



# FIG



**Visvesvaraya Trade Promotion Centre (VTPC)**

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# PREFACE

With a robust agro potential the Country has, the Government of India has launched the One District One Focus Product Scheme (ODOFP) for agriculture sector by the Ministry of Food Processing Industries. Among its primary objectives, the ODOFP initiative aims to enhance the value of the products which is eventually expected to boost employment and income levels of the farmers. The identified products across the country is available at <https://www.nfsm.gov.in/odopstatecropsreport.aspx>

Karnataka has identified its product mix with high demand and export potential across all the districts. The implementing agency for this initiative is the Karnataka State Agricultural Produce Processing and Export Corporation Limited (KAPPEC), the nodal agency in the State.

VTPC being the nodal agency for promotion of exports from the State has made an attempt to draw the action plan district wise, to capture the potential, present status and future prospects in domestic and international markets. Besides, detailed insights have been provided into the biological description of the product, their local, national and international varieties, export-import analysis, HS codes. For a holistic perspective for those concerned, each report also provides SPS standards, processing technologies available, export grading and packing specifications, and suggested pivotal roles and responsibilities among the government departments, boards, corporations and Universities.

Presenting the Action Plan/Report for Fig a ODOFP product mapped to Ballari district of Karnataka, formulated by VTPC. I sincerely hope that this ready reckoner with first-hand information regarding the farming sector would help all those concerned, especially the FPOs and food processing entrepreneurs who have a desire to focus on exporting this product.

**S.R Satheesha**

Director (Exports) & Managing Director





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## Fig – Unexplored potential



### Introduction

Figs commonly known as Anjur in Karnataka, are the pear-shaped false fruits of the fig tree **Ficus carica** of the mulberry family (Moraceae). Fruit is botanically an infructescence (an aggregate fruit), tear-shaped, 3–5 centimetres (1.2–2.0 in) in length with a green skin that may ripen toward purple or brown. They are sweet, soft, reddish fleshy fruits containing numerous crunchy seeds. The fig plant is often a more bush-like short shrubby plant, native to the Persian Gulf and the Mediterranean region but is now widespread throughout the tropics and subtropics.

### Uses

Figs can be eaten fresh or dried or processed into jam, rolls, biscuits, and other types of desserts. Since the ripe fruit does not transport and keep well, most commercial production is in dried and processed forms. The drying process flattens the figs, resulting in the loss of their pear-like shape and the adoption of a round shape. Raw figs contain roughly 80% water and **20% carbohydrates**, with negligible protein, fat, and micronutrient content. They are a moderate source of **dietary fibre**.

### Types of figs

Depending on quality, a distinction is drawn between natural figs and processed figs

- Natural figs are dried in the sun or by machine, threaded on cords or into rings. The glucose which crystallizes out and creates a dull surface with its granules preserves the figs naturally as a dried fruit.
- Processed figs undergo several operations, i.e., drying, immersion in saltwater or steam treatment, pressing and then drying again. Pressing into particular shapes (slabs, rolls) and processing give the figs an attractive, shiny appearance. Figs processed in this way are commercially the most desirable.



## Growth and its profits

- The Asiatic origin fruit 'Fig'(Anjur) is cultivated in Israel, Spain, Turkey and America and other western countries. This shrub size tree reaches the fruit-bearing stage in just 7-8 months and is less susceptible to pests and plagues.
- One acre of field can accommodate 400 plants. The cost of each plant is Rs.12-15 depending on the nursery. It would cost Rs.5000 per acre to plant 400 plants.
- A single plant yields 20-30 kilos of figs and about 500-1000 fruits which are sold at Rs.50 -60 a kilo.
- Even if the wholesale value of figs is a minimum of Rs.20 per kilo, one can earn Rs.2.40 lakh per acre. Moreover, figs can be harvested continuously every 2-3 days and if everything goes as per calculations, it is the most remunerative fruit among horticulture crops.
- The farmers growing the crop in 10 acres of land earns on an average Rs.15 lakh for a single harvest. Return-on-investment starts in just 8 months.
- Detailed procedure and complete guide for growing the crop and profits that can be achieved are explained in the link here -  
<https://www.agrifarming.in/fig-farming-project-report-anjeer-cultivation-economics>.

## ● Areas

The majority of producers of this fruit in Karnataka are from Kalaburgi, Raichur, Koppal districts and as per recent reports many farmers from Ballari are interested in growing the crop for export and local consumption.

## ● Varieties

There are about 20 popular varieties of fig that are being grown in different parts of the world. Some famous varieties of common fig grown in different countries are 'White Adriatic' 'Black Mission', 'Kodota' and 'Conadira' in California; 'Kalamon' in Greece; Sultani in Egypt. The 'Smyrna types' includes popular Turkish cultivar known as 'Saricop' in Turkey and 'Calimyrna' in United States.



- India 'Poona' is the most popular cultivar grown for consumption as fresh fruit. Most of the fig grown in Mangalore, Ballari, Coimbatore, Daulatabad, Ganjam, Lucknow and Saharanpur resemble Poona fig in plant and fruit morphology. Recently, a variety 'Dinkar', an improvement over 'Daulatabad' variety for yield and fruit quality is gaining commercial importance.

## Commercial Varieties of Figs (World Scenario)



### Adriatic Figs

This Mediterranean fig has light green skin with pink flesh, especially when they are fresh. Its high sugar content makes it great for drying and applying in fig bars and fig pastes. Adriatic figs are nicknamed “white figs” for their pale or yellowish-green skin. However, these fruits are delightful and have creamy red flesh inside. They are often candied or eaten on their own due to their excellent flavour.

### Celeste Figs

These are small to medium-sized figs with brown to purple colour that grows on relatively large trees. Celeste figs are early-ripening, producing dessert quality figs earlier than most other figs. They are green at the onset, then change to brown as they ripen. Must be eaten the very day they are picked or stored in a cool dry place for further use. Nicknamed “Sweet figs” for their rich sugar content.





### Black Mission Figs: The Chief Figs

There is one of the most common fig varieties in the world, believed to have originated in Spain. Black mission figs are relatively small with solid pink flesh and a sticky, chewy texture studded with tiny seeds. If left on the trees for long, the sun dries them out like prunes, yielding an extra sweet and gummy texture. Their extra sweetness makes them a perfect snack to eat plain or in different sweet, savoury foods and desserts such as yoghurt or tangy fresh cheese. The name Black Mission was born when California growers adapted the variety but they aren't black - more of a wildy deep blue-purple in color that is beautiful in its virtue. Before their introduction to Californians by Spanish missionaries, they were known as the Franciscana, the chief fig of the Catholic missions.



### Caprifigs: The Pollen guy

Caprifigs only produces male flowers and never bear fruit. Their only purpose is to pollinate female fig trees. These are not edible.



### Brown Turkey figs

These are bigger fruits with brown to pale purple shades on their primarily brown or green skin. They have a milder flavour than other figs and are noticeably less sweet than the similar-looking Black Mission figs. They tend to have a light pink flesh with fewer seeds than other figs. Brown Turkey's lighter sweetness works well in salads to create a welcome contrast or in cookies where you can use a natural sweetener.





### Calimyrna Figs: Nutty figs



These are well-known for their large, soft and delicious tasting fruits. The fig fruits have greenish, light golden skin and stunning pink insides. Because of their charming interiors, Calimyrna figs are a great choice just to cut up and serve as-is. They have a unique nutty flavour, which is characteristic of all figs, which is why they are so great with nuts. But Calimyrna figs have a great sense of nut about them, making this variety more popular than black mission figs.

Based on its geographical location, Calimyrna is also known as Smyrna. Some people believe that Calimyrna figs are the US version of the Smyrna fig. These plants are known to bear female flowers that are cross-pollinated by caprifigs as the donor of pollen.

### Kadota Figs: All-light-Green igs

These are an all-light green type of fig with a pale interior that is less sweet than other figs. But they are sweet enough at the correct ripeness. Kadota figs are known as Dottato figs in Italy. The Kadota tree is a beautiful type of ornamental plant with a bold, branching structure during the winter season. It is among the more commonly seen fresh figs in California. The figs are good raw but can be heated up with other foods or used to make jams and preserves.





## Popular varieties of Fig in India

### Common Fig

The common fig is the most popular variety in India. The leaves and the stems of the tree exude a milky sap when broken.



### Black Mission

This self-pollinating and drought-tolerant fig tree produces sweet fruits with black skin and red flesh during summers.

### White Adriatic

The tree variety produces figs with red to deep purple pulp and green skin that take an amber-hue during summers. It is also popular as candy-striped figs, as the skin of the fruit has pale green to white bands.



### Kalamon

This variety is native to the Kalamon region of Greece. The figs are firm, medium-sized, and very sweet in flavour. It ripens from mid-summer to late fall.

### Kadota

The tree variety has exceptional hardiness and adaptable to a wide range of environments. Its fruit has green-yellow skin and is great for canning, jelly making, and raw consumption.







### Poona

The variety bears bell-shaped, medium-size fruit with purple skin. This popular variety of India is commercially cultivated near Pune and is great for canning.

### Dinkar

Producing 200-300 fruits per tree, this fig variety is mostly cultivated in the Maharashtra state. The variety was released by Marathawada Krishi Vidyapeeth Parbhani.



### Daultabad

It is a cultivar of Dinkar fig and was released by Marathawada Krishi Vidhyapeeth Prabhani. This variety produces medium-sized 200-300 figs per tree.



### Alma

This variety produces small to medium-sized figs of a pear shape. The brown-skinned fruit has good resistance to fruit rotting and other diseases.



### San Pedro

This fig tree variety produces two crops. The first one does not require any pollination, while the second crop needs pollination from the Capri fig tree.





### Capri Fig

Though this fig variety produces non-edible fruits, yet the variety plays an important role in cross-pollination. Its pollen is helpful in the cross-pollination for Smyrna and San Pedro fig varieties.



### Smyrna

This fig variety is more popular for dried use and the fruits are also big in size. The tree requires pollinating from a Capri fig for fruiting.



### YCD 1

The fig variety was introduced by the Horticultural research station, Yercaud. It is drought-tolerant and bears red-purple skin fruits.



### King

It features strawberry red pulp with green to yellow skin that varies according to ripening rate. The variety is quite hardy and is self-pollinating.



### TP 7

This fig variety was released in 2000 and is popularly cultivated in Maharashtra state. The tree bears 70-100 fruits.



### Excel

The fig is oblong to spherical shaped and has an excellent flavor. It is exceptionally hardy and is drought-resistant too.



## Fig and its products: HS codes (APEDA)

08042010	Figs, Fresh/Dried
08042090	Other Figs Excluding Fresh

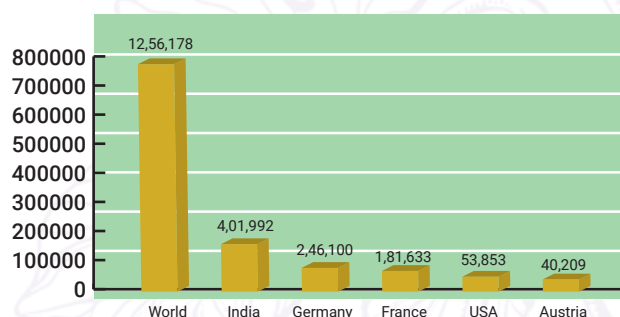
Other products of figs known across the world are **fig paste, fig concentrate, fig powder, fig nuggets, diced and sliced figs and fig jam.**

## World Export and Imports

### 080420: Fresh or dried figs

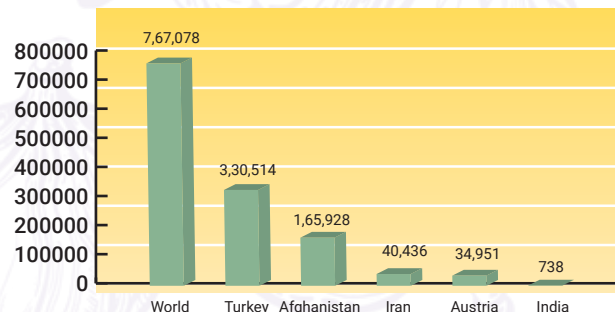
**2021 Global Imports 784,604 USD.**

No.	Country	Value USD
1	India	163,802
2	Germany	81,963
3	France	71,541
4	USA	51,590
5	Austria	42,183



**2021 Global Exports 767,078 USD.**

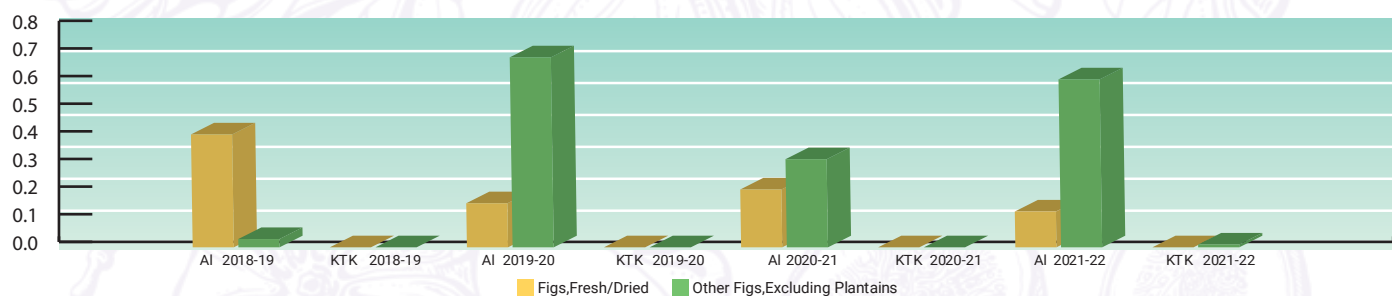
No.	Country	Value USD
1	Turkey	330,514
2	Afghanistan	165,928
3	Iran	40,436
4	Austria	34,951
5	India	738





## Fig Export Performance of last 4 years

Value in Mn USD												
No	HS Code	Description	2018-19		2019-20		2020-21		2021-22		Major Exporting State (2020-21)	Karnataka's Rank (2020-21)
			AI	KTK	AI	KTK	AI	KTK	AI	KTK		
1	08042010	Figs, Fresh/Dried	0.41	Nil	0.16	Nil	0.21	Nil	0.13	Nil	Tamil Nadu, Telangana, Bihar	Nil
2	08042090	Other Figs, Excluding Plantains.	0.03	0.00	0.69	Nil	0.32	Nil	0.61	0.01	Delhi, Maharashtra, Bihar.	8th

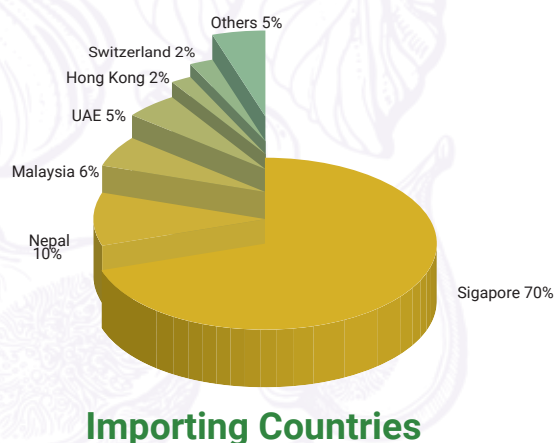
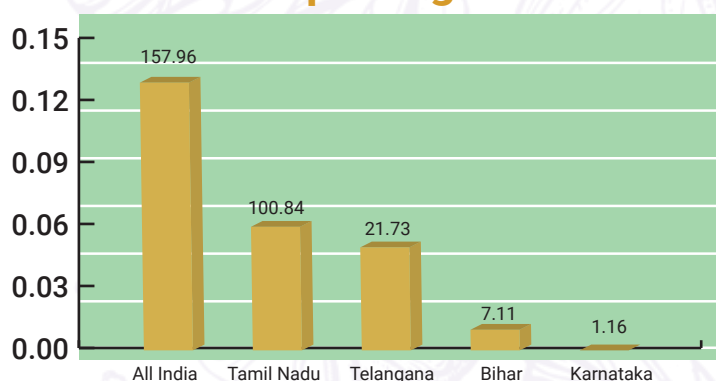


## Export Analysis of Fig and its products: 2021-22

### 08042010: Figs, Fresh/Dried

No.	State	Value USD Mn	Destination
	All India	0.13	Singapore, Nepal, UAE (+9)
1.	Tamil Nadu	0.06	Singapore, Malaysia, Maldives
2.	Telangana	0.05	Singapore, UAE, Switzerland, UK
3.	Bihar	0.01	Nepal
0.	Karnataka	Nil	N/A

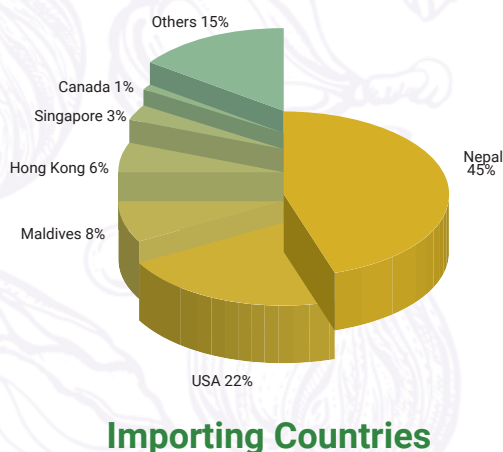
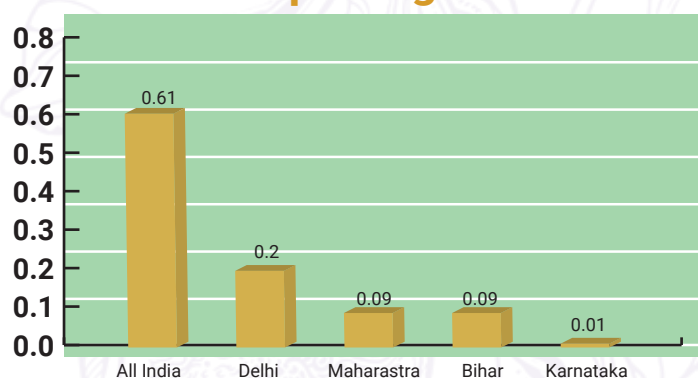
#### Exporting states



### 08042090: Other Figs Excluding Fresh

No.	State	Value USD Mn	Destination
	All India	0.61	Nepal, USA, Maldives (+37)
1.	Delhi	0.20	Nepal, UAE, Hong Kong (+2)
2.	Maharashtra	0.09	Hong Kong, USA, Canada (+17)
3.	Bihar	0.09	Nepal
8.	Karnataka	0.01	United Kingdom, Oman

#### Exporting states





## Harvesting and Storage of Figs

Dried figs have only a limited shelf life, due to their high residual water content. Provided that the recommended storage temperature and relative humidity are complied with, dried figs may be kept for a few months.

When handled incorrectly, figs may become tacky, support yeast growth, grow mouldy, ferment, and take on an unpleasant odour. Fruits that are very severely dried-out and display severe candying and a sour odour are generally from the previous year's harvest which get rejected in international market.

For better quality dry fruit processing, figs should be large, thin-skinned, light brown and taste sweet, juicy and honey-like. The most sought-after are **Smyrna-type** figs, which are well suited to the drying process. These fruits dry well under processing and sometimes leave a whitish coating on the skin of glucose due to crystallization.

### During post-harvest storage: Packing and packaging of fruits:

Preparation of produce for market may be done either in the orchard or at the packing house. This involves cleaning, sanitizing, and sorting according to quality and size, waxing and where appropriate, treatment with an approved fungicide prior to packing into shipping containers.

Packaging protects the produce from mechanical injury and contamination during marketing. Corrugated fiberboard containers are commonly used for the packaging of produce, although reusable plastic containers can be used for that purpose. Packaging accessories such as trays, cups, wraps, liners, and pads may be used to help immobilize the produce within the packaging container while serving the purpose of facilitating moisture retention, chemical treatment and ethylene absorption. Either hand-packing or mechanical packing systems may be used. Packing and packaging methods can greatly influence air flow rates around the commodity, thereby affecting temperature and relative humidity management of produce while in storage or in transit.

## Temperature and relative humidity management

Most perishable horticultural commodities have an optimal shelf-life at temperatures of approximately 0 °C. The rate of deterioration of perishables however increases two to three-fold with every 10 °C increase in temperature. Temperature has a significant effect on how other internal and external factors influence the commodity, and dramatically affects spore germination and the growth of pathogens. Temperatures either above or below the optimal range for fresh produce can cause rapid deterioration.

### Cooling methods

Temperature management is the most effective tool for extending the shelf life of fresh figs. It begins with the rapid removal of orchard heat by using one of the cooling methods. Packing fresh produce with crushed or flaked ice provides rapid cooling and can provide a source of cooling and high Relative Humidity during subsequent handling. The use of crushed ice is, however, limited to produce that is tolerant to direct contact with ice and packaged in moisture-resistant containers.

Clean, sanitized water is used as the cooling medium for the hydrocooling (shower or immersion systems) of commodities that tolerate water contact and are packaged in moisture resistant containers. During forced-air cooling on the other hand, refrigerated air is forced through produce packed in boxes or pallet bins. Forced-air cooling is applicable to most horticultural perishables. Precision temperature management (PTM) and RH management tools, including time temperature monitors, are increasingly being employed in cooling and storage facilities.

### Refrigerated transport and storage:

Cold storage facilities should be appropriately designed, of good construction and be adequately equipped. Their insulation should include a complete vapor barrier on the warm side; sturdy floors; adequate and well-positioned doors for loading and unloading; effective distribution of refrigerated air; sensitive and properly located controls; refrigerated coil surfaces designed to adequately minimize differences between the coil and air temperatures; and adequate capacity for expected needs. Commodities should be stacked in the cold room or the refrigerated vehicle with air spaces between pallets and room walls to ensure proper air circulation. Storage rooms should not be loaded beyond their capacity limit if proper cooling is to be achieved.



## SPS -TBT Standards for fig

- Permitted Import: Importing countries have the infrastructure or logistical capacity to ensure the commodity's pest free status in the origin country only then the imports are permitted pertaining to their guidelines. For example, certain goods from ECOWAS (West African) countries are permitted entry to the U.S. if irradiated. Since no irradiation facilities have been certified by APHIS in those countries, APHIS does not issue import permits.
- Destination Restriction – The commodity's movement is restricted within the U.S. following importation. Destination restrictions are typically utilized if a pest endemic to a commodity has a very specific host that is geographically isolated.
- Phyto Certificate Required – A “phyto” is the colloquial terms for a phytosanitary certificate issued by the plant health regulatory authority in the country of origin and Shipments typically require a phytosanitary certificate (a “Phyto”) verifying the shipment's provenance, regional restrictions, process restrictions or pre-shipment inspection restrictions. For example, a plant product can only arrive in the U.S. if it has been grown in a greenhouse, than it typically must be accompanied by a Phyto documenting that origin.
- Preclearance Possible – The shipments may arrive pre-cleared. In this case, all relevant phytosanitary inspection functions have been performed in the origin country by an employee of the U.S. government. This inspection, however, does not represent whatever security inspection that the Department of Homeland Security might conduct upon arrival and the shipment may still be re-inspected for pest in the U.S.
- Treatment Required – APHIS may require that a treatment be a pre requisite as a condition of entry.
- Required Treatments – Treatment requirements are specific to the commodity and pest. Within a category of treatment (T101 – Methyl Bromide Fumigation), the dosage, duration and ambient temperature requirements of the treatment vary.

## Treatments and their specifications

T101 – Fumigation – Fumigation with methyl bromide gas. This treatment takes 0.5 to 4 hours.

T102 – Water Dip – Immersion of the commodity in hot or soapy water. Treatment time varies by pest but is less than 110 minutes in all cases and may be 20 minutes more frequently.

T103 – Hot Air – exposure to forced hot air, similar to vapor heat but differing in the humidity of the air involved. Typically requires 1.5 to 4 hours.

T104 – Methyl Bromide – Fumigation with methyl bromide gas. This treatment takes 0.5 to 2 hours and is similar in nature to T101 Treatments

T105 – Irradiation – Exposure of commodity to radiant energy (x-rays or gamma rays)

T106 – Vapor Heat – exposure to vapor heat, similar to hot air similar to forced hot air but differing in the humidity of the air involved.

T107 – Cold Treatment – prolonged exposure (typically 2 weeks) to cold, though not freezing, temperatures.

T108 – Fumigation Then Cold Treatment – a combination of fumigation and cold-treatments

T109 – Cold Treatment then Fumigation – a combination of fumigation and cold-treatments

T110 – Quick Freeze – exposure to freezing temperatures for a several day period.

Source: <https://www.ers.usda.gov/data-products/phytosanitary-regulation/>

(Note: The above link has SPS for many products imported to US)



## Processing technologies available in India

### How are figs processed?

- During the months of February-March, the fig fruits arrive in a large quantity. The process of drying figs is very simple and can be done at a low cost. The procedure for making dry figs is as follows:
- To prepare dry figs first select the best ripe fig fruits – large, thin skinned, juicy and green. Fruits with blemishes, holes and deformities aren't accepted.
- Total Soluble Solid (T.S.S) content of selected fig fruits must be more than 17 percent.
- A wooden box is taken and a mesh/net is placed at the base on which the fruits are spread for uniform drying.
- After spreading the fruit on net, the flames of the fire are kept burning in the grate and the sulphur powder is sprinkled on it (4 gram per 1 kg) before closing the box. The colour of the fruit starts to turn white due to the fumes of the sulphur. Supply of smoke created by fire ensures proper drying of fig fruits and if no smoke is given, the fruits turn black. The odour of sulphur stops the growth of the fungus in the fruit.
- Let the fruits dry in a clean place.
- The figs are usually dried for about 5-6 days.
- Pack the dried figs in an airtight bag and keep in a cool and dry place.

### Technology from CFTRI, Mysore

Value added products from Fig: <https://cftri.res.in/technologies/FVP/vpf.pdf>

### Economics of Fig Industry

Few variations of machinery available in the market:

- The hot air circulation fruit drying oven and its process-  
<https://www.fruitok.com/product/drying-machine/dried-fig-machine.html>
- Dried Fig Processing Machine -  
<https://www.tradeindia.com/products/dried-fig-processing-machine-6049688.html>

## Action Plan

- Upon analyzing on strengths and potential of this crop, both cultivation and processing will be independently profitable businesses. Creating suitable commercial atmosphere for prospective growers and investors in this sector is the need of the hour.
- Initially stressing on quality parameters, involving concerned departments for educating more farmers and growers to emphasize on large production of the crop is recommended. Focus on quality development and yield improvement in existing fig varieties of India.
- Later these departments and industrialists can be encouraged for establishment of processing industries in the state.
- Further when the production of fig fruits reaches a threshold mark, emphasis can be laid on exploring international market to export the dry fruit.
- State and Central governments must sponsor financial schemes/ subsidies to aid capacity building in setting up of production of the fresh fruit, processing industries and encourage skill development programmes for the youth to develop figs in the state.

## Opportunities in Fig and related products

- As a dry fruit, fig has huge export and local market potential. It is diet rich super food according to dieticians and nutritionists.
- At present keeping quality of fresh fruits grown in Karnataka aren't satisfactory and unavailability of processing industry in the state leads to financial losses to the growers. Low shelf life of the best raw material makes it difficult to store and transport it to the processing industries located in other neighboring states hence there is a grave need of having a processing industry in the state to empower this sector.
- As per export analysis of Fig both fresh and processed, in spite of the challenges in the sector, minute quantity of the exports from the state has fetched great rates and been appreciated for the quality.
- Presence of one or more processing industries encourages local growers and farmers to focus on the crop and establish an international market and export this fruit.



## Responsibility Matrix

Sl.no.	Actions	Responsibility
1.	Research on best global varieties	Agricultural and Horticultural Universities, Karnataka
2.	Delegation of progressive farmers to Turkey, Afghanistan and Middle east	Horticulture department, Govt. of Karnataka
3.	Farmer Sensitization program on available opportunities	Agriculture and Horticulture departments, Karnataka
4.	Inviting Exporters/entrepreneurs to Investors meet for contract farming and processing industries	Horticulture Department and DIC Districts
5.	Farmer database and aggregation of the produce	Horticulture department and related FPOs
6.	Processing technology and Value Addition Handholding.	Horticulture department through CFTRI, Mysore
7.	Export training, orientation and Market Intelligence	VTPC Karnataka

## Regulators and Service providers

No.	Organization	Service	Contact
1.	APEDA	RCMC, Market survey and assistance.	1st Floor, Beeja Bhavan, Bellary Rd, Hebbal, Bengaluru - 560024. E: <a href="mailto:apedabl@apeda.gov.in">apedabl@apeda.gov.in</a>
2.	KAPPEC	PMFME Scheme	17, Richmond Rd, Shanthala Nagar, Richmond Town, Bengaluru - 560025. E: <a href="mailto:kappec1996@gmail.com">kappec1996@gmail.com</a>
3.	DGFT	IEC, Customs and ICEGATE	6th floor, Kendriya Sadan, C & E Wing, 17th main, Koramangala 2nd Block, Koramangala, Bengaluru - 560034 E: <a href="mailto:bangalore-dgft@nic.in">bangalore-dgft@nic.in</a>
4.	Plant Quarantine	Phyto Sanitary certification (SPS)	Hebbal-Boopasandra Road HA Farm Post, Bengaluru - 560024. E: <a href="mailto:dd-pqfsb-ka@nic.in">dd-pqfsb-ka@nic.in</a>
5.	BIAL Cool Port	Freight and Flight	KIAL Road, Devanahalli, Bengaluru -560300 W: <a href="http://www.aisats.in">http://www.aisats.in</a>