MINISTRY OF FOOD PROCESSING INDUSTRIES
GOVERNMENT OF INDIA

सत्यमेव जयते

Reading Material for
Isabgol Processing
Under PMFME Scheme

National Institute of Food Technology Entrepreneurship and Management
Deemed to be University (De-novo Category) under Section 3 of the UGC Act, 1956
An Autonomous Institution under Ministry of Food Processing Industries, Government of India, Sonepat, Haryana, India

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Chapter – 1
Raw Material

1.1 Introduction

Isabgol (*Plantago ovata*) is an important annual, short stemmed commercial medicinal herb belonging to the family Plantaginaceae. The name is originated from two Sanskrit words, 'asp' and 'ghol' referring horse ear as the seed resembles to horse ear, also refers to the boat shaped seeds. It is known by several names such as ispaghula, sheetabeeja, aspaghol, isofgolu, ashwagolam, aspagol, ashwakarna, bazarqutuna, sand Plantain, psyllium husk, blond Psyllium and spogel seeds. Isabgol is indigenous to India and Mediterranean countries, cultivated extensively in many parts of world. Seed of isabgol contains colloidal mucilage (epicarp of seed) a translucent membrane commonly known as white husk which is odourless and tasteless in nature and is about 30% of the seed on weight basis. Husk is rich in fiber, fiber content varies from 75-80% (50 to 55% soluble fiber and about 25% insoluble fiber) and can imbibe 14% more water than its weight while seeds can soak water upto 3% of its weight. It is an oily, gluey and calorie free fiber food with a sweet, astringent taste, forms gel when soaked in water due to presence of gelatinous substance. The natural laxative property of isabgol gel helps in absorbing harmful toxins and bacteria present in the intestine. Isabgol is mainly known for its medicinal properties such as promotes digestive health, relieves constipation, treats diarrhea, lowers cholesterol and blood sugar levels, boots satiety and aids in weight loss.

1.2 Isabgol Industry in India

India lead the world market in terms of production and export of isabgol seed and husk to the world market. India's average annual production is 120,000 tonnes, and in 2020-21 there's likely to be negligible carry-forward stock (https://economictimes.indiatimes.com). India produces about 80% of isabgol husk powder in the world market and about 90-95% of India's isabgol production is exported. The major importer of isabgol end products are United Kingdom, USA, China, France, Norway, Korea, Japan, Italy and Australia. In India, Isabgol is extensively grown in Rajasthan, Gujarat Madhya Pradesh, Haryana and Punjab. Rajasthan accounts for 67% of total isabgol production in India followed by Gujarat. The total farm area under this wonder herb is 55,000 acres promoting its large scale farming.

1.3 Insight on value added product

Owing to presence of mucilaginous husk, isabgol is used in pharmaceutical industries, dyeing, calico priming, and confectionary and icecream industries. Isabgol value added products include Instant vegetable soup mixes (tomato soup and tomato-mushroom soup), composite flour (biscuit and noodles), cookies, cake mixes (chocolate and plain cake), ice-cream stabilizer and dessert mixes (suji kheer mix and falooda mix), isabgol husk, isabgol husk powder and isabgol kha-kha powder. These value added products are cost effective, safe for human consumption and rich in total dietary fiber. The main by-product of isabgol husk is,

Lali: Used as cattle feed.

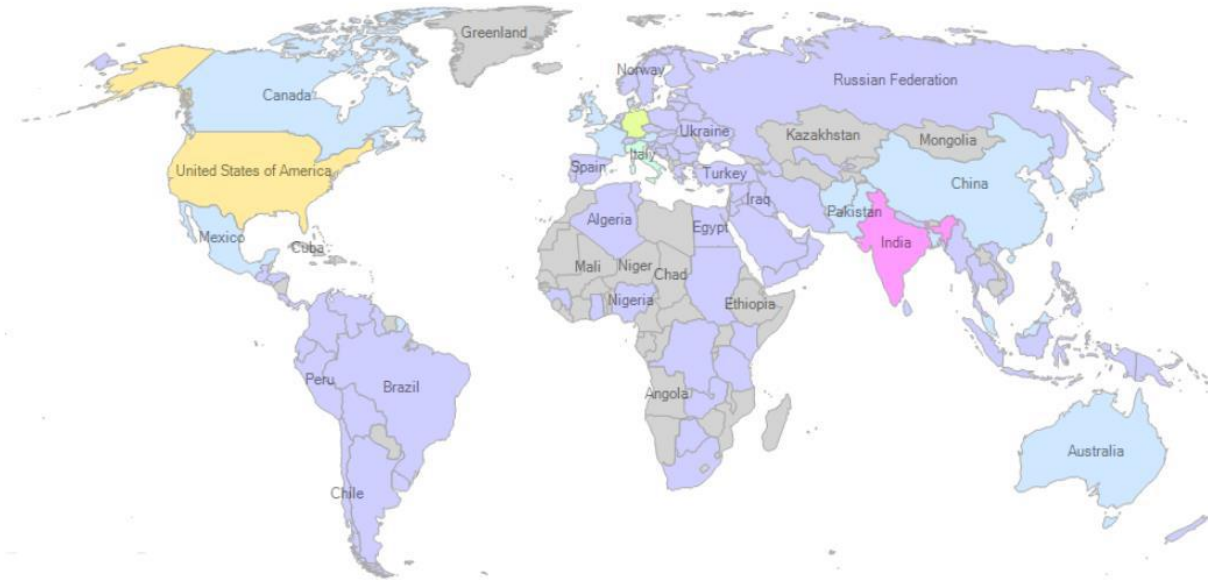
Chito: Used as Pig feed.

Khakho: It is used to prevent ice slipping

Golaisab: Used as cattle feed

1.4 Export-import opportunities

Isabgol has huge export potential due to its numerous health benefits and use in Unani and Ayurvedic medicines. India holds a monopoly in production and export of isabgol seed and husk in the international market. Isabgol end products are exported to United Kingdom, USA, China, France, Norway, Korea, Japan, Italy and Australia. USA is the chief importer of Isabgol seeds and husk followed by Western Europe, and about 90% of its production is exported to these countries. Last buyer of isabgol is Procter & Gamble from Gujarat, along with other buyers like Dr Morepan, Dabur, Lupin and Glaxo.

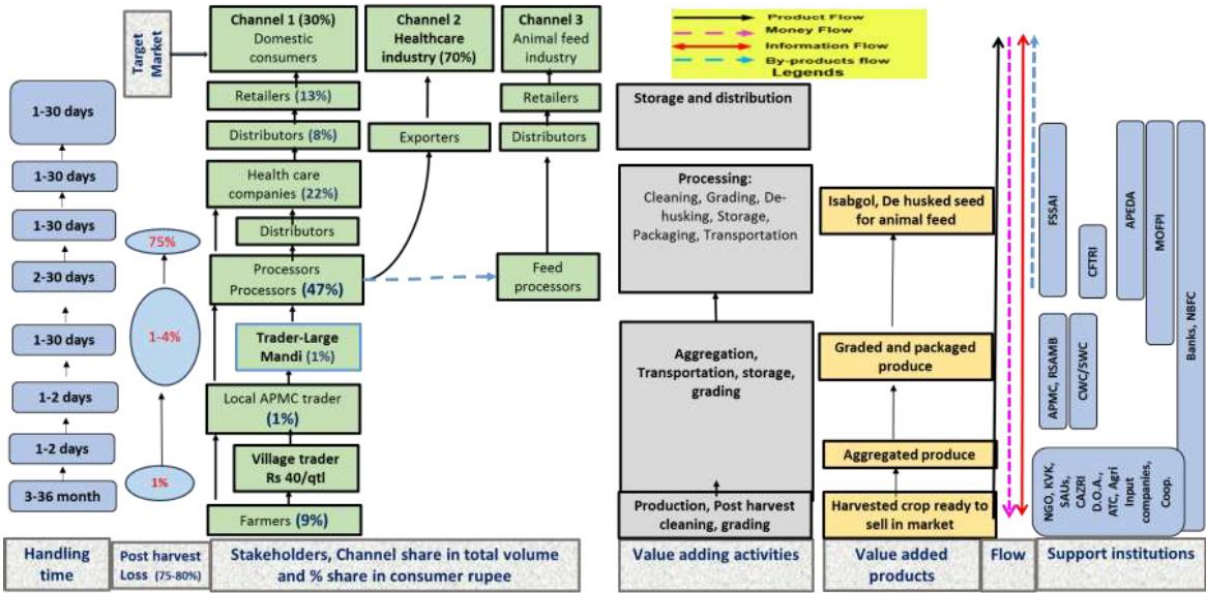


Importing markets of Isabgol husk from India

1.5 Key deterrents to the growth of the market

- Highly weather sensitive crop so, unseasonal rains in winter causes damage to the crop and loss to the farmer.
- Non-availability of mandis and processing hub in Rajasthan.
- Price is highly volatile and depends upon previous years stock.
- Lack of research and development facilies.
- Shattering of seeds under climatic adversity.
- Prolonged monsoon results in delay in sowing.
- Unavailability of quality, non-shattering seeds to withstand climatic anamolies.
- Lack of incentives from the government to take up research and trials for value addition in the crop.

Pre-intervention value chain chart of Isabgol



1.6 Need for Processing Isabgol

Isabgol is economically important medicinal herb used in pharmaceutical industries because of its nutritional and nutraceutical properties. It has to be processed to;

- Increase the storage life and produce wide range of products.
- Value added products include isabgol husk, isabgol husk powder and isabgol kha-kha powder etc. obtain higher returns. Real return in isabgol comes from processed products.
- Enhance the fibre content of the food.
- Increase the bulk of the food.
- Provide consumers with an incentive to make purchase.
- Essential for uplifting the economy because of its high value and increased market demand.

- Create profit and enhances income by attracting more customers.
- Generate employment opportunities, accordingly building financially strong Nation.

1.7 Nutritional Value

Nutritional quality of Isabgol Seed

Parameters	**Amount**
Energy	4.75 kcal/g
Protein	17.40%
Fat	6.70%
Linoleic acid (LA)	40%
Total dietary fibre	24.60%
Insoluble fibre	19.60%
Soluble fibre	5%
Triglycerides	10-20%

Nutritional quality of Isabgol husk

Nutrients	**Amount (100g)**
Energy	375 kcal
Protein	5 g
Fat	6.25 g
Carbohydrate	75 g
Fibres	10 g
Sugars	30 g
Minerals	
Iron	50 mg
Calcium	1.8 mg
Potassium	262 mg
Sodium	288 mg
Fats/Fatty acids	
Saturated	2.5 g

Reference: USDA Nutrient Database

Chapter -2

Processing and Machinery

2.1 Introduction

Primary processing is basically referred as cleaning of isabgol seeds. De-husking/grinding, sieving/winnowing are the intermediate processes involved.

2.2 Different Departments in a unique Isabgol Processing Plant

Production is the main body of any food processing unit. Based on the capacity and product variants, different supporting departments made to deliver right product at right time to the consumer and consequently generate revenue. Departments are majorly categorized into;

1. Production and Operation: Production planning, Scheduling, managing daily production
2. Quality Assurance and Regulatory: Assure quality of the product, Establish food safety, organizing internal audits, Certifications (FSSAI, FSSC 22000, Agmark, BRC etc.) and updating of food safety manual
3. Research and Development: New Product development
4. Engineering
    a. Engaged in new projects
    b. Maintenance of the machinery and infrastructure
    c. Managing water treatment plant (WTP)
    d. Managing power supply unit (UPS, Generators, Solar panels, and coordination with electricity board)
5. Procurement: Engaged in procurement of raw material, packing material, engineering items, vendor development etc.
6. Store: Maintaining the inventory and alarm procurement, maintaining FIFO, LIFO etc.
7. Logistic and Supply Chain: Deliver products to the consumer at right time
8. Deals and Marketing: Manager is answerable for exploring and creating advertising openings and arranging and executing new deals plans.
9. Safety Health & Environment (SHE): Ensure safety personnel, premises and environment, coordinating with Pollution control board
10. Human Resource and Legal

    Role and Responsibilities:

- Recruitment: To ensure that right people are recruited for right position and in right number to meet the requirement.
- Medical examination and health card record keeping: Medical examination of the employee is carried out to ensure that they are medically fit to carry out their work.

- Contract labour engagement: To describe a procedure for contract labour engagement.
- Attendance and leave policy: To describe a procedure for monitoring the employees the punctuality and discipline.
- Training for Roll and contractual labour employees: To describe a procedure for carrying out training for all employees and to ensure proper training records are maintained at plant level.
- Skill matrix: To ensure the effectiveness of occupational/working skill for employee.

2.3 Different operations in Isabgol processing unit

The primary raw material in Isabgol processing unit is its seed. The crude isabgol seeds should be cleaned by mechanical cycle through different steps of processing where no chemicals are utilized. In the wake of cleaning seeds from the cleaning and pre cleaning chambers, de-husking measures begin. The interaction comprises of crushing the seed with emery mills and division of husk in a shut circuit of a programmed pneumatic aspiration framework. The isabgol seed husk is then isolated from the rest of the seed by utilizing slight mechanic pressure. The seeds are slammed between pivoting rollers and plates. Isabgol husk is then purified by sieving the combination to isolate the husk from the rest of the seed part. To acquire high return of unadulterated quality isabgol seed husk, there is flawless processing of isabgol seed in a factory which makes the husk be divided by crash under specific conditions. The husk is cracked isolating non-husk segment of the isabgol seed. Isabgol powder is obtained through slamming the unadulterated husk isabgol. The items are then packaged under total sterile control. Finished products are treated with Ethylene Oxide, Methyl Bromide, Gamma Rays Irradiation for sterilization purpose as per customers prerequisites.

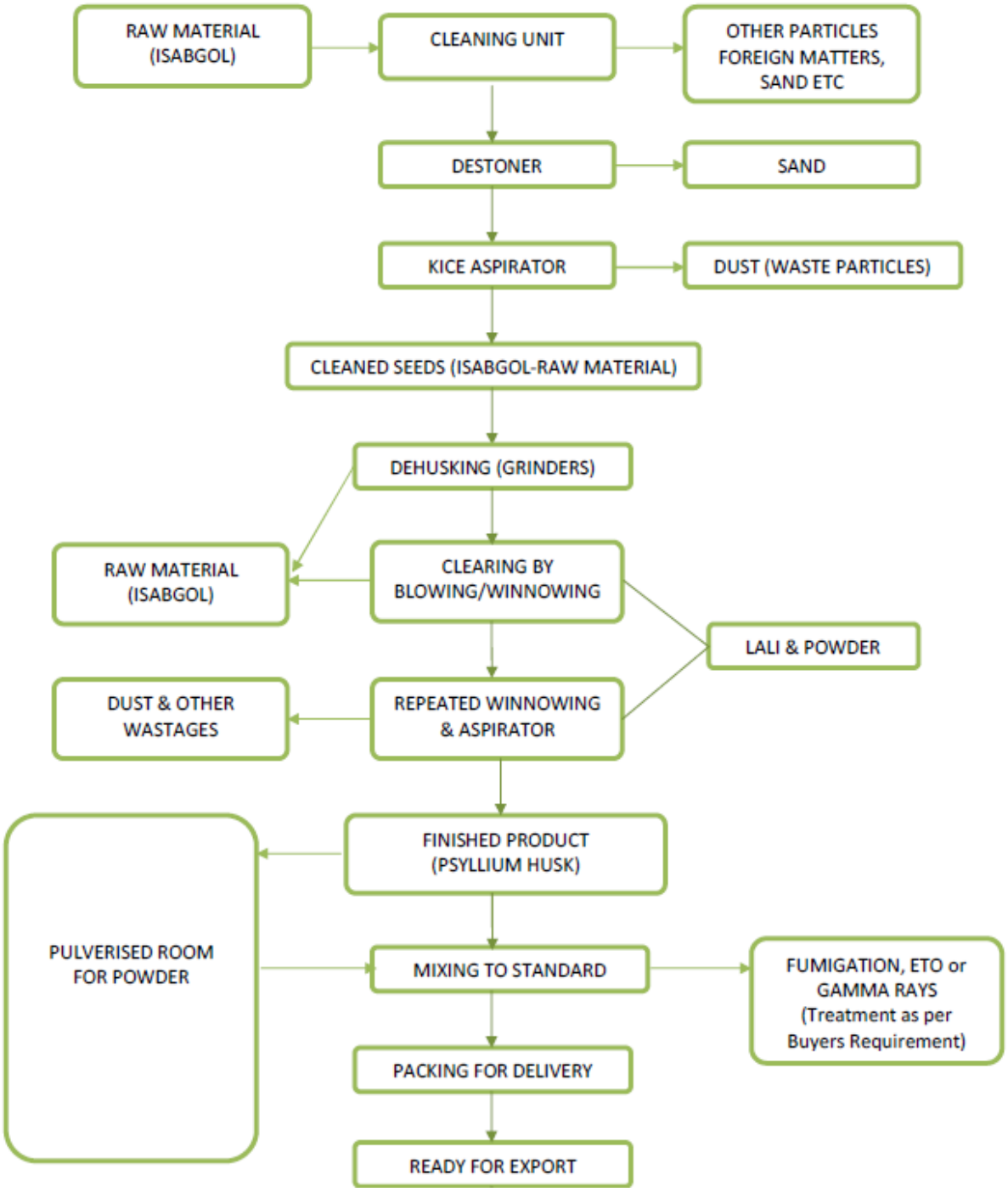
Isabgol De-husking unit consists of following Machinery:

Cleaning, Rubber Polisher, Aspirator, Siever, Grader, Fan, Cyclone, Dust Collector. Milling, Pin Mill, De-husking Machine, Husk Separator, Husk Grader, Pneumatic Conveyor, Husk Cone Mixer etc.

Isabgol Powder Plant Consist of following Machinery:

Pin Mill, Hammer Mill, Roller Mill, Ultrafine Grinder, Fan, Cyclone, Siever, Central Fugal, Pneumatic Conveyor, Powder Cone Mixer, Dust Collector.

Isabgol Processing Plant



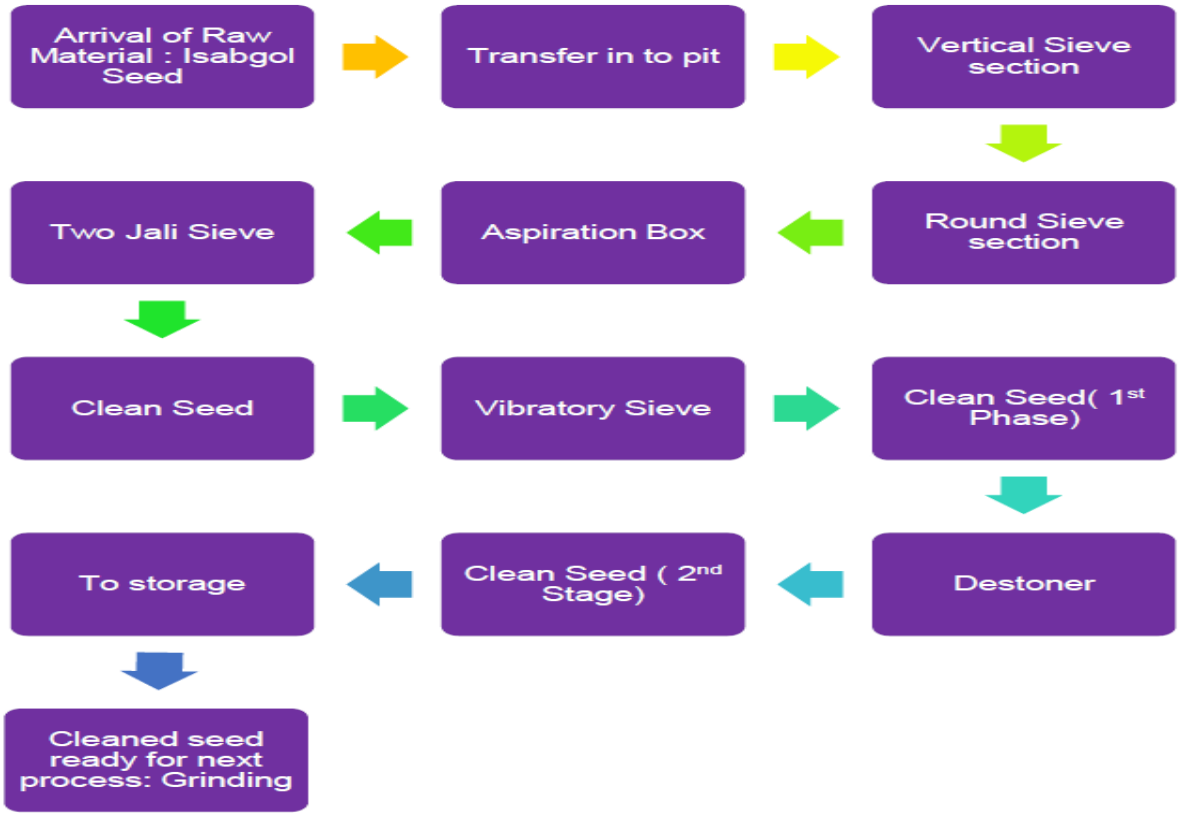
Isabgol Husk/Husk Powder Manufacturing Process Flow chart

2.4 Seed Cleaning

The initial step associated with the cycle is cleaning of isabgol seeds. When the isabgol seed is gotten at Raw Material Reception deck it is weighted and then the crude isabgol seeds are cleaned by mechanical cycle through different strides of preparing. Pre-cleaner is the first step, wherein the machine with different cross section size network isolates the contaminations in the Isabgol seed parcel by size for example more modest than viz. soil, dust, little round other harvest seeds, and so forth just as those greater than Isabgol seed viz. refuse, straw, different seeds, and so forth A Vibro

separator is too utilized in the further line of pre-cleaning to get greatest pollutions and unfamiliar material isolated by size. In cycle of pre-cleaning, lighter than air pollutions (dust, earth and so forth) are likewise cleaned through an arrangement of air obstruction utilizing goal channel. The pre-cleaned Isabgol seed is presently moved to De-Stoner Machine through lift where the stones of same sizes of Isabgol seed are isolated by the head of gravity arrangement which is associated with another goal line.

The crude isabgol seeds are cleaned by mechanical cycle through different steps of handling where no synthetics are utilized. There is a thorough ten phase in cleaning process of the seeds, which is trailed by de-husking of the seeds. 500 kg of isabgol seeds/hour can be cleaned at all stages.

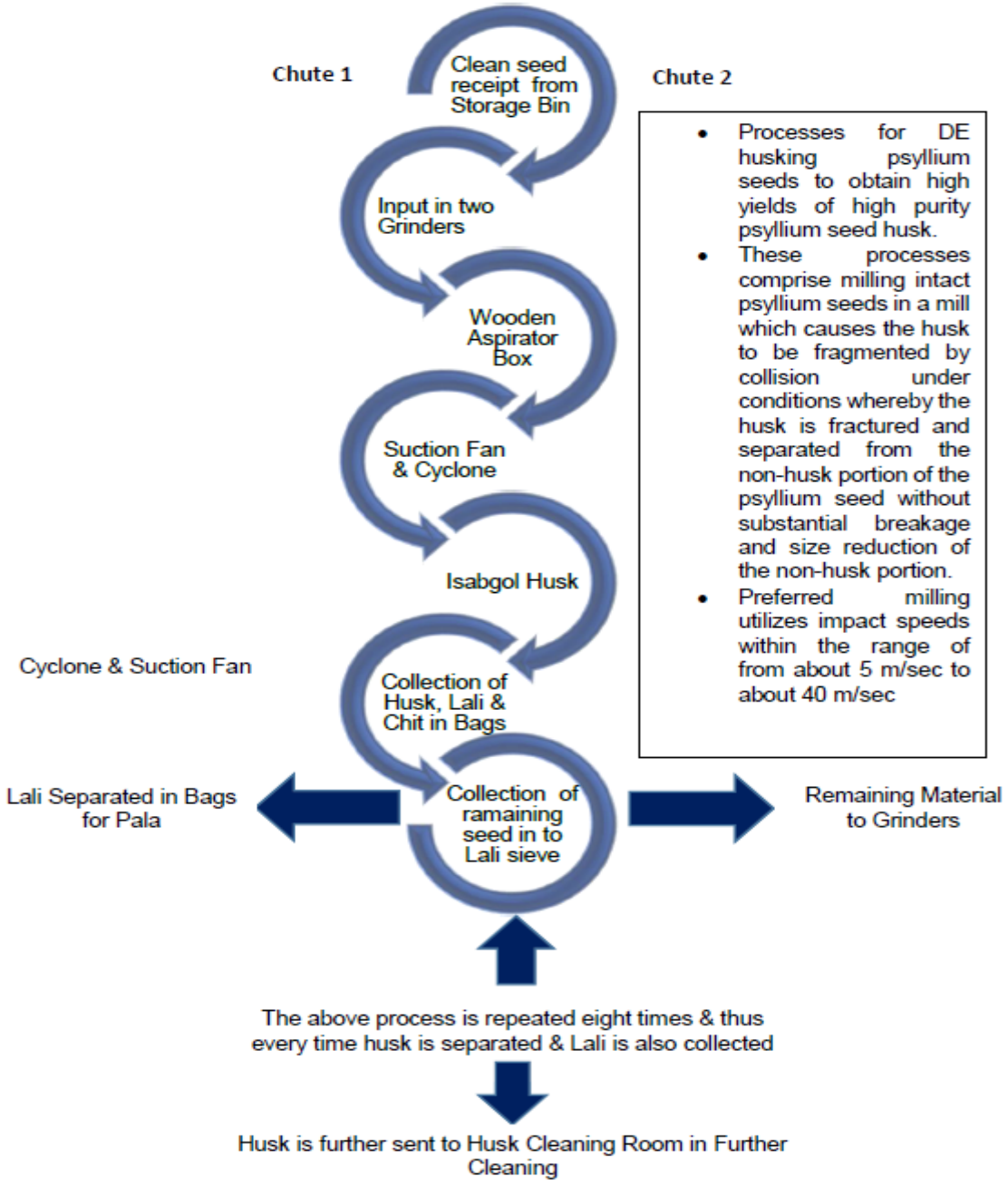


Isabgol Seed Cleaning Process Flow chart

2.5 De-Husking

Interaction of de-husking isabgol obtains critical return of unadulterated and quality isabgol seed husk. The interaction join preparing flawless/perfect isabgol seeds in a plant which makes the husk to be partitioned by crash under conditions whereby the husk is broken and separated from the non-husk part of the isabgol seed without impressive breakage and size decline of the non-husk divide.

De-Husking framework with automatic feeding having organized two plants in corresponding with seventy two grinders during which grinders are at 36" distance across. Magnets are organized in important spots. This unit can create 200 kg of mixture of de-husked materials every hour.



Isabgol De-husking/Grinding Process Flow chart

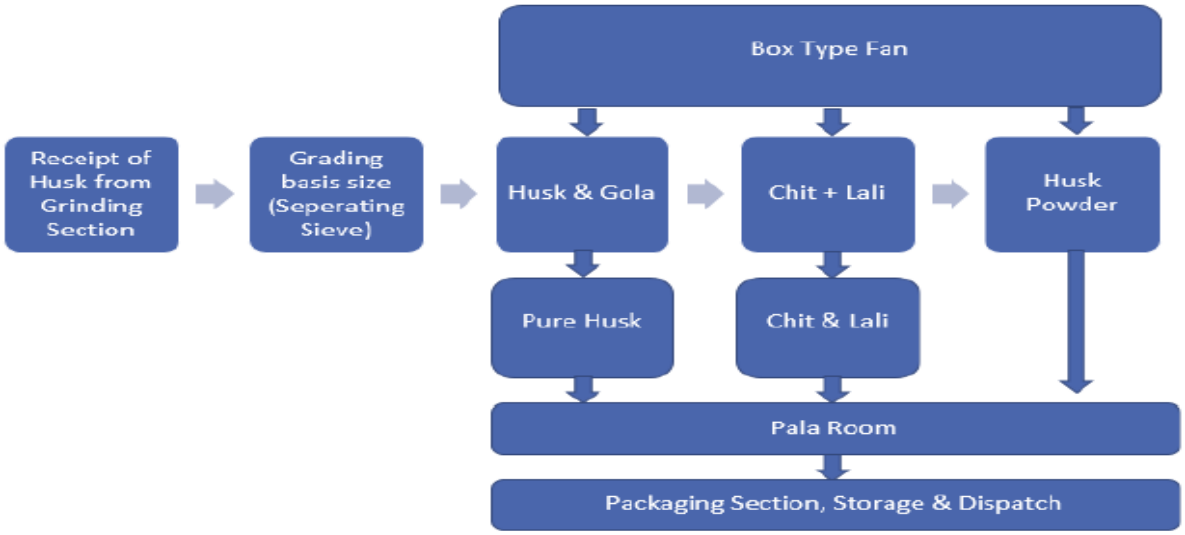
Isabgol Husk Powder, Grinding Plant

2.6 Husk Cleaning and Winnowing

In the above interaction of cleaning, an arrangement of desire utilizing medium pressing factor fan is utilized by permitting pipe/ducting associations with the different machines. The primary capacity of this framework is to separate lighter contaminations from (counting those created in cycle). All the vertical passing on measure is encouraged through utilization of lifts and the even passing on is finished by utilization of worm transports. Magnets are introduced in the middle of not many lines to isolate the ferrous particles present with the Isabgol seeds.

Husk of 100% purity which is obtained after first milling of the seed fetches higher market price and further husk is removed in the subsequent milling process where purity and color gets diluted.

The husk is passed through gravity separators for additional cleansing before custom packaging. This process is called winnowing.



Isabgol Husk Cleaning Unit and Packing Process Flow Chart

2.7 Fumigation

The plant is equipped with a fumigation chamber, which works as per specific guide guidelines from specialists.

The dose of the fumigant and treatment is done according to guidelines of the importing country and prerequisites of customers. Both crude isabgol seeds and the final isabgol items are treated according to the necessity of customers.

2.8 Sterilization

Treatment of the completed item is done with Methyl Bromide Ethylene Oxide and Gamma Rays. Irradiation are given through agreement offices upon explicit solicit from the customer.

2.9 Different tests carried out to assure the quality of processed Isabgol

Swelling index:

It is the measurement of the ability of the isabgol to absorb water and soil. It is defined as the volume in ml occupied by the swelling of 1 gm of isabgol including mucilage after it has swollen in water or any other specified liquid under specified conditions.

Weight 1 gm of isabgol seeds and transfer it in a measuring cylinder of 25 ml. Add 20 ml water in measuring cylinder containing isabgol. Close the measuring cylinder, shake it occasionally and keep aside for 24 hrs. for completer swelling. After 24 hr the seeds absorb water and volume occupied by the seed in the measuring cylinder increases. Quantitative swelling of seeds is due to presence of mucilage. Measure the volume occupied by the seeds before and after swelling. This value gives the swelling index.

Swelling index checks the purity of isabgol and this value ranges between 10-14 for isabgol.

Microscopic examination: The material will adjust to the accompanying depiction:

Prolonged polygonal cells, 90 to 120 micron long, 18 to 27 micron wide, cellulose walled, thickened by auxiliary store.

2.10 Packing Machines

Processed quality products are packed in flexible and cost-effective packaging solutions under total hygienic control regions, while ensuring that the product is kept safe during transit and in storage at the customer end.

Different types of packing machines are used for packing isabgol. In market, isabgol is normally available in two forms,

1. Isabgol husk
2. Isabgol husk powder

Packaging of isabgol husk and husk powder incorporates uncoated and covered Uv balanced out PP woven texture without liner, HDPE laminated paper sacks with inner poly-liner, laminated PP woven sacks with internal poly, fiber paper drum and silver plated ring with inward poly-liner.

Seed Packing Machine

Automatic Husk Powder Packing Machine

Isabgol Husk zipper pouch Packing Machine

Chapter -3

Food Safety Regulations and Standards

3.1 Registration and Licensing of Food business

All Food Business Operators in the nation will be enrolled or authorized in agreement with the methodology set down

Enrollment of Petty Food Business

a. Each frivolous Food Business Operator will enlist themselves with the Registering Authority by submitting,

b. An application for enlistment in Form an under Schedule 2 of these Regulations alongside an expense as given in Schedule 3.

c. The unimportant food producer will follow the fundamental cleanliness and wellbeing necessities gave in Part I of Schedule 4 of these Regulations and give a self-bore witness to assertion of adherence to these prerequisites with the application in the configuration gave in Annexure-1 under Schedule 2.

d. The Registering Authority will think about the application and may either allow enlistment or reject it with motivations to be recorded as a hard copy or issue notice for review, inside 7 days of receipt of an application for enrollment.

e. In case of an investigation being requested, the enlistment will be allowed by the Registering Authority subsequent to being happy with the security, cleanliness and sterile states of the premises as contained in Part II of Schedule 4 inside a time of 30 days.

f. If enrollment isn't in truth, or denied, or examination not arranged inside 7 days as given in above sub guideline (3) or no choice is imparted inside 30 days as given in above sub guideline (4), the insignificant food producer may begin its business, given that it will be officeholder on the Food Business Operator to follow any improvement proposed by the Registering Authority significantly later.

g. Given that enrollment will not be rejected without giving the candidate a chance of being heard and for motivations to be recorded as a hard copy.

h. The Registering Authority will give an enrollment declaration and a photograph character card, which will be shown at an unmistakable spot consistently inside the premises or vehicle or truck or whatever other spot where the individual carries discounted/production of food if there should arise an occurrence of Petty Food Business.

i. The Registering Authority or any official or office explicitly approved for this reason will complete sanitation investigation of the enlisted foundations at any rate once in a year.

3.2 Hygienic and Sanitary Practices

Additional consideration ought to be taken on plant sterile condition. Week by week/Fortnightly cleaning, endorsed Inner/Outer Spraying, Fogging, Rodent Trap Placing, Fumigation for Pest Control time to time under master watch.

The premises will be kept up in clean and sterile conditions with appropriate ventilations and well lit game plan and the work force occupied with these activities ought to be in sound wellbeing and liberated from any irresistible, infectious or transferable diseases. The premises will have clean storerooms liberated from rat and bug invasion.

a) Cleaning and maintenance

(i) Cleaning and maintenance of all machinery and equipment to be done as per schedule specifying areas & equipment to be cleaned, frequency of cleaning, cleaning chemicals used and their dozes.

(ii) Cleaning chemicals to be handled carefully and stored properly with identifiable containers.

(iii)Isabgol seeds are cleaned, arranged, as well as examined in such a way as to lessen natural, physical and compound pollution and to forestall tainting of the completed item.

(iv) Adequate cleaning, dehusking/husk cleaning examination are important to forestall, diminish or eliminate tainting with natural, compound or potentially actual dangers. Legitimate cleaning, arranging and examination diminish the underlying microbial burden, guaranteeing the viability of the antimicrobial treatment step (if appropriate).

(v) The disinfection program is done in a way that doesn't defile food or bundling materials during, or resulting to, cleaning and sterilizing (for example no pollution by vaporizers or compound buildups).

(vi) Effectiveness of the disinfection program is observed and checked (for example by a pre-operational examination of premises and gear or, where fitting, by microbiological inspecting) and where fundamental, the program is changed as needs be.

(vii) A vacuum cleaner can be utilized for tidying up fine residue as brushing will in general drive dust into the air for it to settle somewhere else.

b) Pest control

(i) The food establishment to be kept in good repair so as to deny entry and harbor of rodents, pests and insects

(ii) Holes and drainages to be adequately sealed to prevent entry of rodents

(iii)Treatment with permissible pesticides and insecticides with appropriate limits shall be carried out carefully to ensure safety of food and person who handle the chemicals

Personal hygiene

(a) Health status:

(i) No individual experiencing irresistible sickness is permitted to work in processing area.

(ii) Workers shall be medically examined before employed for work in processing operations.

(iii)All specialists and plant staff will be immunized against enteric gathering of illnesses once in a year.

Personal cleanliness

(i) All food handlers to be provided with clean and protective clothes, hand gloves and foot wear.

(ii) Their personal cleanliness to be maintained at all the times, they should clean/sanitize their hands with soap or sanitizer and disinfectant before every entry to processing premises and after use of toilets.

(iii) Supervisors shall ensure that their nails cut regularly and hair trimmed.

(iv) No ornaments, except marriage bangles/ chains or such ornaments with proper covering shall be allowed during food handling.

(v) Workers shall refrain from bad habits like chewing, smoking, scratching parts of body, sneezing, coughing etc. during food handling.

3.3 Packaging and labeling

(1) Isabgol Husk will be pressed in new, perfect and dry jute packs, fabric sacks, paper packs and card board containers with internal coating of food grade material, food grade High Density Polyethylene overlaid paper sacks, food grade plastic compartments or in glass bottles or such other sort of holders as might be endorsed by the Agricultural Marketing Adviser or an official approved by him for this benefit as per rule 11 of the General Grading and Marking Rules.

(2) The pressing material will be liberated from creepy crawly or parasitic pervasion and ought not give any poisonous substance or bothersome scent or flavor to the item.

(3) Isabgol Husk will be pressed in pack measures according to arrangements of the Legal Metrology (Packaged Commodities) Rules, 2011 made under sub-segment (1), read with provisos (j) and (q) of sub-segment (2) of area 52 of the Legal Metrology Act, 2009 (1 of 2010) or according to the guidelines gave by Agricultural Marketing Adviser every once in a while.

(4) Graded material of little pack sizes of a similar parcel or group and grade will be stuffed in an expert holder with complete subtleties consequently alongside grade assignment mark.

(5) Each bundle will contain Isabgol Husk of a similar sort and of a similar evaluation assignment.

(6) Each bundle will be appropriately and safely shut and fixed.

3.4 Selection of Packing Material

Isabgol husk are exceptionally delicate to ecological boundaries. To improve the time span of usability and capacity it ought not be presented to dampness and air and thus pressed in plastic covered jute sacks. Anyway it can likewise be gathered in paper sacks, manufactured pack, drum packs with plastic covering.

Normal kinds of bundling include:

Super Sacks: Uncoated and Coated UV Stabilized PP woven texture without liner. Content Net Wt. 950 kg/sack, 500 kg/pack, 1000 kg/pack and so on

Paper packs: HDPE Laminated paper sacks with inward poly-liner 15 kg/pack, Content Net Wt. 25 kg/sack.

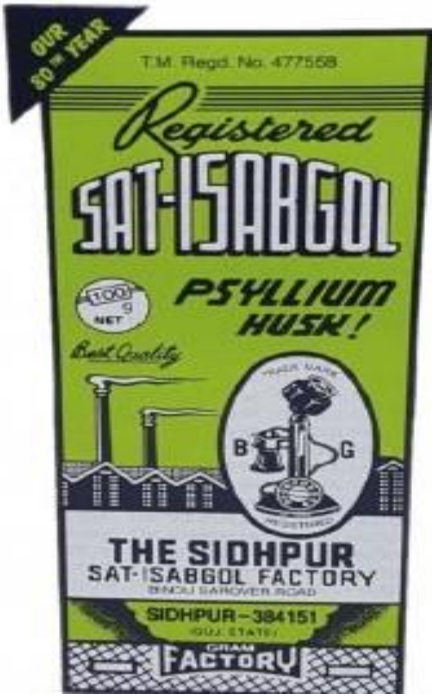
PP Woven Bags: covered PP woven sacks with an inside poly-liner. Content Net Wt. 25 kg/pack, 50 kg/sack.

Plastic Container: Plastic White holder (tubs) with lead and white covered handle. Content Net Wt. 9.1 kg/tub.

Fiber Drum: Fiber Paper drum and silver plated ring with internal poly-liner. Content Net Wt. 25-50 kg/drum

Pet jar: 50g, 100g, and 250g pet container pack by covered poly sack and mass in Carton pack.

Sachets and Lined Carton: 10g. Sachets and 50g, 100g, 120g, 250g lined container.



3.5 Coding and Labelling

A particular bunch number or Lot number or Code number, either numeral(s) or alphabet(s) or in any blend, addressing the clump number or Lot number or Code number being gone before by the words "Cluster No., or Batch, or Lot No., or Lot, or Code No., or Code will be given on the mark with the end goal of discernibility according to the detail of FSSAI.

(1) The evaluation assignment mark will be safely joined to or imprinted on each bundle in a way endorsed by the Agricultural Marketing Adviser or an official approved by him for this sake as per rule 11 of the General Grading and Marking Rules.

(2) Notwithstanding the evaluation assignment mark, following points of interest will be unmistakably and permanently set apart on each bundle, to be specific:

(a) name of the item;

(b) nation of beginning;

(c) grade;

(d) assortment or trademark (discretionary);

(e) part or cluster number;

(f) date of pressing;

(g) net weight;

(h) greatest retail value (comprehensive of all duties);

(i) name and address of the approved packer;

(j) best previously ..... date ..... month ..... year;

(k) some other specifics as might be determined under the Legal Metrology (Packaged Commodities) Rules, 2011 made under sub-segment (1), read with conditions (j) and (q) of sub-segment (2) of segment 52 of the Legal Metrology Act 2009 (1 of 2010), the Food Safety and Standards Act, 2006 (34 of 2006), some other law for the time being in power or guidelines gave by the Agricultural Marketing Adviser or an official approved by him for this benefit as per the General Grading and Marking Rules.

(3) The ink utilized for checking on bundles will not defile the Isabgol Husk.

(4) The approved packer, may, subsequent to getting earlier endorsement of the Agricultural Marketing Adviser or an official approved by him for this benefit as per rule 11 of the General Grading and Marking Rules, mark his private exchange imprint or exchange brand on the evaluated bundles which don't demonstrate quality other than that showed by the evaluation assignment mark fastened to the reviewed bundles as per these guidelines.

Labelling of irradiated Food

1) The mark of a food, which has been treated with ionizing radiation, will convey a composed assertion demonstrating the therapy in nearness to the name of the food. The naming of prepacked lighted food will likewise be as per the arrangements of the Atomic Energy (Control of Irradiation of Food) Rules, 1991, under the Atomic Energy Act, 1962 (Act 33 of 1962).

2) what's more all bundles of illuminated food will bear the accompanying assertion and logo, in particular :-

PROCESSED BY IRRADIATION

Technique

DATE OF IRRADIATION.....

Permit NO .....

Reason for irradiation Regulation.

3.6 Grade designation and quality of Isabgol Husk

1. Isabgol Husk will comprise of dry seed layers of the seeds of Plantago ovata Forsk (Family Plantaginaceae) implied for human utilization which is acquired by smashing the seeds and isolating the husks by winnowing.

2. Least prerequisites:

(i) Isabgol Husk will -

(a) be white to grayish in shading;

(b) be scentless and have slender boat molded designs, 2 to 3 mm long and 0.5 to 1 mm wide;

(c) have dull and adhesive taste;

(d) be liberated from bug or parasite pervasion and from matured, stale smelling or other questionable scents;

(e) be liberated from any additional tones, flavors and destructive unfamiliar materials;

(f) be liberated from obvious superfluous matter.

(ii) It will follow the limitations with respect as far as possible for metallic pollutants, crop impurities, normally happening harmful substances, insect poisons and pesticides deposits, microbial necessities and other food handling prerequisites as indicated under the Food Safety and Standards (Contaminants, Toxins and Residues) Regulations, 2011 and the Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011, made under the Food Safety and Standards Act, 2006 (34 of 2006) for homegrown exchange.

(iv)It will conform to the lingering furthest reaches of substantial metals, pesticides and other food handling prerequisites as set somewhere near the Codex Alimentarius Commission, or bringing in nations necessity for sends out.

Grade specifications of Isabgol

Properties	Grade			
	85% Pure	**95% Pure**	**98% Pure**	**99% Pure**
Colour	Light Brown to Pale Bluff			
Taste	Bland			
Odour	Faint Distinct			
Moisture	12% Max			
Mucilloid content	86% min	95% min	98% min	99% min
Light Extraneous Matter	15% max	5% max	2% max	1% max
Heavy Extraneous Matter	1.1.% max	1.1.% max	1.1.% max	1.1.% max
Swell Volume/gm	35 ml/min	40 ml/min	40 ml/min	50 ml/min

3.7 Documentation and Record Keeping

Each association needs to keep up records of crude material acquisition, creation cycles, and deals. This is to guarantee that the business runs viably and is productive. Recorded underneath are a few reasons why there is a requirement for documentation:

1. It gives point by point information about maintaining the business.
2. It assists with controlling item quality.
3. It assists with monitoring the cash put resources into the business.
4. It assists with recognizing the different expenses of crude material or item fixings.
5. It assists with distinguishing the creation cost of a specific interaction.
6. It assists with ensuring that all the quality affirmation rehearses were followed during the creation.
7. It assists with ensuring that the creation gear is running easily/adequately.
8. It fills in as a proof for legitimate methods.
9. It assists with setting a fitting item cost.
10. It assists with taking remedial measures at the perfect time.

The most effective method to Keep Records

Each food handling association follows a pretty much comparative method of keeping records. Creation records keep a log of the accompanying:

- The amount and kind of crude materials got
- The amount and kind of fixings utilized during preparing
- The preparing conditions in which creation occurred (for example the temperature set or the pneumatic force applied)
- The item quality created

Item quality can be kept up just when:

- The same amount and nature of fixings and crude materials are blended in each cluster
- A standard plan is utilized for each cluster
- Standard measure boundaries are applied for each cluster

Each cluster of food is given a clump number. This number is recorded in:

- Stock control books (where crude material obtainment is noted)
- Processing logbooks (where creation measure is noted)
- Product deals records (where deals and appropriation is noted)

The batch number should connect with the item code number, which is imprinted on marks. This encourages the processor to follow any issue found in a bunch back to the crude material utilized or the creation interaction.

Chapter – 4

Cleaning and CIP

4.1 Cleaning

Cleaning is the mother of all nozzle applications. The point of cleaning is to eliminate bothersome particles from the actual item without adversely influencing the item.

CIP (Clean-in-Place) is a bunch of techniques used to appropriately clean preparing hardware without eliminating channeling or gear. The components grouping and term of cycles fluctuates from framework to framework however some common steps are associated with majority of the cycles.

- Sanitary measure lines
- Vessels
- Equipment usually utilized in cycle plants

CIP Systems siphon cleaning, flushing, and disinfecting arrangements through a similar channeling way as the item to wipe out item soil from every single inside surface.

4.2 Advantages of a CIP framework

• **Minimizes Mistakes:** Automating cleaning lessens the opportunity of human blunder that can add to a risky item.

• **Keeps Employees Safe:** Reduces synthetic openness by containing cleaning arrangements inside the framework.

• **More Production Time**: As less creation time is lost to cleaning, additional time is spent making item.

• **Product Quality:** Reliable and repeatable cleaning implies feasible item quality and consistency. Less tainting implies less item reviews and higher brand certainty.

• **Utility Savings:** Water and energy utilization is diminished through repeatable cycle control.

Steps involved in a CIP cycle

4.3 Steps involved in a CIP cycle

- **Pre-rinse** - Eliminates the excess buildup in the product offerings. Breaks down sugar and somewhat dissolves fat.
- **Caustic wash** - It helps in mellowing fats. Alkali which is utilized in caustic wash has a high pH centralization of 0.5-2%. Commonly the caustic wash can go back to its tank and can be reused on numerous occasions further.
- **Intermediate rinse** –Following the caustic wash, this process removes out the evidence of remaining detergents.
- **Final rinse** - This cycle helps in flushing out the excess purifying agent. Numerous times the last flush water can be recuperated and re-utilized as pre-wash solution for the following cleaning cycle.
- **Sanitizing rinse** - This progression helps in killing microorganisms before the following production use.

Since each cycle has its novel boundaries, some facilities choose to do some or all of these optional steps.

- ⌀ **Push out:** Prior to pre-flush, pushes out residual product in lines with a projectile- type product recovery system. Improves cleaning and saves item from going down the channel.
- ⌀ **Acid wash:** It can happen after middle of the flush. . Breaks down mineral scale from hard water stores and protein buildups. It helps in neutralizing framework pH.
- ⌀ **Air blow:** It eliminates remaining moisture in the line after definite wash utilizing air blow check valves. CIP'able valves are suggested.