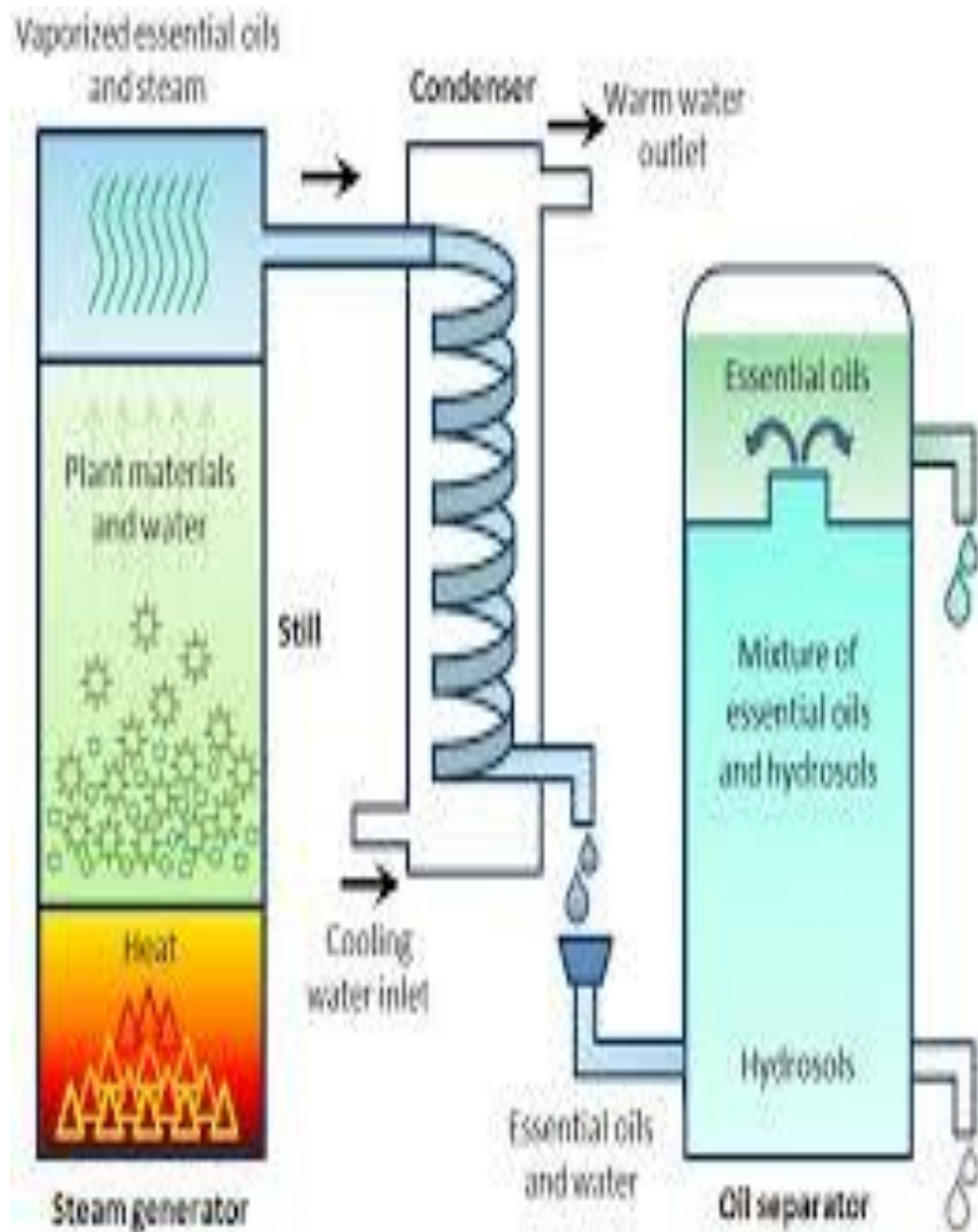
- Garlic oil is derived by steaming crushed garlic and capturing the resultant oil released.
- The yield of garlic oil is around 0.46-0.57 per cent on moisture free basis (quite expensive)
- It is reddish brown over powdering liquid.
- One gram of oil is equivalent in flavoring terms to 900 g fresh or 200 g dehydrated garlic powder.

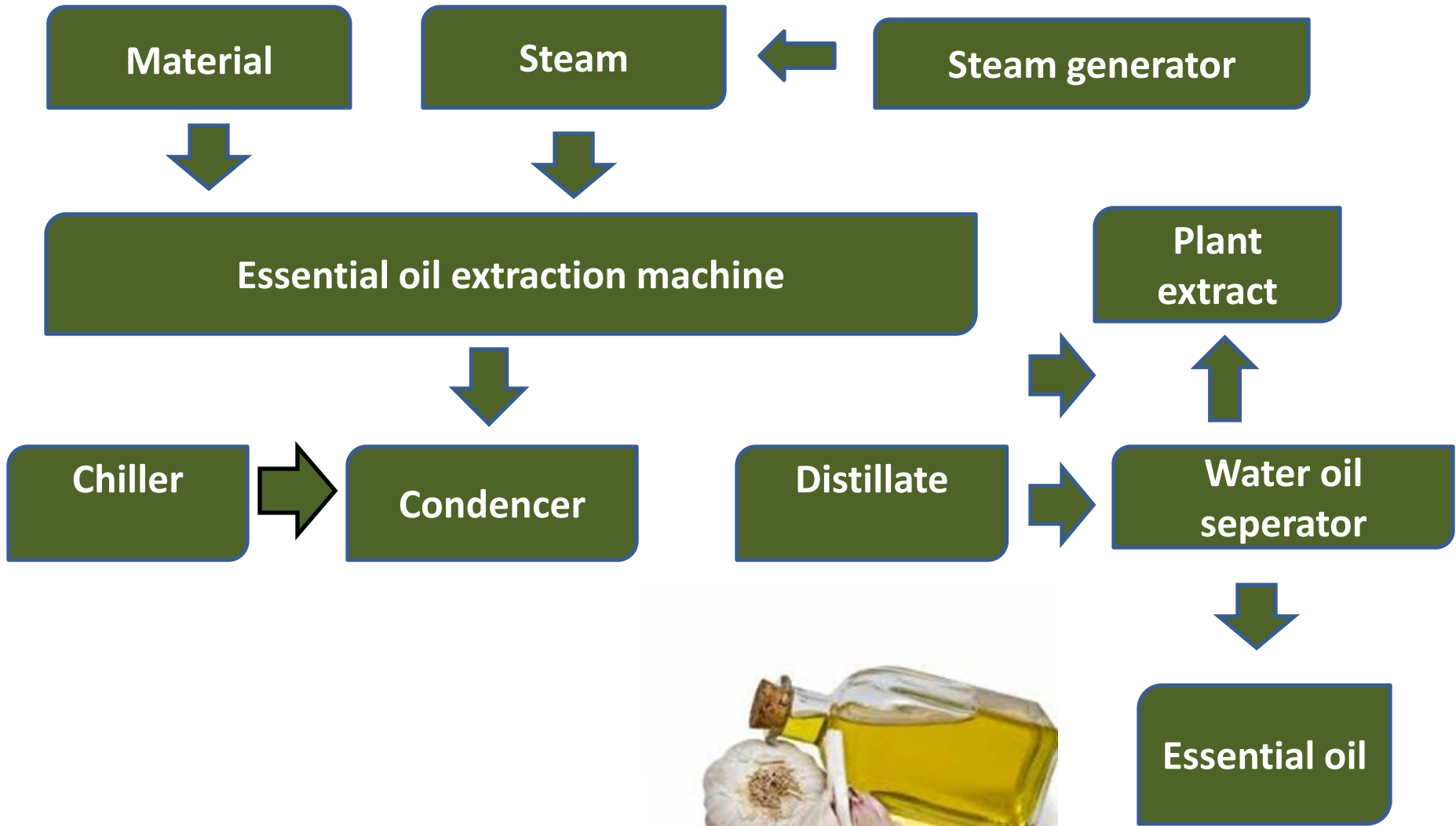




GARLIC OLEORESIN

Garlic oleoresin is also extracted which is dark viscous liquid, having 12 times the flavor of dehydrated garlic and 50 times that of fresh garlic cloves.





ESSENTIAL OIL



PICKLED GARLIC

- Whole, sliced, cubed garlic is pickled in vinegar or brine or vegetable oil or their combinations.
- Picking garlic in vinegar leads to formation of S-allyl cysteine.



- The simple and low cost Garlic processing machines and technologies for processing developed by Department of Processing and Food Engineering, CTAE, MPUAT, Udaipur are: –
- Garlic Grader
- Garlic bulb breaker
- Garlic clove flaker
- Dry Garlic peel remover (de-skinner)
- Fresh Garlic clove peeler

Advanced dryers for the dehydration practices

- Cabinet dryers
- Solar dryers
- Vacuum dryers



GARLIC PEELING MACHINE





GARLIC CLOVE SEPERATING MACHIME





GARLIC CLEANING MACHINE



AUTOMATIC GARLIC PASTE MACHINE





SCOPE OF GARLIC PROCESSING INDUSTRY IN INDIA

- India is one of the leading Garlic producer.
- Garlic is consumed in every home in India.
- processing industry shows constant market demand.
- Bulbs are easily stored for 5-6 months after harvest
- Garlic is used in varied food preparations
- Raw garlic is also used in second generation products like garlic powder, garlic salt, garlic vinegar, garlic cheese croutons, garlic potato chips, garlic bread etc.
- It has also been used as a popular remedy since vedic period



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

For More details Contact:



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THANKYOU