

PROCESSING OF ASAFOETIDA



AATMANIRBHAR BHARAT

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

Raw Material Description (Plant)

Botanical Name - *Ferula asafoetida*

Commercial Part- Oleogum resin extracted from rhizome and thickened root

Processing method: Twist the plant and then cut the transverse roots

Color: grayish-white when fresh, darkening with age to yellow, red, and eventually brown

Common Names in India: Hing, Heeng, Hengu, Hingu, Ingu, Inguva, Kayam, Perungayam, Perunkaya, Raamathan



INTRODUCTION



Industrial Overview

- In treatment of asthma, bronchitis, chest congestion, whooping cough, and other respiratory problems
- Cleanses the intestinal flora and augments the digestive fire
- Eliminates all kinds of stagnation in the gastrointestinal tract, relieves colic and cramping, and drives out intestinal gas.
- Potent antimicrobial and antiseptic properties that aid in treating toothache, bleeding gums, bad breath or halitosis, and harmful cavities
- Effective in stimulating the pancreatic cells to secrete more insulin, as improved insulin levels are known to bring down the blood sugar levels to normal.
- Also used as a pesticide and insecticide for protecting crops from pests and for repelling mosquitoes and certain other insects
- Antimicrobial for the treatment of skin issues as well as anti-inflammatory for relieving pimples and other minor inflammations.

Industrial Overview

- Ease anxiety due to its sedative qualities and to help toothache, bad breathe, and gum bleeding
- Best remedy for cough, cold, asthma, and chest congestion
- Anti-flatulent and effective digestive aid
- Used as a natural contraceptive
- Will be of great assistance in treating dysmenorrhea or painful menstruation, excessive bleeding, irregular or delayed periods, leucorrhoea, nausea, fatigue, anxiety, and other symptoms associated with menses
- Cure impotency, premature ejaculation, and spermatorrhoea in men
- Effective aphrodisiac
- Addresses male and female reproductive problems in a natural way
- Effective in improving the quality and quantity of breast milk in nursing women
- Post-pregnancy use period is recommended for relieving colic, indigestion, and other digestive difficulties in both the mother and the baby



PHYSICAL AND OTHER CHARACTERISTICS OF ASAFOETIDA

PARAMETER	REMARKS
Odour	Strong characteristic garlic-like odour.
Solubility	Soluble in alcohol and oils, insoluble in water.
Optical rotation	-9°0' to +9°18' @ 20 °C
Refractive index	1.493–1.518 @ 20 °C
Fire/explosion hazard	Flammable liquid, fl ash point: 65.5 °C
Reactivity	Stable
Decomposition	When heated to decomposition produces acid fumes and carbon monoxide smoke
Toxicity	Liquid may irritate eyes and skin. Avoid handling during pregnancy
Specific gravity	0.906–0.973 @ 20 °C

CHEMICAL COMPOSITION

Foods	Wt(g)	Kcal	Protein(g)	Fat (g)	CHO (g)	Ca (mg)	Fe (mg)	Fiber (g)	Minerals
Asafoetida	100	297	4	1.1	67.8	690	39.4	4.1	7.0

C.K. George, 2012 , Handbook of Herbs and Spices (2nd edition) Volume 2



DIFFERENT TYPES OF ASAFOETIDA

1. TEAR ASAFOETIDA (BITTER AND SWEET)

- is secreted from plant by natural factors
- is the purest, the best, and the rarest form of asafoetida
- is rounded or flattened, 5 to 30 mm in diameter, and greyish or dull yellow in color
- essential oil content is up to 15%.



2. DRIED ASAFOETIDA (KOKH)

- exudate is excreted after the first cut (incision) on the top of the root and is completely clean and dried.



DIFFERENT TYPES OF ASAFOETIDA

3. MASS ASAFOETIDA (BITTER AND SWEET)

- Is A Common And Commercial Form
- Is Available In Two Types Of Shir And Paste
- Both Types Are Available In Refined And Clean And Unrefined Forms
- % Of Sulfur Compounds In Bitter Asafoetida Is Higher Than That Of Sweet Asafoetida

4. KESHTEH ASAFOETIDA (BITTER AND SWEET)

- Includes A Thin Layer Of The Upper Part Of The Root And Its Secretions
- Is The Cheapest Type Of Asafoetida.



INTRODUCTION

Raw Material Description:

- The gum resin is extracted from incisions in the plants' roots and rhizomes
- Most commonly available form is compounded asafoetida, a fine powder containing 50% asafoetida resin, along with rice flour or maida (white wheat flour).

Asafoetida seed contains:



- 67.8 percent carbohydrates per 100 gm
- 16.0 percent moisture, 4.0 percent protein
- 1.1 percent fat
- 7.0 percent minerals
- 4.1 percent fibre

Types of Raw Material:

- Species are distributed to Central Asia from the Mediterranean region.
- In Kashmir and in some parts of Punjab, it is grown in India. Afghanistan and Iran are the main suppliers of Asafoetida to India.
- Two major varieties of asafoetida are found, i.e. *Hing Kabuli Sufaid* and *Hing Lalal Sufaid* (Milky White Asafoetida) (Red asafoetida)



INTRODUCTION

Variety	Description	Image
Hing Kabuli Sufaid (Milky White asafoetida)	The white or pale variety is water soluble.	
Hing Lal (Rd asafoetida)	The Red variety of Hing is oil soluble.	

Raw Material Aspects :

- Asafoetida is dried latex of the rhizome or tapped root of many *Ferula* species (*F. foetida* and *F. assafoetida*). The plants are perennial herbs and grow up to 1 to 1.5 m (3.3 to 5.9 ft) in height.
- Asafoetida typical contains approximately 40% to 60% resin, 25% gum, 10% to 17% volatile oils, and 1.5% to 10% ash. Aresinotannols A, B, ferulic acid, umbelliferone, and four non-identified compounds found in the resin
- Various organo-sulfide compounds, including 2-butyl-propenyl-disulfide, diallyl sulphide, diallyl disulfide, and dimethyl trisulphide, which are equally responsible for the odors of onions, form a rich component of the volatile oil.
- The main responsibility for the smell and taste of asafoetida is organo-sulfides.



Source of Raw Material:

- They belong to Umbelliferae family. The species is native to Iranian deserts and Afghanistan's mountains, where substantial quantities are cultivated.

India imports about 1,200 tonnes and spent around US\$100 million every year, from Iran, Afghanistan, and Uzbekistan.

- Today, asafoetida, a fine powder containing 30 percent Asafoetida resin, rice flour or Maida (white wheat flour), and rubber Arabs, are the frequently added material in processed hing.
- As India import raw heeng, the raw Hing can be procured from the hing vendor or from the various online platforms.

PROCESS & MACHINERY REQUIREMENT



Manufacturing Process

Modern method

Compounded Asafoetida Manufacturing Process given below:

Grinding

All the raw material are grinded separately by using industrial Grinder, Mix the ingredients in the required proportion using a Grinder machine and mixer Machine.

Blending

This process is where the grounded powder of the raw materials are blended into a homogenous mix.

Packaging

Now the Compounded Asafoetida or Hing powder is packed with the help of a Packaging machine, appropriate packaging material (e.g. polythene bags) is used for packaging purposes.

GUM EXTRACTION AND PURIFICATION

- Mill the yellowish brown crude asafoetida gum in a blender to obtain powder



- Extraction in a reactor system at 75°C, during 5 hours and under stirring (200 rpm) using ethanol (ethanol to crude gum ratio at 35:1 w/w) as solvent of resins and volatile oil for oleo gum resin



- Collect ethanol insoluble gum after precipitation using a glass filter (100-160 µm). Then dissolve precipitate at x g.L⁻¹ in ultra pure water during 30 min at 45 °C and then 2 h at room temperature under stirring



- Then filter gum solution (cloth filter), centrifuge(1500 g, 15 min and 20 °C) and precipitate with 3 volumes of ethanol at 4 °C, overnight. Then collect precipitate, air dry it , dissolve with 10 fold of water and precipitated again with 3 volumes of ethanol to increase the degree of purity



- Finally, collect the precipitate as described above, resolved in 5 fold of ultra pure water and freeze dried

- Asafoetida is processed and marketed either as lumps or in powdered form. The lump asafoetida is the most common form of pure asafoetida.
- The trading form is either the pure resin or so-called “compounded asafoetida” which is a fine powder consisting to more than 50% of rice flour and gum arabic to prevent lumping.
- The advantage of the compounded asafoetida is that it is easier to dose.
- The gum-resin is also steam distilled to obtain the essential oil known as Oil of Asafoetida.

The main products of asafoetida are:

- Volatile oil
- Tincture of gum resin
- Compounded asafoetida



TINCTURE OF ASAFOETIDA

- Strength of the tincture depends on the application
- Regular tincture of 1000 ml is prepared by macerating 200 g asafoetida in 750 ml ethyl alcohol (70 %) in a closed vessel for 7 days and shaking occasionally
- The liquid is filtered and made into the required volume
- Tincture becomes milky on addition of water due to separation of the resin.
- Flavoring and pharmaceutical industries mainly use alcoholic tinctures.







COMPOUNDED ASAFOETIDA



- Also called Bandhani Hing in India
- Is a ready-to-use powder
- Designed in particular for making Indian curries because natural asafoetida is so strong and not appropriate for direct use in cooking, being difficult to grate
- Is composed of asafoetida mixed with gum arabic and edible starch or edible cereal flour
- Blending formula varies from manufacturer to manufacturer and is a trade secret.
- However, the product will generally have 30 % asafoetida.
- Product is popular particularly in South India.
- Available in the market in the form of powder or brick (powder compacted)






Flow Chart:

Steps	Machine Name	Description	Machine Image.
Weighing	Weighing scale	This scale is used for weigh the raw materials for the further processing.	
Mixing	Mixer Grinder	Used to mix the ingredients for hing production	
Blending	Ribbon Blender	By using the milling machine compounded asafoetida is made into powder form.	
Filling and Packaging	Filling and Packaging machine	This machine is used for filling and packaging of compound hing powder.	

PROCESS & MACHINERY REQUIREMENT

Machine and Equipments	Description	I
Powder grinding machine	The powder grinding machine is primarily used For food, herbs, cumin powder, resin powder, powder, chemicals, pharmaceuticals, and other weak electrical substances	
Automatic Pouch Filling & Packaging Machine	This Machine is used for filling of Cumin powder in different volumes pouches as per setting followed by sealing them.	

Additional Machine & Equipment:

Machine and Equipments	Used	Machine Image
<p>Drum Sieve</p>	<p>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.</p>	
<p>Online Inkjet Printing Machine</p>	<p>Use ink to print text, graphics, and images onto various types of paper or pouches.</p>	
<p>Conveyor</p>	<p>These are conveyors with food grade belt to maintain food safety standards set by monitoring authorities.</p>	

General Failures & Remedies:

S. No.	General Failures	Remedies
	Ball bearing failure of various machine	<ol style="list-style-type: none"> 1. Proper periodic lubrication of all bearings in various machines. 2. Regular replacement of all bearing to prevent critical failures.
2.	Power Drive Overload	<ol style="list-style-type: none"> 1. Ensure proper weighing & metering specially in case of semi-automatic plant. 2. Install warning sensor in buffer region of loading capacity to ensure efficient operation.
3.	Mechanical Key Failure	<ol style="list-style-type: none"> 1. Ensure that mechanical keys are replaced as per there pre-defined operational life. 2. Prevent Overloading.
4.	Loss of Interface	<ol style="list-style-type: none"> 1. 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. 2. Provide proper physical shielding for the connections.
5.	Improper Sieving (Optical Sorters)	<ol style="list-style-type: none"> 1. This problem fundamentally occurs due problem with optical sensors. 2. The solution involves cleaning the optical surface & if problem persists replacing the sensor.

NUTRITIONAL INFORMATION(100 GMS)

- Carbohydrates 67.8%
- Moisture of 16.0%
- Protein of 4.0%
- Fat of 1.1%
- Minerals of 7.0%
- Fiber of 4.1%.



Export Potential & Sales Aspect:



- India's overall usage of asafoetida has been estimated to be 40 percent of the global supply. In Himachal Pradesh, India, however, some praiseworthy steps are being taken.
- In 2018, A fifth-year after plantation is projected to support this initiative. Afghanistan was the top asafoetida exporter to India with 98.19 percent of the overall Indian commodity imports in 2019-20. On the other hand, in 2019-20 India's exports to the world of this commodity amounted to US\$8.63 million.
- Indian asafoetida importers usually buy it raw, then add value by transforming it into a compounded shape and then exporting it to the rest of the world.
- Exports of asafetida have risen by 5.13% in the last five years, and the United States, Saudi Arabia, Singapore, and Malaysia are all included in India.

CONTACT DETAILS



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