Ministry of Food Processing Industries
Government of India

सत्यमेव जयते

NIFTEM
Knowledge. Innovation. Outreach

Processing of Coriander Powder

AATMANIRBHAR BHARAT

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

INTRODUCTION

Industrial Overview:

- India is the largest producer of spices in the world.
- In India, approximately 80% of the world's total coriander seed is produced.
- spices are cultivated in different climates in various parts of the world.
- Traditionally, spices in India have been grown in small land holdings, with organic farming gaining prominence in recent times.
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- It is a member of the same family (Umbelliferae) and is native to the Mediterranean and the Middle East as carrots and parsley.

INTRODUCTION

Product Description:

- Coriander is an annual herb that grows with branching stems and small white, pinkish flowers to a height of about 90cm.
- It is a member of the same family (Umbelliferae) and is native to the Mediterranean and the Middle East as carrots and parsley.
- Coriander is cultivated for its seeds and leaves, also known as Chinese cilantro and parsley, both of which are used in a variety of dishes.
- Mature brown seeds should be used to ground the powder.
- Coriander powder and its essential oil are known as natural food preservatives, including antibacterial, antifungal, and antioxidant properties.

INTRODUCTION

Market Potential:

- The demand for vegetarian and non-vegetarian recipes is increasing day by day.
- the market for spices is also increasing nationally and internationally.
- In 2019-20, exports of Indian spices and spice products increased 19,505.81 crore to Rs 21,515.4 crore (USD 3033.44 million).
- India exported a total of 11,00,250 MT of spices and spice items during the preceding year of 2018-19.
- The Indian share is 80%, Morocco 4.7%, Bulgaria and Canada 3.75%, Romania 3.12%, China 2.2%, and Syria 2.5% each.

INTRODUCTION

Market Potential:

- The world's two biggest producing states are Madhya Pradesh and Rajasthan, adding more than two-thirds of the country's total production.
- The other growers are Gujarat, Assam, Andhra Pradesh, Karnataka, Orissa, and Tamil Nadu.
- From the southern states of India, Delhi is the major domestic buyer of coriander powder.
- The spice processing agencies that consume about 50 percent of the products are mainly based on coriander powder.
- The demand from this industry peaks from April to June, which also coincides with the peak arrival season.

INTRODUCTION

Raw Material Description (Plant)

- Coriander, ***Coriandrum sativum***, is an erect annual herb in the family Apiaceae.
- The leaves of the plant are variable in shape, broadly lobed at the base of the plant, and slender and feathery higher on the flowering stems.
- It is a soft, hairless plant.
- The plant produces an oval-shaped fruit that is yellow-brown in color and contains two seeds.
- Coriander is an annual plant, surviving only one growing season and reaches up to 50 cm.

INTRODUCTION

Raw Material Description:

- Within 90 to 135 days, the coriander crop matures.
- To prevent shedding losses, the correct harvesting time is in the morning hours.
- Coriander is commonly found both as whole dried seeds and in ground form.
- They are used extensively for grinding and blending purposes in the spice trade.
- Ground coriander seed loses flavor quickly in storage and is the best ground fresh.
- the seed has a volatile oil content of around 0.4-1.8%.

INTRODUCTION

Types of Raw Material:

- As the coriander seed is the only raw material is the coriander powder processing it is important to select a suitable variety.
- The different majorly cultivated varieties are given below:
  - Sadhana (CS-4)
  - Sindhu (CS-2)
  - Sudha (LCC-128)
  - Swathi (CS-6)
  - APHU Dhania-1 (LCC-170)
  - Suguna (LCC-236)
  - Suruchi (LCC-234)
  - Susthira (LCC-219)

PROCESS & MACHINERY REQUIREMENT

Raw Material Aspects:

- Coriander is a flowering plant that belongs to the Parsley family, is native to Southern Europe, North Africa, and West Asia.
- Coriander is an aromatic spice, popularly referred to as Dhania.
- Coriander powder is obtained from these coriander plant seeds.
- The fruit is globular, 3 to 4 mm in diameter, and splits into two locules of one seed each when pressed.
- To sweet and savory food recipes, it gives a slight flavor and fragrance.
- Seeds are completely dried and crushed to form a powder.

PROCESS & MACHINERY REQUIREMENT

Source of Raw Material:

- In the year 2020, Madhya Pradesh produced the largest amount of coriander seeds. Rajasthan is the second-largest, and Gujarat is India's third-largest producer of coriander seeds.
- In 2020, the annual production of coriander seeds for that year was over 755,000 metric tonnes.
- The coriander is also cultivated in Assam, Haryana, Maharashtra, Uttar Pradesh, Bihar, Telangana, and Chhattisgarh in large areas.
- The Raw material can be procured directly from the producer, local vendor.
- Contract farming can become the second option for raw material availability.

PROCESS & MACHINERY REQUIREMENT

Technologies:

Traditional methods

- Cleaning of seed is done through a wind-based separator.
- Seeds are further dried in the shade to bring the moisture levels down to 9%.
- The second drying stage should be in the shade to prevent over-heating of the seeds.
- Traditionally, grading has been done through sieves by laborers.
- Traditional Chakki has lower yield efficiency which leads to a loss in form of ground powder.
- The packaging of coriander was in polybags.

PROCESS & MACHINERY REQUIREMENT

Technologies:

Modern method

- This method involves Pre-Cleaner, Gravity Separator.
- There are modern machines like color sorters available for grading the coriander seeds not only on the basis of shape and size but also shape.
- The latest type of pulverizer includes classified material is conveyed into the cyclone for collection and bagging.
- The packaging is involved this pouch is developed using quality materials.
- These pouches are developed by ensuring high durability and better design.

PROCESS & MACHINERY REQUIREMENT

Processing Process:

- For exporting the seed spices, quality is the most important criterion.
- The right time of coriander harvesting is a very important activity in the prospect of quality of coriander powder production.
- Some of the processes involved in between harvesting and delivery to processing plants.

PROCESS & MACHINERY REQUIREMENT

Manufacturing Process:

Sun Drying:

- Sun drying is necessary to remove the moisture from plants and seeds under the sun.

Threshing of seed spices:

- After proper drying, the coriander plant is taken to the threshing process.
- traditionally the threshing of seed spices is performed by treading the crop by stick beating.
- Nowadays the thrasher is invented that reduces the physical losses of seeds.

PROCESS & MACHINERY REQUIREMENT

Manufacturing Process:

Cleaning/Grading:

- Various machines are used for special functions.
- Magnet drum/pulley is used to separate iron particles.
- A Vibro separator is being used to separate identical weed seeds from the product.
- Electronic color sorters are used to separate discolored seeds to enhance the color value of the final product.
- A gravity separator can also be used to separate undesirable material on the basis of weight.

PROCESS & MACHINERY REQUIREMENT

Manufacturing Process:

Seed Roasting/Drying:

- The typical aroma and flavor of coriander seed are not fully developed until it is completely dry.
- Seed roasting machines are used to dry seeds.
- It is necessary to ensure that the drying temperature does not reach 100°C, as this decreases the amounts of volatile oils.

PROCESS & MACHINERY REQUIREMENT

Manufacturing Process:

Grinding:

- The process is the final stage where the dried seeds of coriander are grounded.
- it is turn into a fine powder which is further processed by Pulverizing.

PROCESS & MACHINERY REQUIREMENT

Manufacturing Process:

Pulverizing:

- It's a type of grinding process which grinds the given product to a very fine-sized powder.
- A dust collector is provided in the system for ensuring dust-less operation and for no loss of ground powder.

Packaging:

- The finished product is then packaged and stored for supply.

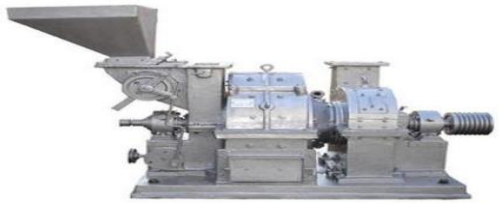
PROCESS & MACHINERY REQUIREMENT

Flow Chart:

Machine and Equipments	Description	Machine Image
Silos	These Equipments are class of storage Equipments which are specifically designed for dry grain raw material of small granule composition. It is used to store grains.	
De-Stoner	This machine is applied for the efficient separation of stones and metal, glass, and other high- density impurities from a stream of grain.	
.Vibro separator	Vibro separator is being used to separate identical weed seed from the product.	

PROCESS & MACHINERY REQUIREMENT

Flow Chart:

Machine and Equipments	Description	Machine Image
Coriander seed roasting machine	This machine is used for Coriander seed roasting, machine uses an advanced drum plus copy board structure.	
Powder grinding machine	The powder grinding machine is primarily used For food, herbs, coriander powder, resin powder, powder, chemicals, pharmaceuticals, and other weak electrical substances	
Pulverizer	A pulverizer is a mechanical device used for pulverizing, crushing, and grinding a wide variety of materials to varying finesses.	

PROCESS & MACHINERY REQUIREMENT

Flow Chart:

Machine and Equipments	Description	Machine Image
Automatic Pouch Filling & Packaging Machine	This Machine is used for filling of coriander powder in different volumes pouches as per setting followed by sealing them.	

Process & Machinery Requirement

Additional Machine & Equipment:

Machine and Equipments	Used	Machine Image
Drum Sieve	A quality drum sieve machine is used for removing large impurities from coriander seeds at high capacities. Careful preliminary cleaning reduces the wear and tear on the downstream equipment in the production process.	
Food Grade Conveyor	These are conveyors with food grade belt to maintain food safety standards set by monitoring authorities.	

Process & Machinery Requirement

General Failures & Remedies:

S. No.	General Failures	Remedies
1.	Ball bearing failure of various machine	▪ Proper periodic lubrication of all bearings in various machines. ▪ Regular replacement of all bearing to prevent critical failures.
2.	Power Drive Overload	▪ Ensure proper weighing & metering specially in case of semi-automatic plant. ▪ Install warning sensor in buffer region of loading capacity to ensure efficient operation.
3.	Mechanical Key Failure	▪ Ensure that mechanical keys are replaced as per there pre-defined operational life. ▪ Prevent Overloading.

Cont..

Process & Machinery Requirement

General Failures & Remedies:

S. No.	General Failures	Remedies
4.	Loss of Interface	▪ This problem is dominant in newly established automatic plant, one must learn to maintain rules in plant & ensure no employee goes near transmission lines, unless authorised. ▪ Provide proper physical shielding for the connections.
5	Improper Sieving (Optical Sorters)	▪ This problem fundamentally occurs due problem with optical sensors. ▪ The solution involves cleaning the optical surface & if problem persists replacing the sensor.

PROCESS & MACHINERY REQUIREMENT

Nutritional Information:

Health benefits of Coriander powder

- Help lower blood sugar.
- Rich in immune-boosting antioxidants.
- Beneficial for heart health
- Protect brain health.
- Promote digestion and gut health.
- Fight infections.
- Protect skin.
- Easy to add to the diet.

PROCESS & MACHINERY REQUIREMENT

Nutritional Information:

Calories	**Net Weight**
Total Fat	0.5g
Sodium	46mg
Total Carbohydrate	3.7g
Dietary Fibre	2.8g
Sugar	0.9g
Protein	2.1g
Calcium	67.00mg
Iron	1.77mg
Potassium	521mg

PROCESS & MACHINERY REQUIREMENT

Export Potential & Sales Aspect:

- Total exports of spices from India totaled 1.08 billion kilograms, valued at US$ 3.11 billion in 2017-18.
- The production of global coriander seeds is estimated at about 6 lakh tonnes.
- In addition, in-home gardens, coriander is widely grown on a small scale and is rarely listed in official figures.
- The Indian share of coriander powder is 80 percent, Morocco 4.7 percent, Bulgaria and Canada 3.75 percent, Romania 3.12 percent, China 2.2 percent, and Syria 2.5 percent.
- The demand from this sector peaks from April to June, which also coincides with the peak arrival period.

PM-FME Scheme

The objectives of the scheme are:

- Support for capital investment for up-gradation and formalization with registration for GST, FSSAI hygiene standards and Udyog Aadhar;
- Capacity building through skill training, imparting technical knowledge on food safety, standards & hygiene and quality improvement;
- Hand holding support for preparation of DPR, availing bank loan and up-gradation;
- Support to Farmer Producer Organizations (FPOs), Self Help Groups (SHGs), producers cooperatives for capital investment, common infrastructure and support branding and marketing.
- https://mofpi.nic.in/pmfme/docs/SchemeBrochureI.pdf

For More details Contact:

National Institute of Food Technology and Entrepreneurship and Management
Ministry of Food Processing Industries
Plot No. 97, Sector-56, HSIIDC, Industrial Estate, Kundli,
Sonipat, Haryana-131028

Website: http:www.niftem.ac.in

Email: pmfmecell@niftem.ac.in
Call: 0130-2281089