

Overview of Post Harvest Technologies in Horticulture- Value Addition of Horticultural Crops



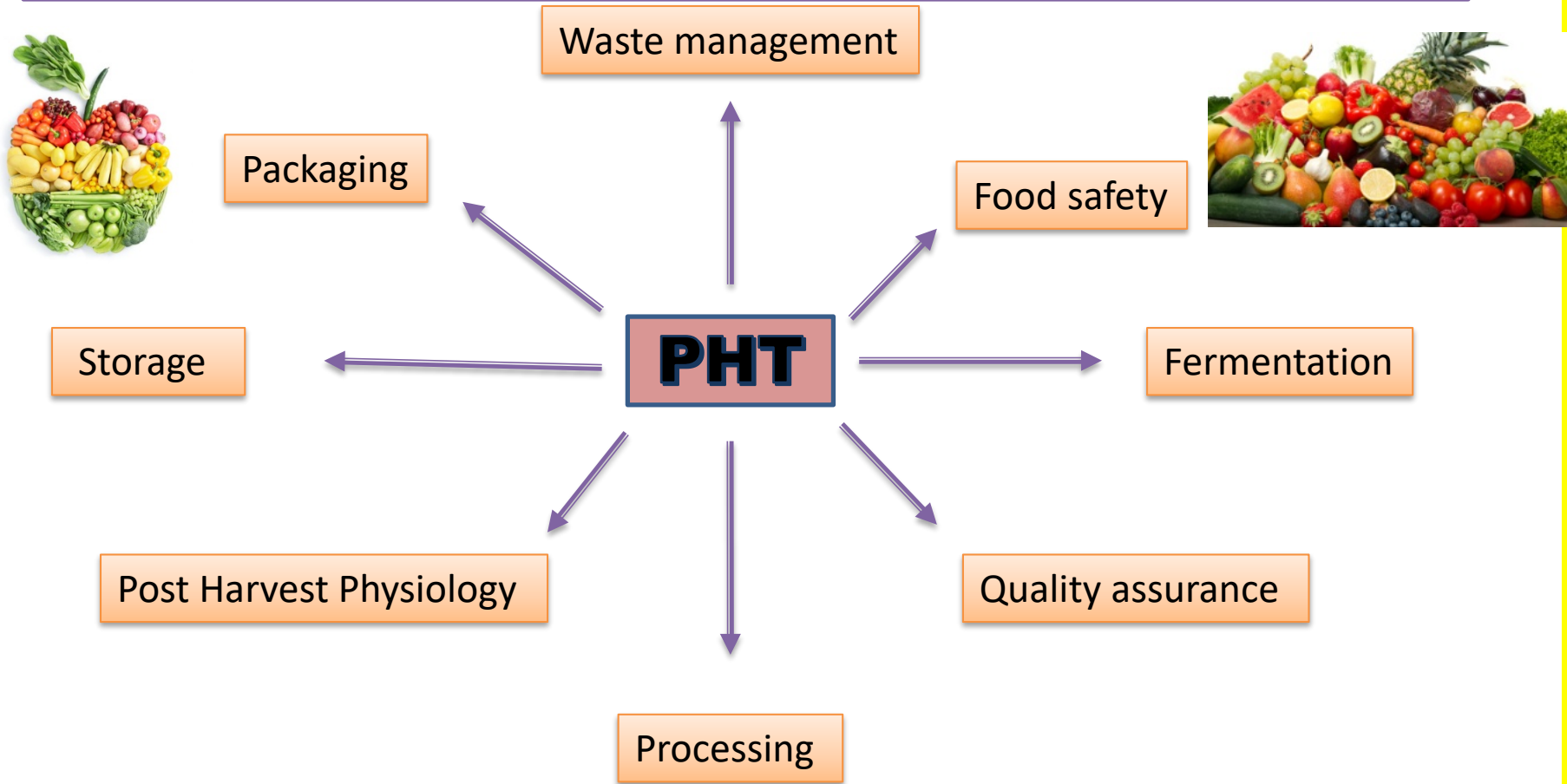
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Importance of PHT in Horticultural Crops

- ❖ **Fresh fruits and vegetables (F&V) have been part of human diet**
- ❖ One example is the ability of the citrus fruit to cure scurvy, a disease wide spread among naval personnel
- ❖ Fruits & vegetables are rich in vitamins & minerals, known as protective foods. Due to their high nutritive value, ready availability & being inexpensive, they make significant contribution to human well-being
- ❖ Realizing worth of fruits & vegetables in human health, **ICMR** recommend consumption of **120g of fruits & 280g of vegetables/capita/ day**



Post harvest technology and its sub - disciplines



Postharvest – all the succeeding action after harvest are defined as post-harvest technique. From this period of time all action is enters the process of preparation for final consumption.

Eg - pre cooling
- chemical treatments
- curing
- storage, ripening and distribution

- waxing
- trimming/sorting
- transportation

- cleaning/washing
- packaging
- grading

PHT – Importance and Role

- PH Loss reduction
- **Value addition**
- Contribution to the Economy
- Making availability of fruits and vegetables during off seasons
- Tools for export earnings
- **Employment generation**
- Adding variety in taste and nutrition
- **Waste utilization**
- Home scale preservation





Value addition in Mango



Hot water Treatment Unit

- Semi-automated system
- 500 kg capacity
- Controls fruit fly & anthracnose infections



Mango products

RTS Beverages

Pulp,

Osmo-dried slices,

fruit bar,

dehydrofrozen

slices,

beverages

concentrate,

canned slices

canned pulp

and jam.



Canned slices



Mango Fruit Bar

Arka Probiotic-Mango Juice

- Contains added water & sugars but no preservatives, Rich in free phenolic acids, carotenoids with added vitamins through probiotication
- Shelf life of >4months under refrigerated conditions



Pomegranate- Value Addition

Pomegranate syrup and RTS incorporated with chia seeds

- ✓ Pomegranate syrup incorporated with 15 per cent chia seeds showed higher level of **antioxidant and phenol content**



Pomegranate syrup incorporated with chia seeds

Nutri-enriched pomegranate RTS blended with soymilk, drumstick leaf extract and ginger juice

- ✓ 90% pomegranate juice + 10% drumstick leaf extract RTS and 68.50% pomegranate juice + 30% drumstick leaf extract + 1.5% ginger juice squash have the highest nutrient content



Grapes- Value Addition

Grapes vs Raisins



Per 100g

70 Calories

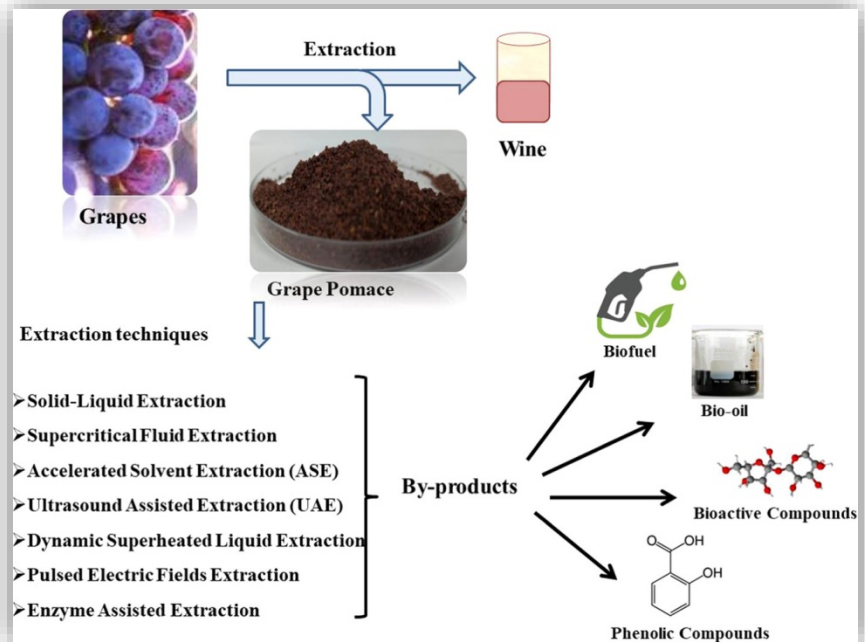
15g Sugar



Per 100g

300 Calories

60g Sugar



Value addition in Banana



Williams



Grand Nain



Luvhele



Dwarf Cavendish



Ice cream



Composite bread



Banana muffins



Banana spaghetti



Chips



Yogurt



Cake



Banana juice



Banana jam

Probiotic fruit juices

Probiotic fruit juices:

- ❑ Probiotic beverages were developed from **carrot, guava, aonla, pineapple, mango, pomegranate & jamun:**
- ❑ The shelf life of the products ranged from 2 months to 3 months at 5°C storage

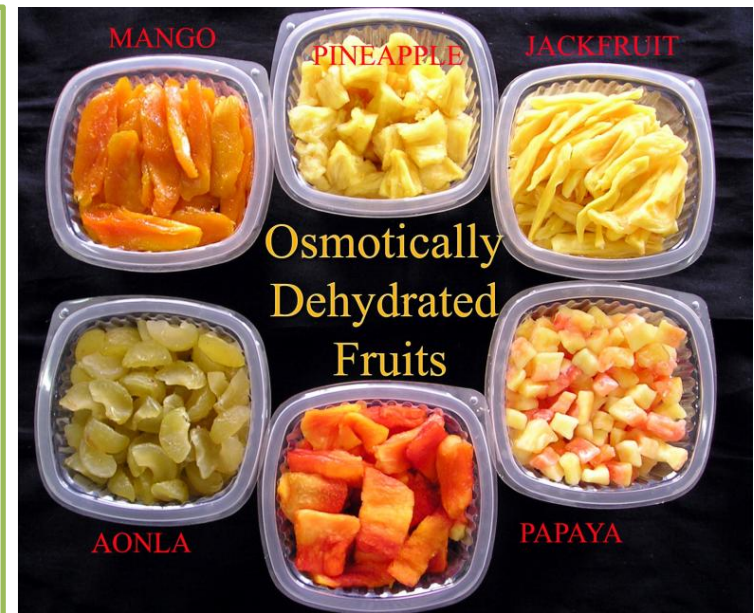
Value addition in Pineapple and Kiwi fruit:

- Methods for dehydrated slices, fruit powder, probiotic beverage, jam, jelly, RTS beverage with improved cloud stability, pulp storage method etc. were standardized for kiwi fruit value addition



Diversified Value Added Products in Horticulture

- ✓ **Osmotically dehydrated fruits** - pineapple, mango, aonla, sapota and papaya
- ✓ **Dehydrated fruits** - grapes, fig, anardana from pomegranate
- ✓ **Dehydrated vegetables, culinary pastes (vegetable pastes)** - onion, garlic, chilli, ginger
- ✓ **Intermediate process products/ semi processed products** - mango pulp
- ✓ **Tomato products** - tomato whole concentrate, puree, ketchup
- ✓ **Mushroom products** - dehydrated mushroom, pickle and chutney
- ✓ **Fermented products from vegetables;** raw mango slices in brine for pickle production



Diversified Value Added Products in Horticulture

- ✓ Banana chips
- ✓ Watermelon rind candy
- ✓ Cider - Anola
- Guava
- ✓ Banana flower pickle
- ✓ Banana fig
- ✓ Biscuit from Banana flour
- ✓ Value-added food products from Cassava-based composite flour
- ✓ Cassava Mini- Papad
- ✓ Ethanol from Cassava



COCONUT: A potential sector for secondary agriculture in India

Major products:

✓ Desiccated Coconut, Virgin Coconut Oil, Packaged coconut milk, Coconut water concentrates, Coir products, Activated carbon, Shell powder, Coconut oil, Packaged tender coconut water

Kalparasa® and value addition

Coconut sap, popularly called as neera, is a natural health drink

Using the ICAR-CPCRI technology (of using a chiller box for collection) neera with 0% alcohol is obtained (i.e., Kalparsa®)

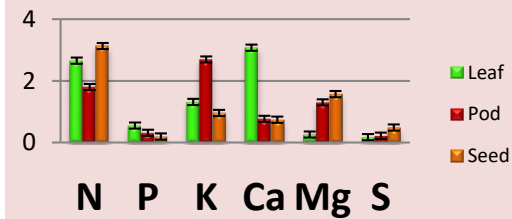


Drumstick – Versatile Crop for Value Addition

- ✓ Drumstick leaf green tea powder blended with tulsi, ginger and lemon grass
- ✓ Rich in anti-oxidants and polyphenols
- ✓ Rich in Protein Fibre Vitamins and Minerals
- ✓ Drumstick leaf incorporated products



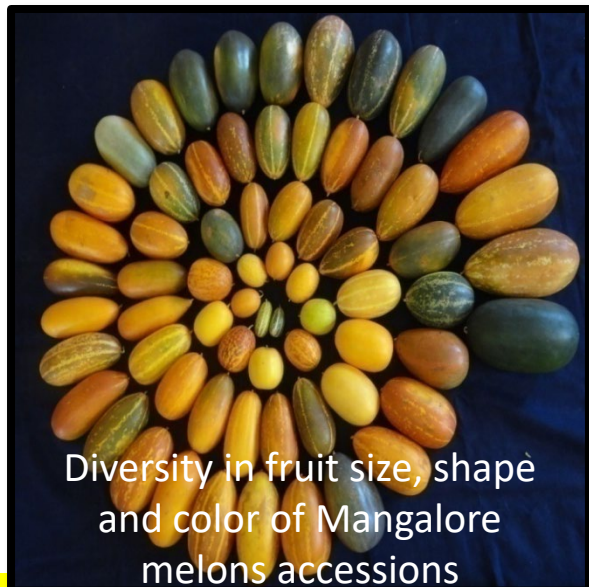
Macro nutrient content variation in different tissues of drumstick



Oriental Melon- Value Addition

Jam prepared by incorporating oriental pickling melon

- *Cucumis melo* var. conomon (50%) + Apple (50 %) Jam
- Rich in nutrients and can be stored for 6 months at ambient temperature
- *Cucumis melo* var. conomon+ Mango (50% + 50 %) Squash
- Rich in nutrients and can be stored for 6 months at ambient temperature



Diversity in fruit size, shape and color of Mangalore melons accessions

- **Mangalore Melon (*Cucumis melo* var. *acidulous*)** culinary melon potentially originated in coastal regions of South India
- Possess long shelf life of > 12 months at room temperature
- Development of ***Intra-specific crosses*** between **Mangalore Melon X Muskmelon**

Flower Waste

In India, Lots and lots of flowers are used for religious devotion.

Worshiping is the way of living and people offer various offerings to the deities, out of which floral offerings are found in huge quantity.

Every year, around 800 million tons of blossoms-red roses, yellow marigolds, gerberas, hibiscus and tuberoses are deposited at the Nation's Temples, Mosques and Sikh and Gurudwara's for creating a colourful, but highest waste problem



Utilisation of Flower Wastes for Value addition

- Biofertilizers
- Incense (Agarbattis)
- Dyes
- Generation of bio-fuels
- Food supplements
- Value added products
- Potpourris
- Handmade paper
- Greeting cards



Constraints

- ❖ Non availability of proper infrastructure for PHT i.e., processing facility, grading, packaging
- ❖ Lack of awareness of Indian fruit varieties in foreign countries, quarantine restriction
- ❖ Irregular supply and non uniform quality of processed product neither satisfies the consumers in domestic market nor encourages buyers in national market
- ❖ Non utilization or improper waste management in processing industry causes pollution
- ❖ Proper research and development support to industry is lacking

Improvements needed in PH handling

- ✓ Adequate inputs for developing infrastructure for PH handling are to be provided
- ✓ Establishment of growers association or cooperative under take various organizations
- ✓ Storage facility should be develop at collection centers
- ✓ Establishment of more processing units should be encouraged near production area both by the private and public sector
- ✓ Packaging methods for different fruits and vegetables needs standardization and packaging materials should be available locally

Future thrust areas

- ❖ Practicing contract farming for horticulture crops to benefit both consumers and formers
 - Eg: Namadhari fresh - Many vegetables
 - Ken Agritech – Gherkhin
- ❖ Determining harvest maturity indices in relation to intended use
- ❖ Developing new methods of harvesting, handling, packaging and pre packaging system
- ❖ Developing low cost, improved storage technique to extend shelf life and regulate or delaying ripening process
- ❖ Developing suitable technology for recycling and utilization of processing waste for giving economic viability to industry
- ❖ Biotechnological approaches in horticulture crops for better storage and processing quality
- ❖ Development of novel bi-products from Horticulture produce



THANK YOU



HORTICULTURE FOR HEALTH & PROSPERITY

