

Kinnow Peel Candy: Waste Utilization

The waste utilization and disposal of fruit processing industries has become one of the biggest challenges faced in the recent past due to the increasing production and processing of fruits and vegetables and plant material being prone to microbial spoilage which is limiting further exploitation. Thus, an attempt to utilize waste products from Kinnow Peel to develop a candy was found necessary in Punjab regions where Kinnow is grown extensively and available in abundance during the main season to minimize the extent of post-harvest losses and add value to the fruit.

INDIA is known to be the second largest producer of fruits and vegetables and being bestowed with varied agro-climatic zones makes it suitable for growing all kinds of crops. However, despite the self-sufficient production, the per capita availability is comparatively low due to huge post-harvest losses of fruits and vegetables accounting for the range of 20-40%. Out of the total production, only about 2.2 % is being processed and a huge amount of waste is generated in the process. These by-products are otherwise having the potential to be converted into valuable products which are economically acceptable. Fruit peel for instance is one of the most important by-products from processing industries which contains a variety of active ingredients which can be used to transform waste into valuable products and enhance the utilization rate of raw materials. Citrus fruit peels are a well-known promising source of multiple beneficial nutrients for human beings. Orange peels are rich in pectin, cellulose, hemicellulose, pigment, dietary fiber, oil and several bioactive compounds used as a natural antioxidants for biotechnological, pharmaceutical and food industries. Candying is one of the oldest methods of preservation of food which involves slow impregnation of the peels with sugar syrup until the sugar concentration in the tissues is sufficiently high that, it prevents the growth of spoilage microorganisms.

Kinnow Peel Candy Preparation

For the Kinnow Peel Candy materials and ingredients required are *viz.* Kinnow peels 100 g, Sugar 100 g, Water 200 ml, citric acid (pinch), weighing balance, hand refractometer, measuring cup/cylinder, cooking pan, ladle, drier, etc.

Processing of Raw Materials

- Select healthy fruit, wash thoroughly with clean water and peel off the skin
- Weigh about 100 g of kinnow peels
- Chop the peels into pieces about 3-5 cm length

- Blanch the peels by putting them into hot boiling water for 5-10 minutes, drain the water and repeat the process 4-5 times to remove the bitterness
- Thereafter, the peels will become semi-soft and translucent and are ready for candying.



Blanching of kinnow peels to reduce bitterness and improve colour

Preparation of Sugar Syrup

- Boil about 200 ml of water
- Add sugar @100 g, stir to melt the sugar completely

Candying procedure

- Immerse the blanched Kinnow peels into the sugar syrup solution
- Simmer the materials in low flame for about 10-15 minutes
- Stir continuously to avoid charring
- Cook until sufficient consistency is achieved or 75 % TSS is achieved
- Strain the excess sugar syrup



Immersing kinnow peels into sugar syrup and simmering at low flame

- Let it cool down and then keep it for drying in an oven or sun-dried

Packaging and shelf life

The prepared candy should be stored most preferably in an air-tight container and close the lid tightly so that no air or moisture can make its way into the container.

By keeping the container free of moisture and air, the flavour and texture of the candy will be preserved, allowing it to last for about a year without any changes in its texture and flavour. The candied fruits can be stored for a maximum of 24 months if kept in a cool dry place.

Marketing and Market Potential

Kinnow is an important fruit crop of Punjab regions with its multipurpose utility. The waste generated in the form of peels if converted into value-added products such as candy and bioactive compounds thus synthesized can boost the pharmaceutical industries also and generate a sizable amount of revenue. In India, orange is utilized in various food industries for a wide range of products like Candied Orange Peel, Orange Juice, Orange Squash, Orange Biscuits, Peel candy, etc.

Future trust

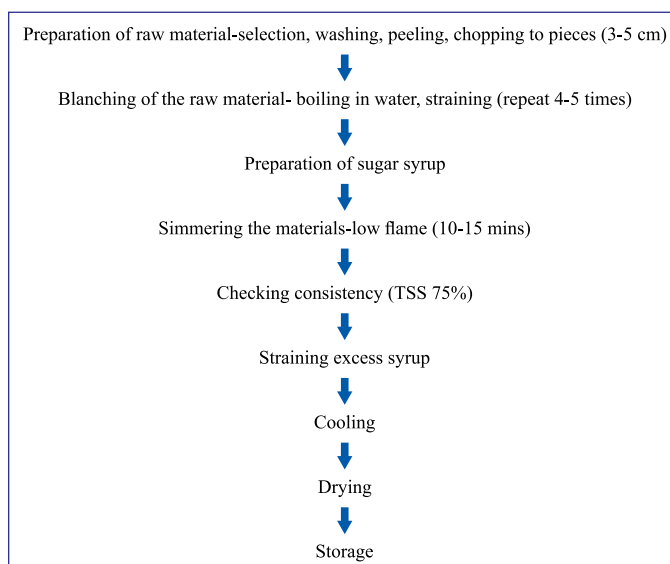
Kinnow peel and pomace, which account for 30-40% of the fruit weight and are otherwise a waste product, can be used for a variety of purposes. It contains a variety of bioactive components of great industrial and nutritional value, including polyphenols, flavonoids, pectin, and carotene. The application of kinnow peel varies greatly and can be utilised in a variety of industries for a variety of tasks, ranging from candy preparation to biofuel manufacturing. The usage of kinnow peel not only lowers waste but also encourages long-term growth and economic value to farmers.

Conclusion

Kinnow is cultivated extensively in the Punjab region



Storage in an air tight container



Kinnow Peel candy preparation

every year and during the season there is a glut in the market leading to extensive post-harvest losses and a huge amount of waste is generated. Converting the peels into value-added products like candy, will not only add to the variety of diets but also minimizes the losses and additional income can be generated. The prepared kinnow peel candy was found to be quite acceptable in terms of taste, flavour and economics. Thus, more emphasis on waste utilization and value addition of such fruit is necessary.

For further interaction, please contact:

School of Agriculture Lovely Professional University Jalandhar,
Phagwara, Punjab 144 411

Email: tchamroy@gmail.com