

Indigenous fruits and vegetables Of India and their derivatives



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Facts and Figures



- India is the second largest producer of vegetables in the world (ranks next to China) and accounts for about 15% of the world's production of vegetables
- Largest producer of fruits = 71.516 million ton
- Total production = 205.254 million tonnes
- Post harvest losses are huge = 25% of total produce (Rs 50,000 cr annually)
- India's share is only 1% of world trade
- We have reservoir of indigenous/underutilized fruits/vegetables

NHB, 2011

Top 4 -Global food trends

- ❖ Doctoring through diet- functional foods/nutraceuticals ----rising health care costs



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- ❖ Farm-Friendly, natural, minimally processed
- ❖ Layering of Flavours- exotic/traditional/fermented
- ❖ Fancy foods- sushi, momos, etc

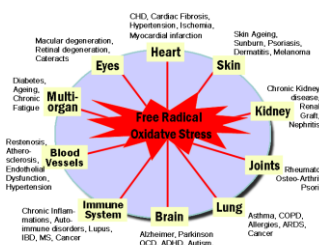


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Value addition – The need

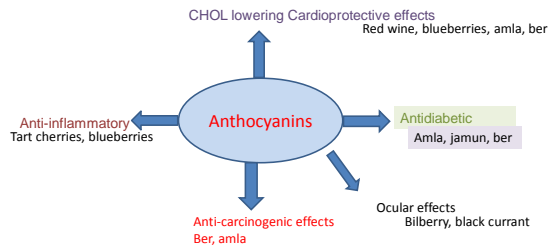
- ✓ Increased globalization
- ✓ Rapid growth of food supermarket chain and international trade
- ✓ Increased consumer awareness on the health promoting capacity of health promoting capacity of fruits and vegetable- in managing life-style diseases
- ✓ Renewed interest in therapeutic knowledge of natural plant products/traditional knowledge

Modern Theory of Disease



A substance that is able to prevent the oxidation of oxidation of oxidizable substrate when present in low concentrations
lycopene, β -carotene, ascorbic acid, anthocyanin

Anthocyanins- health perspective



Indigenous/underutilized fruits -- Anthocyanins

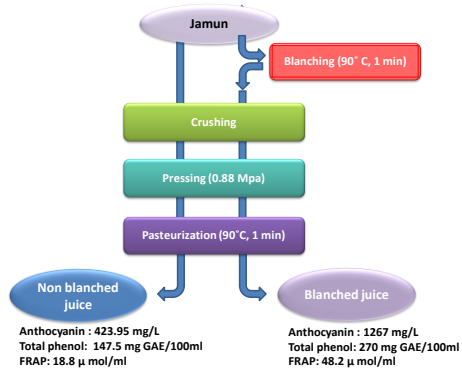


Jamun (*Syzygium cumini*)



- ✓ Rich source of carbohydrates, minerals and vitamins and minerals.
- ✓ Astringent property is due to oxalic acids, tannic acids, gallic acid and certain alkaloids
- ✓ Anthocyanin, phenolics or tannins and help in inhibiting lipid peroxidation and platelet aggregation
- ✓ Anti-tumor, antimutagenic and has hepatoprotective properties

Processing of Jamun juice



Value added products



Madhu Rakshak

Capsule

Vinegar

Black Carrots

- Black carrots a under-utilized vegetable
- A potential source of health pigment- anthocyanins
- Contains acylated anthocyanin cyanidin-3-sinopoyl-xylosyl- glucosyl-galactoside (27.5%)
- Shows greater stability towards light & heat

- ✓ FDA approved color to replace carmosine
- ✓ Solution to replace synthetic colors



KANJI – Traditional food revisited



Natural Black carrot fermented with Salt(3%) and mustard (1.5%)

Fermented product has high antioxidant activity even higher than fruit juices



Product development



Karonda (*Carissa carandus*)



Karonda

- High in ascorbic acid, iron, anthocyanins
- antiscorbutic and used to cure anaemia.
- Glazed Karonda is widely used as a topping on bakery products such as cakes, pasteries, icecreams and paan.



Kokum



Traditional Ayurvedic medicine infusions to treat skin ailments like allergic rashes, burns, chafed skin and scalds; provide relief from sunstroke

Tonic for the heart and liver

Brinjal (*Solanum melongena*)

(Solanaceae)



- ✓ Anthocyanins (major anthocyanin is delphinidin-3-rutinoside)
- ✓ Nasunin – a flavonoid a potent anti-carcinogenic agent
- ✓ High in soluble fiber content
- ✓ Has high glucosidase inhibitory activity- a potential for managing type-2diabetes

Thermal processing enhances the antioxidant activity- roasting increases the AOX
Freezing can be explored to make availability of roasted brinjal

Medicinal Property

Analgesic, anthelmintic, nematicidal, antifilarial, antifungal, anti-inflammatory, astringent, antiviral, dental care, depressants of central and autonomous nervous system and gastro-intestinal disorders

Phalsa (*Grewia subinaequalis*)

Tiliaceae



- ✓Fruits astringent properties& used for several stomach ailments
- ✓Fresh or dried fruits are suggested to cure heart and blood disorders, fever and diarrhoea
- ✓The root bark is used for rheumatism

Phytoconstituents

- Grewinol, a long chain keto alcohol, tetratricontane-22-ol-13-one
- The seeds contain 5% of a bright-yellow oil containing 8.3% palmitic acid, 11.0% stearic acid, 13.4% oleic acid, 64.5% linoleic acid; 2.8% unsaponifiable

Amla (*Phyllanthus emblica*)



Treat urinary problem, kapha problems, supports liver.

Body coolent, improve digestion

Amla an antioxidant for cholesterol and blood sugar control, delaying development of diabetic

Amla - Phytoconstituents

- High ascorbic acid (vitamin C), 445 mg/100g
- Polyphenols: flavonoids, kaempferol, ellagic acid, phyllembin (ethyl gallate) and gallic acid



Phyllembin



Value added products



Bael - *Aegle marmelos* (Rutaceae)



- Consumed raw & as sharbat, squash, murabba, jam etc.
- Medicinal properties and used for the cure of diarrhoea, dysentery & other stomach ailments
- 'Marmelosin' - Therapeutic property

Amongst the fruits it is richest source of flavonoids

Phytoconstituents

- Fruit : Marmelosin, luvangetin, aurapton, psoralen, mormelide, Imperatorin and tannin



Marmelosin: Antihelmantic
Antibacterial
activity



Aurapton: Antihypertension
activity



Mormelide: Effective against
virus

Ber (*Ziziphus* Species)

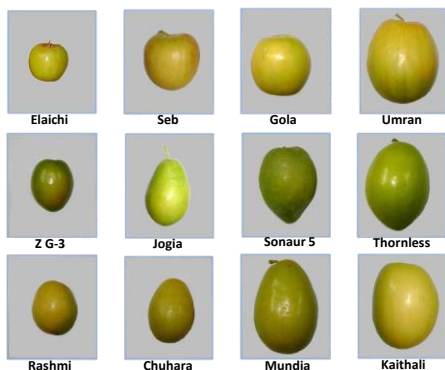


Catechin, caffeic acid, epicatechin, ferulic acid, rutin, p-hydroxybenzoic acid and chlorogenic acid present in fruit

Quercetin, p-coumaric acid, ferulic acid, rutin, apigenin-7-glucoside, eriodictyol, p-hydroxybenzoic acid, chlorogenic acid and syringic acid present in leaves

Medicinal Property

- ✓ Widely used in traditional Chinese medicine and ayurveda
- ✓ Leaves have hypoglycemic effects
- ✓ Essential oil has hair growing potential
- ✓ Fruits and *Zizyphus polysaccharides* is a good therapeutic candidate for a valuable hepatoprotection food.



Can be processed to juice / chawanprash/

Jackfruit (*Artocarpus heterophyllus*)



Fruit is rich in ascorbic acid and isoflavonoids

- Strengthen Immune System
- Protect against Cancer
- Aids in healthy digestion
- Maintain a Healthy Eye and Skin, Control Asthma
- Remarkable attenuations of hyperglycemia and hyperlipidemia

Value added products



Jack fruit Wine

Tamarind

- ✓ Contains tannins, saponins, sesquiterpenes and alkaloids
- ✓ In Indian ayurveda for gastric and/or digestion problems, and in cardioprotective activity
- ✓ Decoction used for treatment of stomach disorders, general pain, jaundice, yellow fever and as blood tonic and skin cleanser and malarial fever



Research Gaps --Product innovations

- ✓ Documentation of Antioxidant potential of our indigenous / undertutilized fruits – advocated through media/ press
- ✓ **New product developments : functional beverages(anthocyanin), extruded products, breads, health supplements, chawanprash**
- ✓ **Juiceceuticals- hybrid dairy products – fruit pulps can enhance the probiotic viability in yoghurts.**
- ✓ Shelf –life studies/ packaging studies
- ✓ Quality products with stable formulations of bioactive principles

Raw material availability can be tackled with adequate blending

