

# PROCESSING OF GREEN CHILLI SAUCES



**AATMANIRBHAR BHARAT**

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

## Industrial Overview:

- Green Chilli Sauce is a table condiment or sauce made from green Chilli.
- It's a consists of green Chilli, sugar, vinegar, salt with seasonings & spices.
- It is used as condiments, dressings and seasonings.
- it can be consumed along with cooked food or used as an ingredient in cooking to add complementary or contrasting flavors.
- Chilli sauces has become a significant part of the modern kitchen.



## Product Description:

- Spices & flavors may include Onions, Coriander, Cloves, Cumin, Garlic, Mustard, Celery, Ginger etc.
- It's used as a condiment to dishes that are served hot, fried or greasy
- It can also be used as an ingredient for certain dishes
- It can also be used as an ingredient in the other sauces
- It's available in pouches, plastic bottles, glass bottles & tubs
- Served in many fast food joints & restaurants



## Market Potential

- Global Green Chilli Sauce market was valued USD 3.34 billion in 2019
- Expected to Grow at CAGR of 5.8% from 2020 to 2025
- It's global market size is projected to reach USD 4.42 billion by 2025
- Indian market is expected to Grow at CAGR of 7.2% from 2020-25
- Market Drivers:
  - ❑ Increase in demand for Fast Food
  - ❑ Increasing is number of restaurants
  - ❑ Increasing Green Chilli Production in Country
  - ❑ Rise in income of Consumer



# FACTORS AFFECTING MARKET POTENTIAL



# INTRODUCTION

➤ Raw Materials Required:

- Green Chilli
- Onion Powder
- Sugar
- Salt
- Garlic Powder
- Mustard
- Vinegar

➤ Consumables Required:

- Diesel
- Cleaning Agents



## Raw Material Description:

- Chilli is considered one of the most important commercial spice crops and is a widely used universal spice, named a wonder spice.
- Different varieties are cultivated for varied uses like vegetable, pickles, spice and condiments.
- Chilli is botanically known as *Capsicum annum* L.
- It is believed to have originated in South America.
- Chillies are referred to as chillies, chile, hot peppers, bell peppers, red peppers, pod peppers, cayenne peppers, paprika, pimento, and capsicum in different parts of the world.



# INTRODUCTION

## Types of Raw Material:

### State wise MAJOR COMMERCIAL VARIETIES of chilli

S. no.	State	Variety
1.	Andhra Pradesh	Jwala, X-235, G-1, G-2, G-3, G-4, G-5, LCA-205, 206, 235, Karakulu, Sannalu,
2.	Karnataka	Jwala, Bayadgi, G-1, G-2, G-3, G-4, G-5, Pusa Jwala
3.	Kerala	Jwala, Sadabahar, Champa, CO-1, Nandan, K-1
4.	Pondicherry	K-1, K-2, CO-1, CO-2
5.	Tamil Nadu	K-1, K-2, CO-1, CO-2, CO-3, PMK-1, PMK-2, Borma Wonder, Sannam, Palam
6.	Bihar	Rori, Moti Mirchi, Chittee
7.	Haryana	NP-46-A, Pusa Jwala, Pusa Summer



# INTRODUCTION

## Types of Raw Material:

### State wise MAJOR COMMERCIAL VARIETIES of chilli

S. no.	State	Variety
8.	Himachal Pradesh	Solan Yellow, Hot Portugal, Pachad Yellow, Sweet Banana, Hungarian Wax, Punjab Lal
9.	Jammu & Kashmir	NP-46-A, Ratna Red, California Wonder
10.	Punjab	CH-1, Sanauri
11.	Uttar Pradesh	NP-46, Jwala Pant C-1, Desh, Pahadi, Kalyanpur, Chaman and Chanchal.
12.	Assam	NP64-Am Pusa Jwala, Surya Mukhi, Krishna, Balihuri
13.	Tripura	Jwala, Suryamukhi, Krisha, Baliurwai
14.	West Bengal	Siti and Suti, Akashi, Kajari, Bow, Dhani, Bullet, Dhala

# INTRODUCTION

## Types of Raw Material:

### State wise MAJOR COMMERCIAL VARIETIES of chilli

S. no.	State	Variety
15.	Goa	Cacana, harmal, Tanvati, Lavangi
16.	Gujarat	K-2, Pant C-1, Jawahar-218, NP-46-A, Jwala
17.	Rajashtan	CH-1, NP-46-A, Jwala, Pant C-1, G-3, G-5
18.	Madhya Pradesh	Pusa Jwala, Sona-21, Jawahar, Sadabahar, Agni.
19.	Maharashtra	Pathori, Bugayati, Dhobri, Black seed, Chaski, Bhiwapuri
20.	Orissa	Jwala, Deshi, Sadabahar.

## Raw Material Aspects:

- Capsicum plants are herbaceous or semi-woody annuals or perennials.
- The flowers are small, white and borne singly or in clusters of 2 or 3 in the axils of the leaves.
- The fruits are of diverse shapes and sizes depending upon the variety
- Pungency in chilli is due to the alkaloid “capsaicin”.
- The hotter the chili pepper, the more capsaicin it contains.
- The hottest varieties include Naga Jalokia, habanero, and Scotch bonnet peppers.



## Source of Raw Material:

- India is the world leader in chilli production followed by China and Pakistan.
- India is not only the largest producer but also the largest consumer of chilli in the world.
- In India, Chillies are grown in almost all the state throughout the country.
- Andhra Pradesh( 26% ) is the largest producer of Chilli in India.
- Another state in India i.e. Maharashtra (15%), Karnataka (11%), Orissa (11%), Madhya Pradesh (7%) and other states contributing nearly 22% to the total area under Chilli.



## Technologies:

### Chopping and Pulping method

- This method involves chopping fresh fruits and boiling them.
- The fresh fruits are stem removed after harvesting and then chopped into small pieces.
- The chopped fruits are taken for boiling for further processing which is followed by filtration using a filtration unit



## Technologies:

### The grinding and Filtration method

- As mentioned in the name the chilli is grinded before boiling.
- The fruit is grounded after de-stemming and washing.
- The grounded fruit is filtered using a filtration machine.
- The filtered pulp is then taken to the boiling plant.
- After proper boiling, the fruit pulp is then taken to further processing.



## Manufacturing Process:

- Raw materials are procured from the local vendor
- All raw materials are placed in the inventory
- Green Chilies are washed thoroughly to remove surface impurities
- They are then fed to cutter, which cuts them in required sizes & removes stems
- Chopped Green Chilies are then fed to Pulper machine
- It grinds them into pulp with some added RO-Purified Water



## Manufacturing Process:

- This pulp is fed to mixer vessel, where it's mixed with other raw materials
- Pulp is simultaneously heated utilizing temperature from steam
- Mixture is then fed to Evaporator which remove all excess water
- It helps achieve desired concentration in Green Chilli Sauce
- Green Chilli Sauce is now cooled & tested for quality & taste





## Manufacturing Process:

- The finished product is then fed to pasteurizer for pasteurization
- After pasteurization product is filled in bottles in aseptic environment
- Aseptic Bottle Filling & Capping Machine is used for the process
- Product is now ready for sale





# PROCESS & MACHINERY REQUIREMENT

<b>Machine and Equipments</b>	<b>Description</b>	<b>Machine Image</b>
<p><b>Rotary Fruit &amp; Vegetable Washing Machine</b></p>	<ul style="list-style-type: none"> <li>➤ It's a water washing class machine which utilizes mainly water</li> <li>➤ This machine utilizes rotating tumbler to enhance washing</li> </ul>	
<p><b>Fruit &amp; Vegetable Slicer</b></p>	<ul style="list-style-type: none"> <li>➤ It's a Cutter class machine, used to slice given fruits &amp; veges</li> <li>➤ In this case is used to chop the Green Chilies for further process</li> </ul>	



# PROCESS & MACHINERY REQUIREMENT

## Flow Chart:

<b>Machine and Equipments</b>	<b>Description</b>	<b>Machine Image</b>
<b>Fruit &amp; Vegetable Pulping Machine</b>	<ul style="list-style-type: none"> <li>➤ It's a Pulper class machine, used to pulp fruits &amp; vegetables</li> <li>➤ It simply crushes fruits &amp; vegetables to extract the pulp</li> </ul>	
<b>Steam Jacketed Mixer Vessel</b>	<ul style="list-style-type: none"> <li>➤ It's a mixer class machine, used to mix solution with precision</li> <li>➤ Steam jackets provide appropriate temperature control</li> </ul>	


# PROCESS & MACHINERY REQUIREMENT

## Flow Chart:

<b>Machine and Equipments</b>	<b>Description</b>	<b>Machine Image</b>
<b>Continuous Evaporator</b>	<ul style="list-style-type: none"> <li>➤ It's a evaporator class machine, used to reduce water content</li> <li>➤ In this case it's used to reduce water content of pulp</li> </ul>	
<b>Tubular Pasteurizer</b>	<ul style="list-style-type: none"> <li>➤ Pasteurization is a process of treating foods with mild heat</li> <li>➤ It basically eliminates pathogens &amp; extend shelf life</li> </ul>	



# PROCESS & MACHINERY REQUIREMENT

## Flow Chart:


Machine and Equipment	Description	Machine Image
<p><b>Aseptic Bottle Filling &amp; Capping Machine:</b></p>	<ul style="list-style-type: none"> <li>➤ It's basically a filling &amp; capping machine to fill sauce in bottles</li> <li>➤ Aseptic environment prevents biological contamination</li> </ul>	

# PROCESS & MACHINERY REQUIREMENT

## Additional Machine & Equipment:

Machine and Equipments	Used	Machine Image
<b>Weighing machine</b>	Used for weighing the raw material and ingredients	
<b>Food Grade Conveyor</b>	These are conveyors with food grade belt to maintain food safety standards set by monitoring authorities.	

## Additional Machine & Equipment:

<b>Machine and Equipments</b>	<b>Used</b>	<b>Machine Image</b>
<b>Boiler</b>	<ul style="list-style-type: none"> <li>➤ It's steam generating device which simply produces steam</li> <li>➤ It utilizes heat generated by burning appropriate fuel</li> </ul>	

## General Failures & Remedies:

S. No.	General Failures	Remedies
1.	Ball bearing failure of various machine	<ul style="list-style-type: none"> <li>➤ Proper periodic lubrication of all bearings in various machines.</li> <li>➤ Regular replacement of all bearing to prevent critical failures.</li> </ul>
2.	Power Drive Overload	<ul style="list-style-type: none"> <li>➤ Ensure proper weighing &amp; metering specially in case of semi-automatic plant.</li> <li>➤ Install warning sensor in buffer region of loading capacity to ensure efficient operation.</li> </ul>
3.	Mechanical Key Failure	<ul style="list-style-type: none"> <li>➤ Ensure that mechanical keys are replaced as per there pre-defined operational life.</li> <li>➤ Prevent Overloading.</li> </ul>



## General Failures & Remedies:

S. No.	General Failures	Remedies
4.	Loss of Interface	<ul style="list-style-type: none"> <li>➤ This problem is dominant in newly established automatic plant, one must learn to maintain rules in plant &amp; ensure no employee goes near transmission lines, unless authorised.</li> <li>➤ Provide proper physical shielding for the connections.</li> </ul>
5	Improper Sieving (Optical Sorters)	<ul style="list-style-type: none"> <li>➤ This problem fundamentally occurs due problem with optical sensors.</li> <li>➤ The solution involves cleaning the optical surface &amp; if problem persists replacing the sensor.</li> </ul>

# PROCESS & MACHINERY REQUIREMENT

## Nutritional information:

### Nutritional value of green Chilli

S. No.	Parameters	Chillies (green)
1.	Moisture	85.700 gm
2.	Protein	2.900 gm
3.	Fat	0.600 gm
4.	Minerals	1.000 gm
5.	Fibre	6.800 gm
6.	Carbohydrates	3.000 gm
7.	Energy	29.000 K gm
8.	Calcium	30.000 mg
9.	Phosphorus	80.000 mg
10.	Iron	4.400 mg

## Export Potential & Sales Aspect:

- The demand for green chilli sauce has been witnessing significant growth with increasing popularity across the globe.
- Introduction of innovative sauce flavors with health beneficial attributes have further augmented the demand for hot sauce.
- Apart from that, increasing urban population, modernization of storage and logistics, rising number of expatriates in countries and cultural exchanges are some of the other factors that catalyse the growth of the hot sauce market.



## 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/SchemeBrochure1.pdf>



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