



PROCESSING OF APPLE JAM



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2020





Introduction

Apple (Malus domestica) is commercially the most important temperate fruit and is fourth among the most widely produced fruits in the world after banana, orange and grape.

It is mostly grown in the states of Jammu & Kashmir, Himachal Pradesh, Uttaranchal, Arunachal Pradesh and Nagaland.

Common name : Apple Scientific name : *Malus domestica* Family : Rosaceae





Production of Apple

- ✤ Total area in India 301 Thousand Ha (2017-18)
- Total Production in India: 2327 Thousand MT (2017-18)
- Export from India (2017-2018)
 Quantity : 12529 MT
 Value : 3916 Lakh Rupees



Source : Horticulture statistics at a glance 2018, Department of Agriculture, Cooperation & Farmers Welfare and APEDA website





Production of Apple

Indian Production of APPLE

			Production(000 Tonnes		
		2017-18			
Sr No.	State	Production	Share(%)		
1	Jammu & Kashmir	1,808.33	77.71		
2	Himachal Pradesh	446.57	19.19		
3	Uttarakhand	58.66	2.52		
4	Arunachal Pradesh	7.35	0.32		
5	Kerala	4.00	0.17		
6	Nagaland	1.99	0.09		
7	Tamil Nadu	0.01	0.00		
	Total	2,326.91			

Source: National Horticulture Board (NHB)







Apple fruit



- Major Producing States/Districts in India :
 - 1) Jammu & Kashmir (Baramulla, Kupwara, Shopian, Kulgam, Badgam etc.)
 - 2) Himachal Pradesh (Shimla, Kullu, Kinnaur, Mandi, Chamba etc.)
 - 3) Uttrakhand (Uttar Kashi, Almora, Nainital, Dehradun, Chamoli etc.)
 - 4) Arunachal Pradesh (West Kameng, Tawang etc.)







Apple fruit











climacteric fruit and is perishable

Post harvest loss is 12.3%

Are mostly consumed fresh but a small part of the production is processed into juices, jams, jellies, canned slices and other items



Nutrition facts



- Dietary fibre soluble and insoluble fiber , vitamin C and minerals like potassium
- Antioxidants quercetin, catechin and chlorogenic acid
 - ***** anti-inflammatory, antiviral, anticancer, and antidepressant effects
 - improves brain and muscle function
 - Iowers blood sugar and cause weight loss









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Moleture	Brot	tein	Ach	Total Eat	Dietary Fibre			Contractor	to Encre
Moisture	PIO	tern	ASI		Total	Insoluble	Soluble	- Carbonydra	tte Energy
←				g				\longrightarrow	KJ
83.01±0.94	0.29±	0.08 0.3	6±0.04 ().64±0.04 2.	59±0.15 1	.43±0.15	1.16±0.17	13.11±0.76	261±15
Thiamine (B1)	e Ribo (I	oflavin B2)	Niacin (B3)	Pantothenic Acid (B5)	; Total B	6	Biotin (B7)	Total Folates (B9)	Total Ascor Acid
			mg		\longrightarrow		← µg	\longrightarrow	mg
0.03±0.0	17 0.0	1±0.011	0.25±0.07	0.09±0.04	0.04±0.0)27	0.34±0.08	3.04±0.94	3.57±0.5
Lutein	Zeax	anthin L	ycopene	β- Cryptoxanthin	γ-Carotene	α-Carot	ene β-Car	otene	Total Carotenoids
~				ч ——	g				\rightarrow
36.4±5.19	1.90±	0.95					2.41±2	2.13	229±98.5
Aluminium (Al)	Arsenic (As)	Cadmium (Cd)	Calcium (Ca)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	lron (Fe)	Lead (Pb)	Lithium (Li)
mg	þġ	mg	mg	mg	mg	mg	mg	mg	mg
0.23±0.12	0.96±0.37	0.040±0.014	13.68±3.2	0 0.007±0.002	0.261±0.093	0.04±0.0	1 0.26±0.02	2 0.058±0.029	0.592±0.40
Magnesium (Mg)	Manganese (Mn)	Mercury (Hg)	Molebdeum (Mo)	n <mark>Nickel</mark> (Ni)	Phosphorus (P)	Potassi (K)	ium Selenii (Se)	um Sodium (Na)	Zinc (Zn)
mg	mg	Рð	mg	mg	mg	mg	ра	mg	mg
8.09±0.81	0.05±0.02	0.01±0.00	0.839±0.44	7 3.798±1.46	1 10.44±1.18	116±1	2.9 0.47±0).18 1.43±0.4	2 0.09±0.0

Source : Indian Food Composition Table, NIN 2017



Health Benefits Of Apple



Apple Fruit: The Healthy Fruit

Control the Body weight



dy weight hier Teeth Reduces Cholesterol

Curb all sorts of Cancer

Get a Healthier Heart

Controls blood sugar



Improves Eyesight



Boost your Immune System





Value Added Products From Apple









□ Jam is a spreadable product

Prepared by boiling the fruit pulp with sufficient quantity of sugar to a reasonably thick consistency, firm enough to hold the fruit tissues in position.

□ Fruit may be rich in pectin and acid content.



Jam



- □ Jam means the product prepared from sound, ripe, fresh, dehydrated, frozen or previously packed fruits including fruit juices, fruit pulp, fruit juice concentrate or dry fruit by boiling its pieces or pulp or puree with nutritive sweeteners namely sugar, dextrose, invert sugar or liquid glucose to a suitable consistency.
- □ It may also contain fruit pieces and any other ingredients suitable to the products.
- □ It may be prepared from any of the suitable fruits, singly or in combination.
- □ It shall have the flavour of the original fruit(s) and shall be free from burnt or objectionable flavours and crystallization.





Preparation of Apple Jam

Product	Pulp %	TSS % (Total Soluble Solid)	Acidity %	Preservative (Benzoic acid in ppm)	Preservative (Sulphur dioxide in ppm)	Preservative (Sorbic acid in ppm)
Apple Jam	45	65	0.3	200	40	500





Formulation of Apple Jam

Ingredients	
Apple Puree	- 1kg
Sugar	- 750 g
Citric acid	- 3 g
Pectin	- 1 g



Process Flowchart



Selection of ripened Apple Washing **Removal of skin Pulping (colloid mill) and Filtering** Addition of sugar (sugar and pectin-dissolved in little water) **Boiling with continuous stirring** Addition of citric acid Judging end point by further cooking (105 °C temp, 65 ° brix, sheet test & drop test) Addition of preservative and colour (For commercial purpose) Filling hot into sterilized bottles **Bottling**, labeling and storage

IIFP



Apple jam



1. Selection of fruit



Only fully ripe fruits are selected



Overripe and green fruits, if used, adversely affect the quality of the jam



The variety and maturity of the fruit and locality of cultivation influence the flavor and keeping quality of its jam

Conveyor







2. Sorting and washing



Diseased, damaged or decayed fruits are rejected or trimmed



Dirt are removed by washing with water, rinsed with chlorine water (10 - 100 ppm) and again rinsed with water







3. Pulping



It is extracted from fresh fruit by crushing and pressing them.

Colloid mill and Screw-type pulpers are mostly used.





Skin can be removed and the fruit can be diced / sliced before pulping

Pulping machine







4. Concentration by heating

Steam jacketed open kettle is used

The fruit pulp is concentrated by continuous boiling and stirring

Required quantity of sugar is added directly during boiling

Sugar also acts as preservative

Brix is checked – 68.5 °B

Temperature 105 ° C



Steam jacketed kettle





5. Addition of colours and preservatives

Colours – Natural and Synthetic food colours

Preservatives – Benzoic acid, sorbic acid and sulphur dioxide







Food processing aids	Uses	
Sulphur dioxide (sulphites)	• Inhibits bacteria and fungi	
Benzoates (Benzoic acid)	• Inhibits bacterial pH<4.5	
Ascorbic acid	• Avoids oxidation and discolouration	
Sorbic Acid	• Yeast and fungi	
Food grade	e food additives are used	



IIFPT

6. Judgement of Endpoint

Drop test:

A drop of hot jam is put into a beaker of water and if the mass remains as one and undispersed – the jam is done

Sheet test:

A spoon of jam is dropped from a distance on to a plate and if it falls down as a sheet – jam is done

Brix test:

By a refractometer











9. Filling and storage

Glass Jars are thoroughly washed with hot water and filled with hot jam

1.5-2.5 cm is head space

Jars are capped and are cooled and stored for 3 - 6 months at ambient temperature





Status



The report 'India Sweet Spread' Market Overview, 2018-2023', says that jam market in the country was pegged more than INR 240 crore in the year 2011-12.

In jam market, there are players like HUL(kissan), Mapro, Patanjali, Tops,
 Mala, Cremica etc with target audience as kids

Jams from fruit imparts nutrition, health, wellness with natural goodness and sweet taste

A perfect kind of jam honours and celebrates the goodness of fruits & value adds and minimizes the post harvest losses.







PM FME Scheme



For the details regarding the PM FME scheme, scheme guidelines, various food processing demonstration videos and DPRs, please visit our weblinks: https://mofpi.nic.in/pmfme/ and http://www.iifpt.edu.in/ab-pmfme.php







Thank You All!