

# BOTANICALS

## SPICES & HERBS



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# SPICE & HERB ?

## HERBS

Leaves (sometimes seeds), usually from temperate-origin plants

## SPICES

flowers, fruits, or bark of tropical-origin plants

*No clear distinction*

# Spices trading?

Very lucrative

Easily be transported

Improved food & health

Many diverse uses

Spicy food considered classy, sign of wealth

Plant protection from herbivores &  
pathogens (mostly fungi, bacteria)

Secondary compounds have anti-microbial  
activities

Anti-bacterial and anti-fungal properties of many essential oils are well established and are related to their function as plant secondary compounds

However, rigorous scientific testing to substantiate other healing claims has not been done

SPICE	PART OF PLANT USED
Black pepper	Dried fruits (pepper corns)
Ginger/Turmeric	Rhizome (underground stem)
Nutmeg	Seed
Mace	Covering of nutmeg seeds
Cloves	Unopened flower buds
Cinnamon	Bark
Cardamom	Fruits, seeds



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graph TD; A((SPICES & HERBS)) --- B((Herbal Teas)); A --- C((Functional Foods)); A --- D((Nutraceuticals)); A --- E((Phytochemicals)); A --- F((Ethicals)); A --- G((OTC Medicine)); A --- H((Flavors and Fragrances)); A --- I((Aromatherapy)); A --- J((Culinary Herbs)); A --- K((Culinary Herbs));
```

**SPICES  
&  
HERBS**

Herbal  
Teas

Functional  
Foods

Nutraceuticals

Phyto  
chemicals

Ethicals

OTC  
Medicine

Flavors  
and  
Fragrances

Aromatherapy

Culinary  
Herbs

## ACTIVE COMPONENT

Black pepper

*Piperine*

Coriander

*Linalool*

Cinnamon

*Cinnamaldehyde, Eugenol*

Fenugreek

*Choline, Trigonelline*

Turmeric

*Curcumin*



# AROMATHERAPY

Essential oils are absorbed thru nose, lungs & skin

Trigger physiological response

Believed to affect both the immune and endocrine systems

holistic approach

Influence moods, memory, emotions,  
performance, and general well-being

Many oils are also

1. Antiseptic
2. Analgesic
3. Anti-inflammatory

Can also be used to treat insect bites, burns and cuts

Spices	Benefits
Black pepper	Analgesic, antimicrobial, insecticidal, antipyretic compound.
Coriander	Analgesic, carminative, digestive, depurative, deodorant, natural antibiotic, antioxidant, antidiabetic, anti-inflammatory galactagogue; antibilious, antispasmodic, aphrodisiac, appetizer, aromatic, diaphoretic, diuretic, refrigerant, stimulant, stomachic, fungicidal, lipolytic, antispasmodic agent.
Cinnamon	Anti-Clotting, anti-microbial agent, invigorating tonic
Fenugreek	Immunomodulatory, antioxidant, chemopreventive, anticancer, antidiabetic, gastroprotective agent.
Turmeric	Antioxidant, anti-inflammatory, antimutagenic, anticoagulant, anticancerous, chemopreventive, bioprotectant, antiviral, antimicrobial, antiprotozoan, antiparasitic, anti-proliferation, anti-invasion, and anti-angiogenesis, antispasmodic agent

# ESSENTIAL OILS

ESSENTIAL OIL	MEDICINAL PROPERTY
Eucalyptus	Anti-inflammatory, arthritis, relaxation
Lavender	Antiseptic, respiratory infections, relaxation
Pine	Asthma, arthritis, depression
Rose	Antiseptic, Insomnia, relaxation
Rosemary	Bronchitis, depression, mental alertness
Sandalwood	Acne, bronchitis, depression
Tea Tree	Respiratory infections, depression

# QUALITY OF SPICES?

## INTRINSIC

chemical quality viz., the retention of volatile oil, alkaloids and oleoresins ...

## EXTRINSIC

physical quality viz., appearance, texture, shape, impurities, colour ...

In addition

some **HEALTH REQUIREMENTS** viz., pesticide residue, aflatoxin, heavy metals, sulphur dioxide, solvent residues and microbiological quality.



# TECHNOLOGY ...

Prevailing stringent regulations/ preferences ...

demands

superior technology for production, processing, packaging and transportation ....

Thus,

Cryogenic grinding,  
Super critical fluid extraction  
Micro encapsulation

..... shows a promising features for promotion of export /domestic market

# CRYOGENIC GRINDING

Low temperature grinding

Produces superfine spice powders

Liquid nitrogen is employed to cool the feed granules below their glass transition temperature

## COMPARISON OF CRYOGENIC & TRADITIONAL GRINDING

Parameter	Cryogenic	Traditional
Energy Consumption	Low	High
Throughput	High	Low
Mill Clogging	No Clogging	Frequent
Volatile Losses	Minimum	Higher
Motor Capacity	Low	High
Control on particle size	Effective	No control
Grinding of soft material	Possible	Very difficult
Fire Risk	No	High
Air Pollution	No	Yes
Microbial Load	Does not exist	Possible

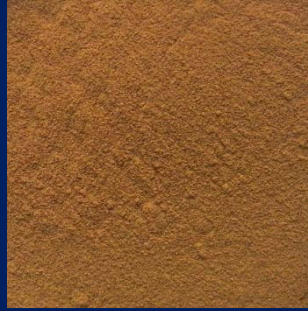
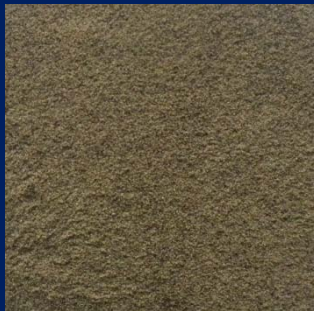
# CRYOGENIC GRINDER



# SPICES



## AMBIENT GRINDING



## CRYOGENIC GRINDING



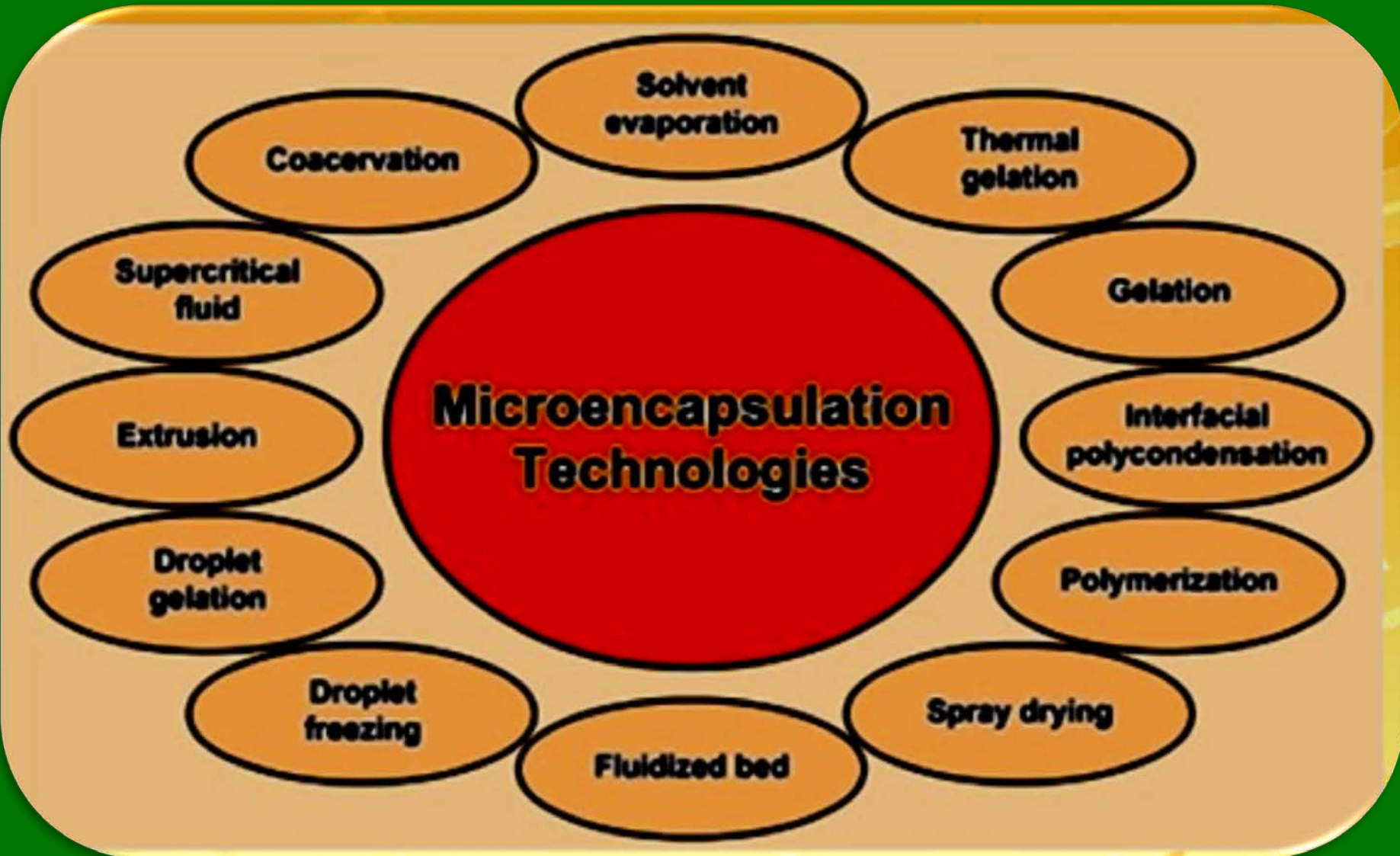


# BLACK PEPPER

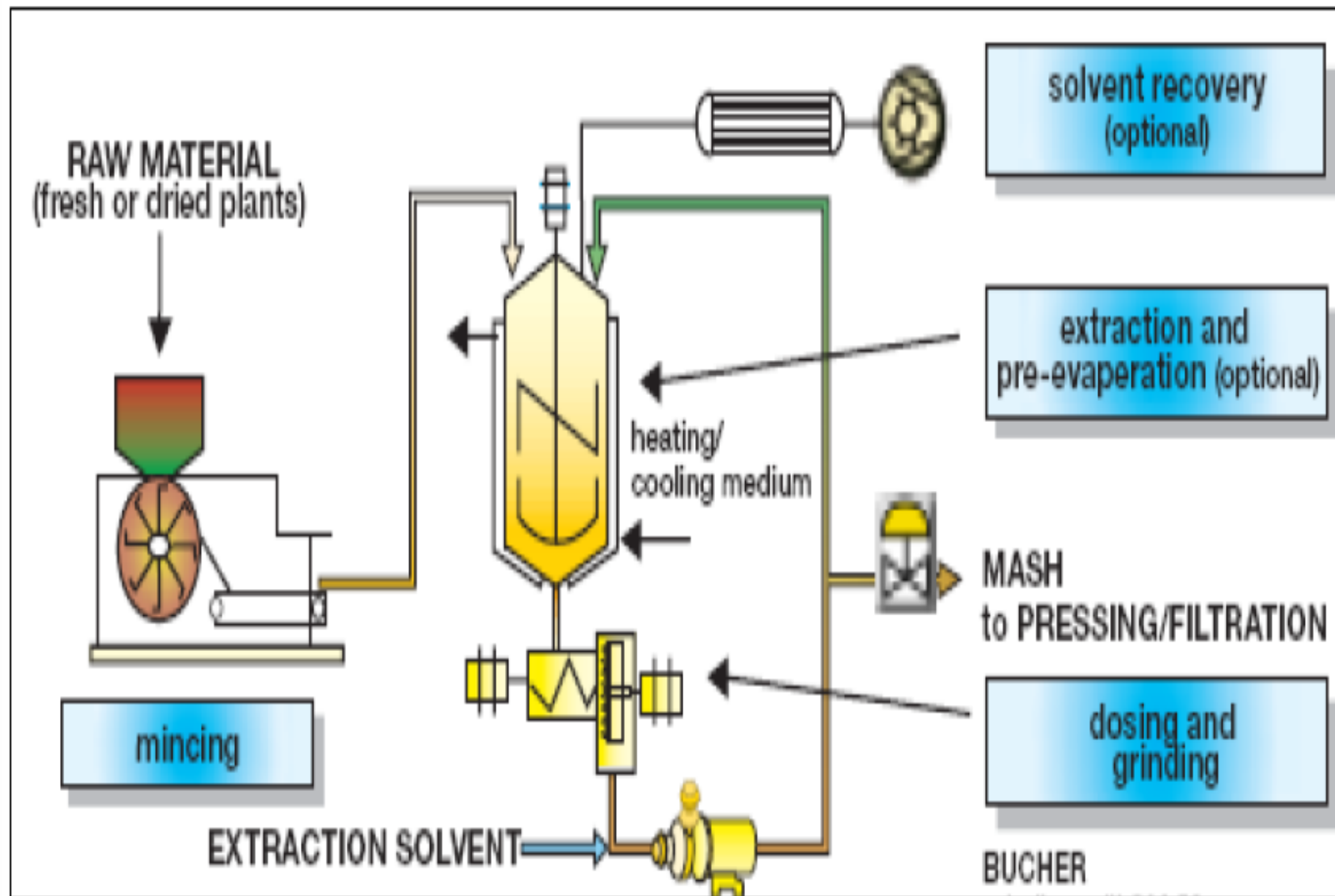
			OIL (%)	OLEORESIN (%)	PIPERINE (%)
Ambient					
	50	Grade I	1.2	7.1	2.2
	85	Grade II	1.2	6.6	1.8
	PAN	Grade III	1.2	6.7	2
Cryogenic					
	50	Grade I	2	11.9	4.1
	85	Grade II	1.6	6.5	1.9
	PAN	Grade III	1.6	7.8	2.2



# MICROENCAPSULATION



# SOLVENT EXTRACTION



# ESSENTIAL OILS

Name	Part of plant	Important Constituents	Uses
Lemongrass and Citronella	Leaf	Citral Citronella Terpenes	Perfumery, Disinfectant
Eucalyptus	Leaf	Cineale, Citronella, Terpenes	Decongestant
Cinnamon leaf	Leaf	Eugenol, Eugenol acetate, Cinnamic aldehyde	Used to make artificial vanilla. Flavouring
Clove	Bud	Eugenol	Dentistry, Flavouring
Turpentine	-	Terpenes	Paints
Lavender	Flower	Linalol	Perfumery
Sandalwood	Wood	Sanatols	Perfumery
Nutmeg	Nut	Myristicin	Flavouring
Almond	Nut	Benzaldehyde	Flavouring
Coriander	Seed	Linalol, Terpenes	Flavouring

Demand for plant based medicines, health products, pharmaceuticals, food supplement, cosmetics are increasing

India has lot of potential for producing world class spices and herbal functional products and medicines.





... friend of physicians and the praise of cooks ...

THANKS

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