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Value addition of underutilized fruits of arid region: A review

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Abstract

Underutilized fruits are equally important and nutritional sound vis a vis commercially grown fruit crops under the present scenario. These fruits are undoubtedly rich in antioxidants, which neutralizes harmful free radicals generated in the body and also a good source of dietary fiber for poor and thus play an important role in overcoming the problem of malnutrition and livelihood security. Despite being highly nutritive with medicinal attributes and their ability to grow under adverse soil and climatic conditions, they have not received the desired attention. The recent awareness regarding the potential of these production of quality horticultural produce has not only opened up scope for providing economic subsistence for the people of these regions, but also for bringing new areas to increase fruits production. Besides, the underutilized fruits have a wide scope of export for various processed products. Value addition of underutilized fruits by processing them into various products is explained in this paper.

Keywords: Underutilized fruits, value addition, arid region, antioxidants, livelihood security

Introduction

Underutilized fruit crops are not being grown and utilized by the people other than in a very localized manner. They have been traditionally consumed as staple food, fiber and also for medicinal purposes. Arid regions of India are characterized by scarce rainfall with high temperature conditions and high wind velocity. Desert fruit crops are well known for its organoleptic, economic, traditional importance as well as for their nutritional and medicinal value. The Underutilized fruit crops of arid region like bael, jharber, phalsa, karonda, kair, lasora, wood apple etc. are of great importance due to their medicinal properties. These fruits are undoubtedly rich in antioxidants, which neutralizes harmful free radicals generated in the body and also a good source of dietary fiber for poor and thus play an important role in overcoming the problem of malnutrition (Gajanana *et al.*, 2010)^[3]. Many of the arid fruits just grow on wild and barren land and available free of cost to provide food and nutrition security. These crops are mainly not popularized due to high amount of astringency and acidic nature of the fruits, and may not be acceptable for fresh consumption as table fruit, there product diversification should be thoroughly evaluated to gain popularity for such plants to increasing the economy of the farmer.

Most of the arid fruits are available as seasonal surpluses during a particular part of year and that time local people hardly get good prices from the abundantly available resources. Food processing and value addition has an important role in the conservation and better utilization of fruits in order to avoid the glut and utilize the surplus during the off-season. There is an earnest need to concentrate on research efforts in diversification and popularization of such underutilized fruit crops. This can be achieved through developing suitable processing and marketing strategies for these underutilized fruits by processing them into various products. Value addition of underutilized fruits by processing them into various products is explained in this paper.

Kair: (*Capparis deciduas*) is an un-utilized multipurpose, drought tolerant tree of arid region of Rajasthan. The flower buds and immature green fruits are pickled, cooked and consumed as vegetables. The immature fruits are rich source of protein, carbohydrate, fat, minerals (Ca, P, Fe) and vitamin C. It is used to cure the stomach problems especially constipation, skin diseases, toothaches, coughs, asthma, ulcers, boils, vomiting, piles and all types of

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inflammations. Kair is rarely cultivated in orchard, fruits are harvested from naturally growing plants either in common or farm land. The rural people used to harvest fruits in the month of March-April for their consumption. For off season consumption kair are mainly either dried or pickled. One can earn handsome money by selling these products.

The fresh fruits are rich in tannin and phenols, which makes fruit astringent. The astringency of fruits is removed by immersing the fruit in 10% salt solution of 4-5 days in earthen

pot. For preparation of dehydrated kair, firstly the astringency of fruits is removed after that fruits are expose to sun or mechanical dryer for drying. Dehydration ratio is about 1:0.25 of processed fruit. Kurchania (2001) standardize the process of blanching before drying. Fruits are blanched for 5 min in 100 °C in a solution containing 0.1% MgO and 0.1% NaHCO₃. The fruits obtain by this method are excellent in cooking quality, colour and taste with regards to drying characteristics.

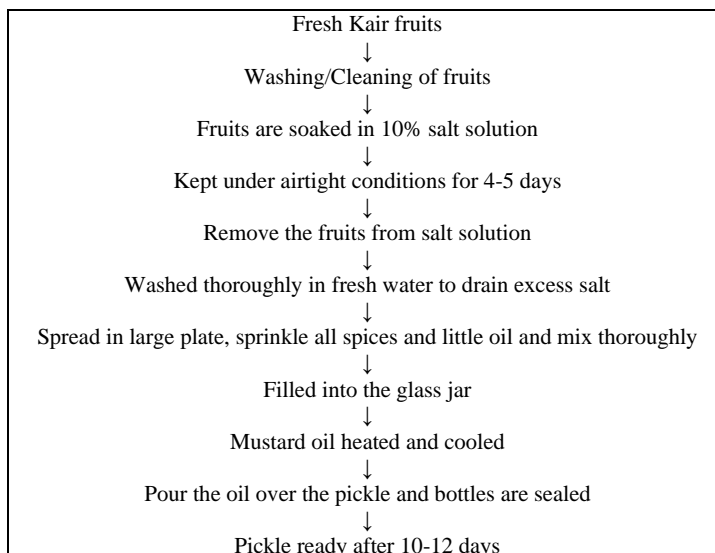


Fig 1: Flow chart of kair pickle

Lasora/ Gonda or Lehsua: (*Cordia myxa*) is a potential underutilized fruit of arid regions. Green unripe fruits of lasora are important as traditional vegetable and pickle. Fruits are rich in minerals, vitamins and fiber, which is essential for human health (Mala, 2009). Plants are rich in Carbohydrates, oils, proteins, minerals, phenols (Spiller, 2001) [1]. Lasora is a one of the important constituent of traditional medicine systems. Fruits have been shown anti-inflammatory, antibacterial, anti-viral and anti-allergic activity; also used to cure ailments viz. dysentery, skin disease, dyspepsia, cholera and dropsy by the local people of the region.

The unripe fruits are used as fresh vegetable for used in scarce period (April-May) when availability of other vegetable is poor. The fruits can be easily dehydrated after blanching for further use in off season. The sticky pulp of lasora also used for preparation of gum.

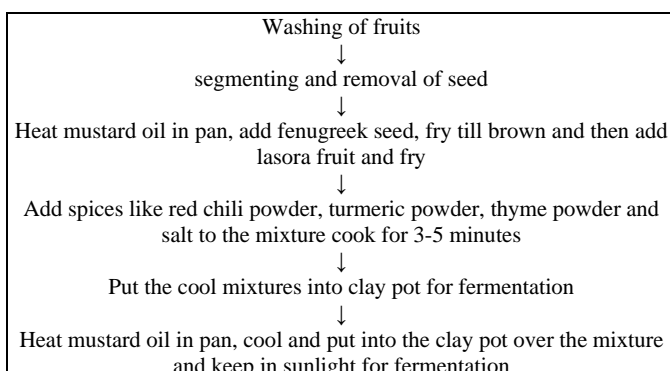


Fig 2: Flow chart of lasora pickle

Bael: (*Aegle marmelos* Linn.) is a highly valued fruit in traditional medicine. Their medicinal property is mentioned in the Charak Samhita, an early medicinal treatise in Sanskrit (Aiyer, 1956) [1]. Every part of the plant viz. stems, barks,

roots, leaves, fruits and flowers possess antipyretic, anti-fertility, anti-inflammatory, antifungal, anti-microfilaria abilities; used in traditional system of medicine for treating many of the disorders like respiratory disorders, constipation, dysentery, ulcer and diarrhea many others. Bael contains carbohydrate, protein, thiamine, riboflavin, niacin, vitamin C and minerals viz. Ca, P, Fe.

Bael is not used as a dessert fruit due to its hard shell, mucilaginous texture and numerous seeds and fiber. It is processed from time immemorial. The fruits are used to prepare various products sharbat, syrup, marmalade, powder, squash, RTS, jam, preserve, nectar and toffee.

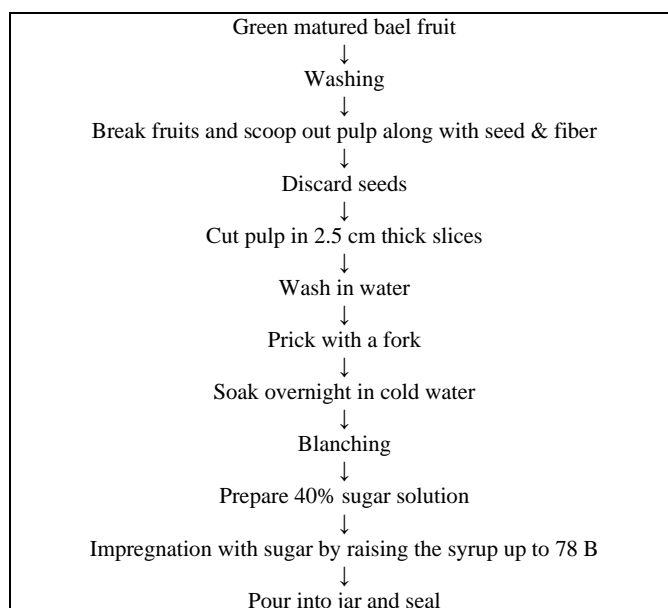
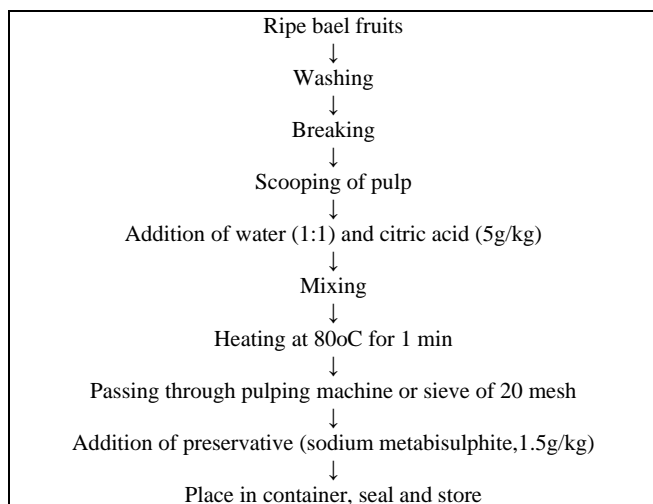
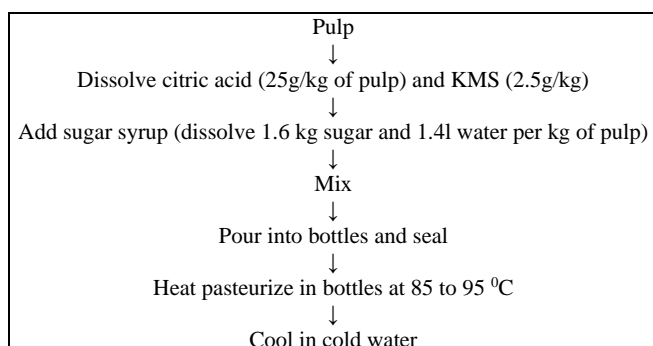
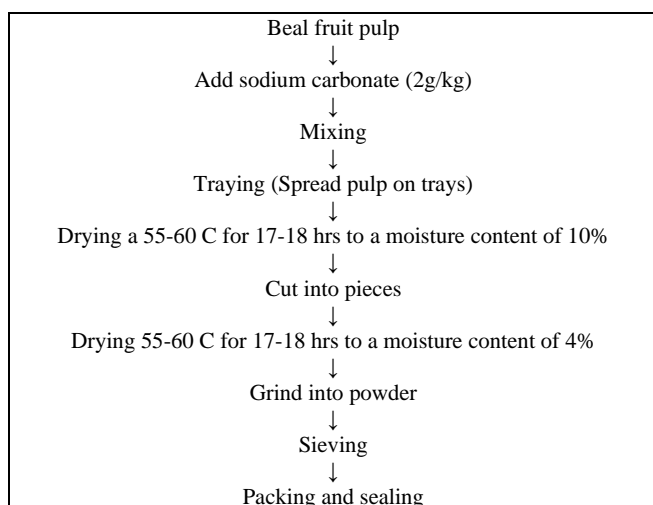
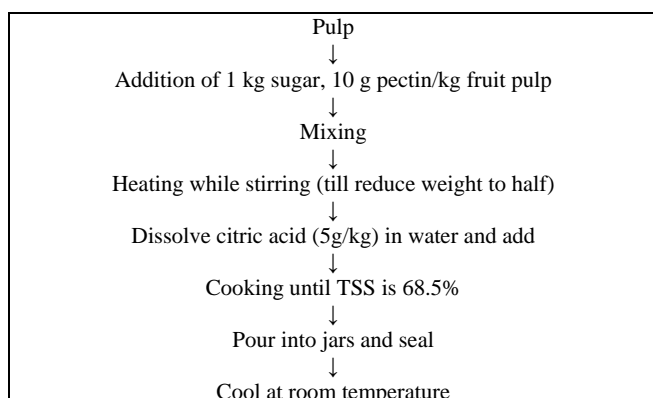
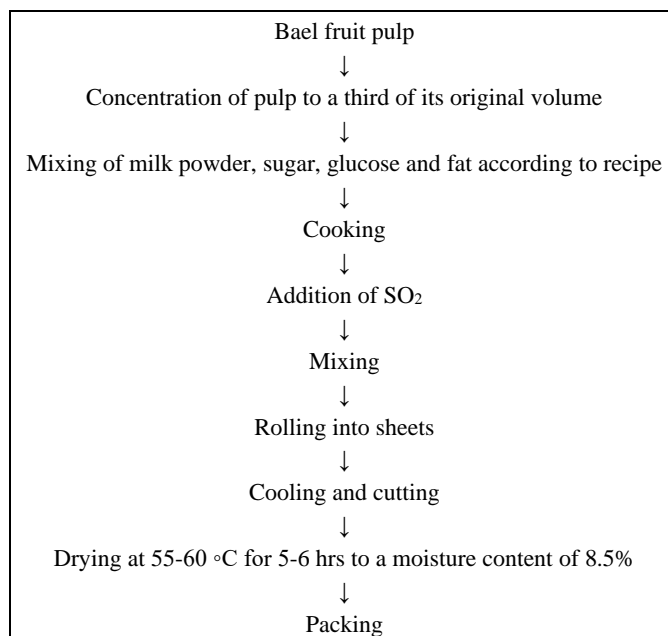
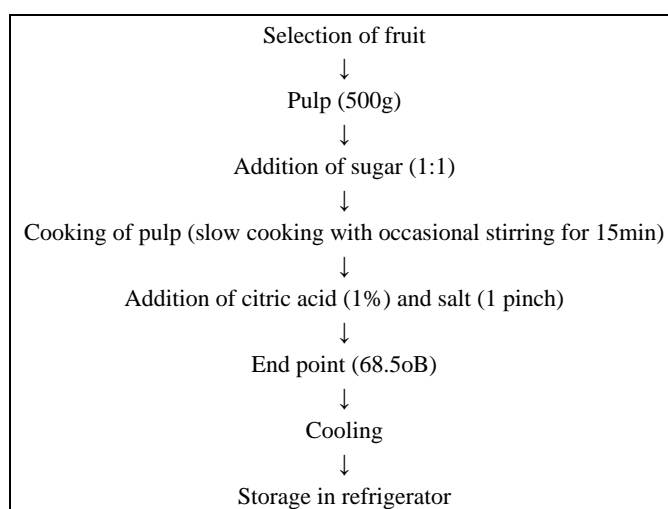


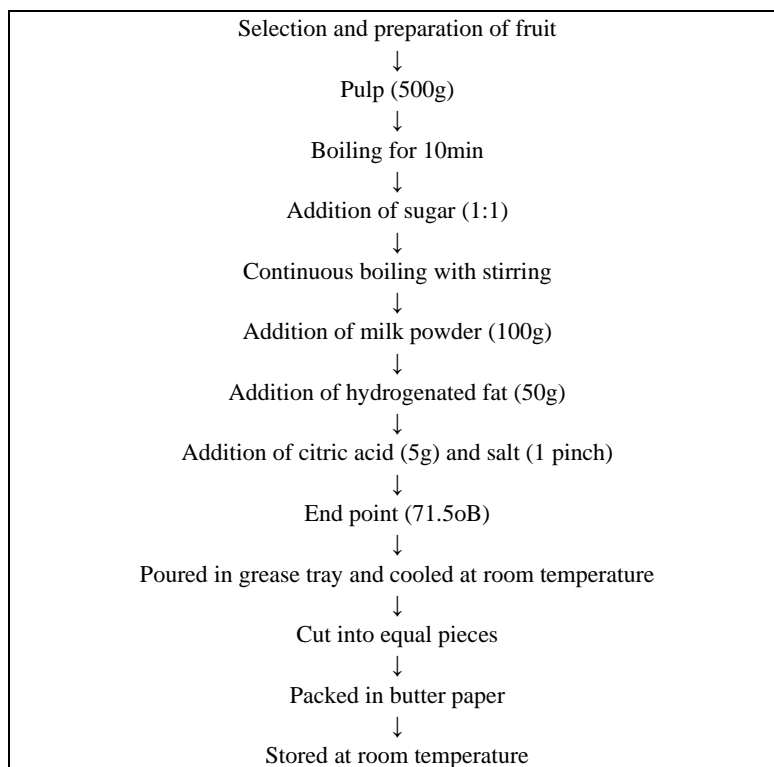
Fig 3: Flow chart of bael preserve

**Fig 4:** Flow chart of bael pulp**Fig 5:** Flow chart of bael squash**Fig 5:** Flow chart of bael powder**Fig 6:** Flow chart of bael jam**Fig 7:** Flow chart of bael toffee

Ber/Jharber: (*Ziziphus nummularia*) is a multipurpose wild economic species with high potential value, well adapted to dry and hot climates of dry regions of Rajasthan (Pandey *et al.*, 2010) ^[8] Fruits are quite nutritious (85% Vit C), delicious and palatable. Jharber have some medicinal properties thus it helps in blood purification and improves digestion. On focusing the prospects of value addition in jharber fruits can be used to prepare pickle, preserve, candy and squash.

Wood apple: (*Limonia acidissima*) has got high medicinal value. Every part of the fruit i.e. pulp, seed and oil has got its medicinal property (Ramakrishna *et al.*, 1979) ^[10]. The fruit is much used in India as a liver and cardiac tonic and when unripe, used to cure diarrhea and dysentery and for effective treatment for cough sore throat and disease of the gums (Mondal *et al.*, 2002) ^[6]. Wood apple can be converted into value added products like jam and fruit bar.

**Fig 8:** Flow chart of wood apple jam



Source: Vidhya and Narain (2011) ^[12]

Fig 9: Flow chart of wood apple bar

Karonda: (*Carrisa carandus* Linn) a minor fruit crop is a base of ayurvedic and unani medicine (Wani *et al.*, 2013) ^[13]. It is grown on a limited scale in Rajasthan, Gujarat, Bihar, West Bengal and Uttar Pradesh. It is one of the richest source of iron and contains a good amount of vitamin C and, therefore, very useful for curing of anemia and has anti-scorbutic properties (Boora and Bons, 2015) ^[2]. Different parts of this plant contain various chemical constituents i.e. carissol, carissic acid, ascorbic acid, glucose, glutamine, lupeol, galactose, serine, glycine, β -sitosterol, valine, phenylalanine and alinine etc (Pada *et al.*, 2014) ^[7]. fruits are used as astringent, antiasorbic and as a remedy for biliousness also used as aphrodisiac for women, antiparasitic, antifungal, antimicrobial, topical wound treatment (juice) and skin remedy (Jadhav *et al.*, 2004) ^[4].

Ripe karonda fruits contain high amount of pectin. Therefore, it is also used in making jelly, jam, squash, syrup, tarts and chutney which are of great demand in international market (Wani *et al.*, 2013) ^[13].

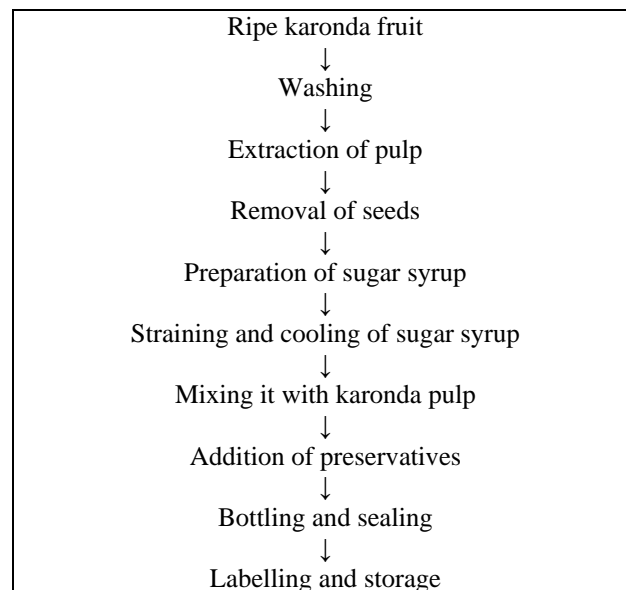


Fig 11: Flow chart of karonda squash

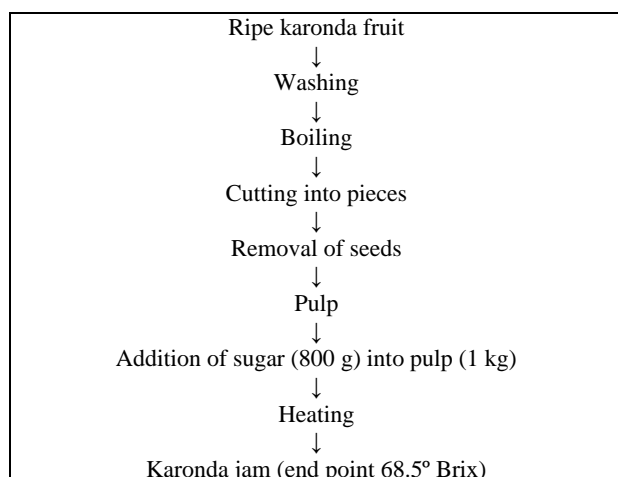


Fig 10: Flow chart of karonda jam

Phalsa: (*Grewia Subinequalis*) fruits are acidic, good source of vitamin A, ascorbic acid and also rich in various other nutrients. There seed, fruit, and pulp contain numerous functional phytochemicals that can be used to treat various diseases, and have be found to be highly effective in improving respiratory and cardiac functioning as well as in fever reduction. Its cultivation has been limited to subsistence cultivation and it is sold in the form of raw fruit mostly. There are certain challenges as regards to its perishable nature of the berry fruit, and the optimization of the crop yield. In addition, fruits are used for making excellent juice, squash, syrup and crush having cooling effect on the body (Boora and Bons, 2015; Pangotara *et al.*, 2018) ^[2, 9].

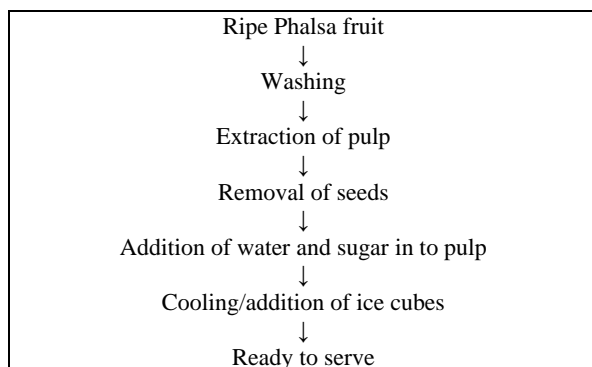


Fig 12: Flow chart of phalsa juice

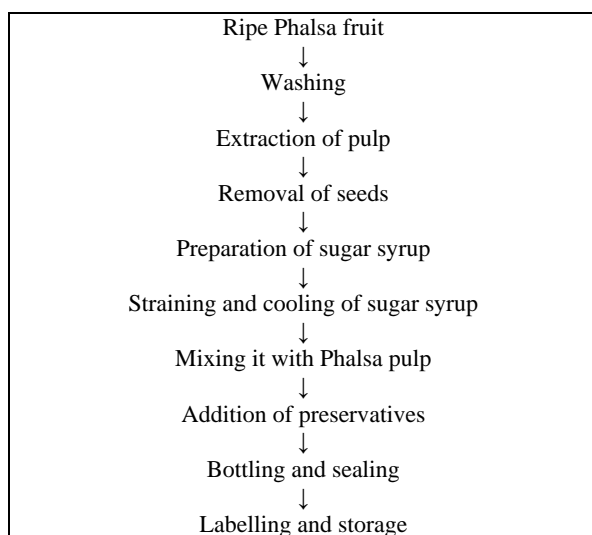


Fig 13: Flow chart of phalsa squash

Conclusion

These crops are present around us in staggered manner. So cultivation of these crops in systematic manner to promote commercial orcharding as well as efficient utilization of marketing systems and channels for fresh fruits during glut periods and processed products can motivate the growers towards growing these crops and can uplift the economy of country.

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