



Processing of spices – An introduction

Agenda

1

- Introduction

2

- Classification of spices

3

- Processing of spices

4

- Factors affecting

5

- Reference

1.Introduction

- A Spice is a seed,fruit,root,bark,or other plant substance used primarily used for flavoring or coloring food.
- Spices are available in several forms such as raw, whole dried ,or pre ground dried.
- For convenience purpose spices are ground into powder.
- India contributes to 75% of global spice production .It is reflected to cultures & cuisines .



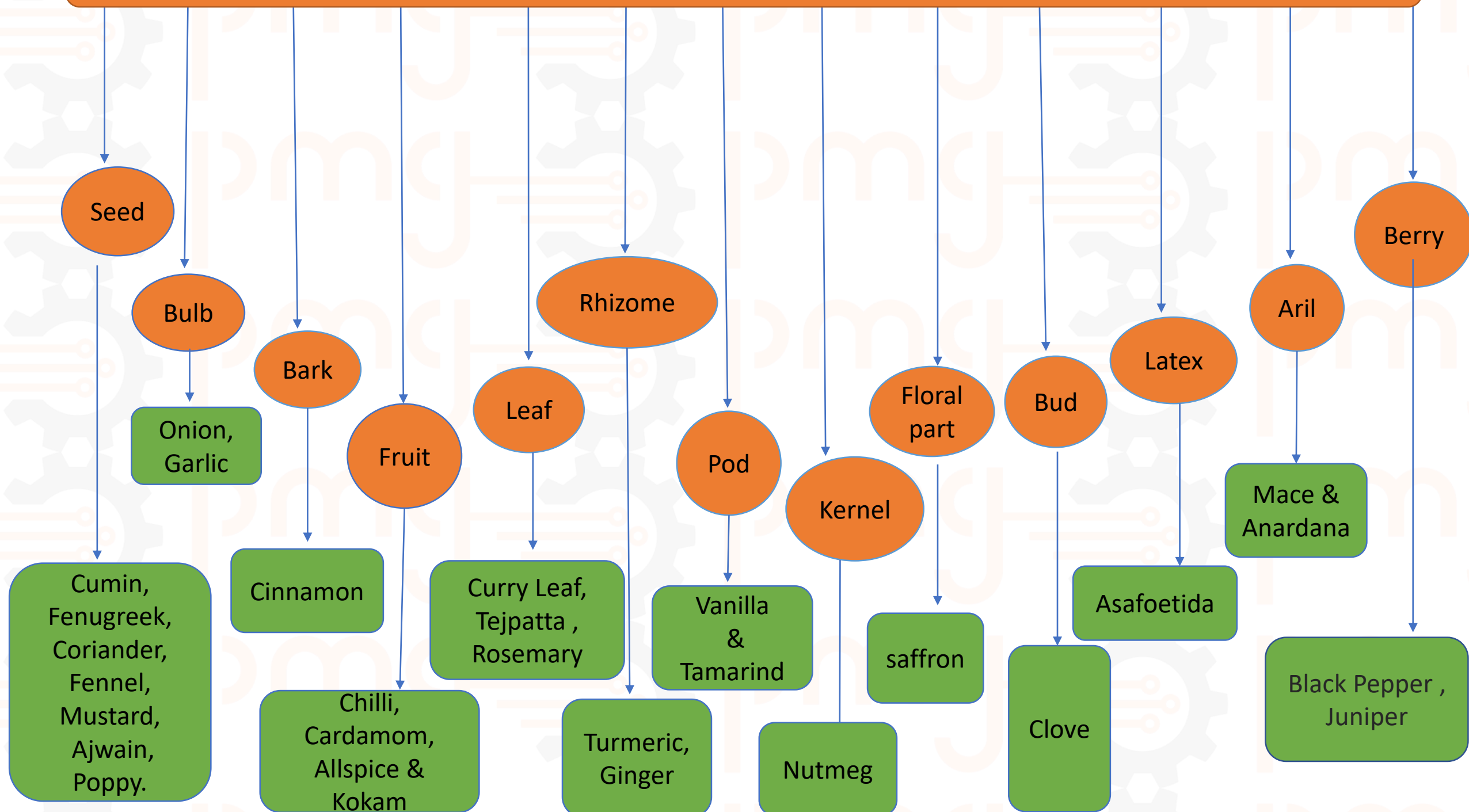
2. Classification of spices

Generally spices are classified on the basis of

- Economic importance,
- Climate
- Taste
- Weather and
- Useful parts.



2. 1. Classification based plant used parts



2. 2. Classification Based On Economic Importance

a) Major spices

1. Black Pepper ,Chilli, Turmeric & Ginger.

b) Minor spices.

1.Bulbous Spices- Garlic ,Leek , Onion And Shallot.

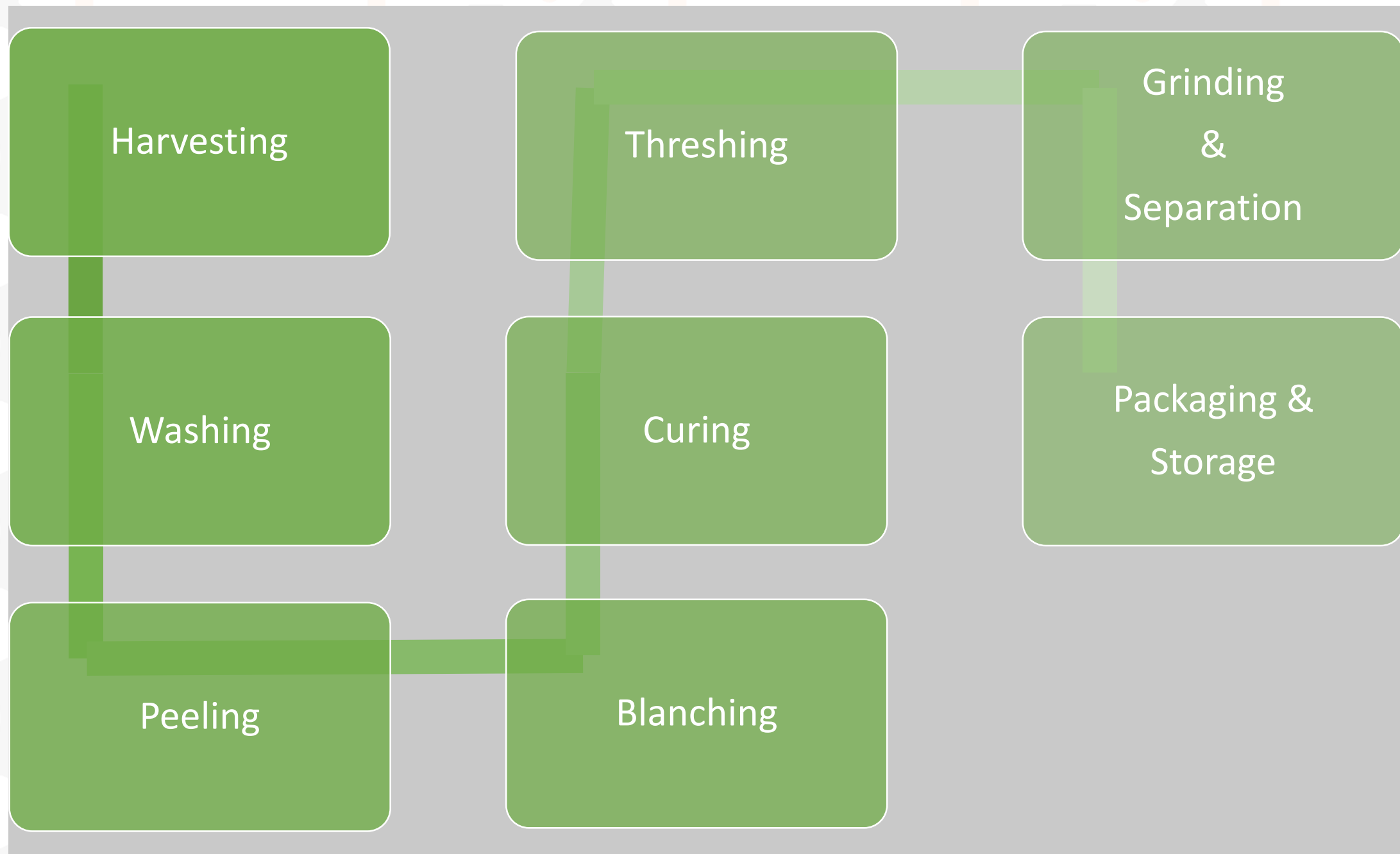
2.Leafy Spices – Rosemary , Bay Leaf , Curry Leaf ,Parsley

3.Acidulent Tree Spices – Tamarind ,Anardana And Kokam.

4.Aromatic Spices – Clove ,Cinnamon, Allspice, Aniseed And Nutmeg.

5.Seed Spices – Poppy, Coriander , Celery ,Mustard ,Cumin Fennel, And Caraway

3. Processing of spices - Flow chart



3.1. Harvesting

- Collecting the crops from the farm when crops attain Physiological maturity.
- Proper care should be taken care of to ensure avoiding mixing of foreign particles.
- Harvesting should be done under best conditions ,
- In wet conditions, immediately dry to prevent mould/Microbial growth.
- Post harvesting- to be stored in dry place ,free from rodents, insects, and pests.
- In case any plant material found to be damaged it should be removed immediately in order to prevent quality loss of other plant materials.



3.2 Washing

- The spices which are dug from soil need to be washed properly in order to remove the dirt and adhering mud. E.g. Ginger, turmeric, onion, angelica. If this process is done perfectly that will keep the raw material free from microbes.
- During these operations removal of sticks, insects and rodents is done to prevent microbial contamination



3.3 Peeling

- All spices are dried except garlic, ginger and onion. The peel of the ginger constitutes a wall to transpiration of moisture content from inside. Therefore best way for drying ginger is peeling.
- Cinnamon barks are peeled from the branches of tree .And in other spice such as Nutmeg ,the outer part is removed and then sundried.



3.4 Blanching

- Blanching is done in order to inactivate the enzymes present in the spices. But Not all the crops can be blanched some of them are garlic, onion, parsley and celery.
- Blanching is done in the presence of sodium bicarbonate or dilute lime water.



3.5 Curing

- Spices such as garlic, cinnamon, cassia, saffron, vanilla beans, turmeric, are cured by different methods to generate characteristic flavour in which they are valued .
- In cinnamon and cassia the branches that are plucked are packed and kept overnight for fermentation.
- Smoking of garlic is done for partial dehydration, incorporation of natural antioxidants ,effect on microbes and by improving organoleptic quality



3.6 Threshing

- Process of removing and separating seeds or fruits from unwanted parts of flower stems or plant stalks. And also removal of immature or damaged material.
- Can be done manually with the help of screens & screens or with the help of winnowing or mechanical shakers & sorters.
- Seed spices are threshed by beating with bamboo sticks. The threshed stocks are remove by winnowing



3.7 Drying

- Purpose of drying is to decrease the moisture content of the product to improve the shelf life.
- This process consists of 2 stages :
 - **Heat transfer** to raw material to vaporize the water in the product.
 - **Mass transfer** of moisture from inside the raw material to the surface to evaporate.



- Most basic method of drying is sun drying.
- For drying of seeds and fruits-

1. Immediate drying: After blanching & threshing seeds and fruits are dried in sun until 7-10 days.

2. Programmed drying: Infuses the enzymatic development of flavour compounds .e.g., vanilla, all spice, pimento .



3. Drying to retain colour :

Colour retention in the spices indicate the spice is of highest quality . E.g. in cardamom the colour retention is done by bagging in jute bags, cool & storage place.

Flue pipe curing /drying is preferred to retain colour.

4. Drying leaves and stems :

The harvested leaf consists of 80-90% water . The temperature maintained is critical in order to prevent the loss of volatile compounds. In General the drying temperature should be 40 degree Celsius.



5. Drying flowers& buds : The damaged and spoiled buds are removed and the drying is continued for 4-5 days that having not more than 12% moisture.

In flower saffron plucked and dried immediately flowed by separation of stigma from floral parts.

Generally the stigma consists of 80 % moisture it is reduced to 10 %



6. Drying roots and Rhizome: In turmeric after the harvest curing is done in order to improve colour and aroma .

7. Drying Seed spices – Seed spices are dried in sun but mechanical dryers enhance the quality and post harvest losses.

Traditionally sun drying is done but as the technology is developed now a days, hot air drums, tray and continuous tunnel driers are used at temperature range 60 degree Celsius. If the temperature is more than 60 degree Celsius than the volatile components in the spices are lost.



3.8 Grinding & Separation

- Grinding of herbs and spices are to specified on particle size based on that different types of sieves are used as per the product requirement. These will obtain the fineness required .
- In white pepper removing of pericarp from mature or semi ripe and after they are grinded.
- In cardamom the capsules are sorted according to their sizes,
- In nutmeg they are grouped into 3 broad quality classes.

i)Sound –used for grinding and extraction of oleoresin .

ii)Substandard- used for making powders

iii)Poor – Essential oil distillation



3.9 Packaging & storage

- The processed materials should immediately be packed to prevent deterioration of the quality.
- Processed plant materials should be cleaned and packed in clean and dry place.
- Reusable packing material such as jute bags & sacks should be disinfected .



- Packaging of spices according to their suitability :

1. Vanilla – cardboard boxes
2. Cardamom – polythene bags
3. Nutmeg and mace: Double layered linen , jute or woven bags.
4. Chilli's – Air Tight Containers
5. Coriander – LDPE ,PET + LDPE
6. Cloves – Double Jute Bags
7. Saffron – Air Tight Containers
8. Ginger – Polyethylene Bags



4. Factors affecting quality of spices

1.Maturity at Harvest :

- Immature Harvest affects the flavour and aroma.
- Over Mature spices spoil during storage.

2.Drying :

- Critically followed at certain temperatures and time.
- prevent loss of volatile components and odd flavours.

4.Relative humidity :

- Stored where the humidity is low .
- As they absorb moisture from the atmosphere causing mould, spoilage and develop off flavours.

5.Storage :

- Stored in clean and damp area to prevent rodents, insects and organisms.



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