

Freezing of the Fresh Figs at Different Temperatures and Investigation Quality Changes

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Abstract

With different evaluation methods in fig cultivation, acceleration of fig trade will be possible with the emergence of high value added products. For this reason, in our fresh fig, which is an important agricultural export product for our country, we need to maintain our place in the world and increase our existing export potential. This trial was conducted in the harvest season of 2016 and 2017, to determine the effects of freezing and thawing temperatures on fruit quality properties of hard-ripe and ripe maturity stages of Sarılop, Bursa Siyahı, Yeşilgüz and Siyah Orak fig fruits during the postharvest storage period. For this purpose, after pre-cooling treatment, fresh fig samples, which were grown without any inputs, were frozen at -20°C for 24 h and -40°C for 8-10 h. Frozen figs were stored at -18°C with doypack bags for 10 months. After 60 and 300 days at -18°C , fruit samples were thawed in plastic containers during 24 hours, at 0°C and 4°C , respectively. Specifically, the drip loss (%), firmness (N), total soluble solids (%) and skin color (L) values were determined at the end of storage periods. Under tested freezing and thawing conditions, there was no statistically significant differences in the drip loss values, even if the lowest drip loss was found for freezing at -20°C for 24 h. Besides, fruit firmness decreased during the storage period both in hard-ripe and ripe fruit, and maximum total soluble solids were measured in fruit that was frozen at -20°C and then stored at -18°C for 300 days.

Introduction

Horticulture is the branch of agriculture which deals with the study of garden crops, fruits, vegetables, and ornamental plants. The word is derived from the Latin words – hortus meaning “garden,” and colere meaning “to

cultivate.” Pomology refers to study of cultivation of fruits.

Fig (*Ficus carica*) is one of the ancient fruits known to mankind. The fig fruit is unique and unlike most fruits the edible part is matured ovary tissue but while coming to the fig's the edible structure is actually a stem tissue. The fig fruit is an inverted flower with both the male and female flowering parts enclosed in the stem tissue, botanically called as a syconium. At maturity stage, the interior of the fig fruit contains only the remains of the flowering structure, including the small gritty structures commonly known as 'seed', which are actually the unfertilized ovaries that had failed to develop and they impart resin like flavor associated with fig. Fruits are consumed both in the form of fresh as well as in the dried form. Fresh Figs are delicious and nutritious as they are rich in protein, calories, calcium and iron. The bulk of the fruit (about 80%) is consumed in the dried form only. The fruit is also credited with laxative and medicinal properties which can be applied on boils and for other infections related to skin.

Fig is a moderately important fruit crop with an annual estimated global production of nearly one million tons of fruit of which about 30% is produced only in Turkey. The other major producers are Egypt, Morocco, Greece, California, Italy, Algeria, Syria & Tunisia.

Fig being a deciduous & sub-tropical tree, it prefers areas having arid or semi-arid environment with high summer temperature, plenty of sunshine and required amount of water. Although the plants can survive temperatures as high as 45°C , the quality of the fruit deteriorates beyond 39°C . Though a mature tree can withstand low temperatures up to 4°C , it makes good growth and

development when the temperature is above 15 - 21°C. The size shape and colour of the skin and pulp quality of the fruit are markedly affected by climatic conditions. But quality figs are produced in the region having dry climate especially at the time of fruit development and fruit maturity. High humidity along with low temperature usually results in fruit splitting and reduced fruit quality.

Fig is one of the most salt and drought tolerant crops and it can tolerate high levels of sulphate or chloride salt. Medium to heavy calcareous well drained soil having pH of 7-8

Fig is planted in a square system of planting at a spacing of 5 x 5 m which accommodating about 160 plants per acre. Pits of 0.6 cum are taken for planting the cuttings. To promote good shoot growth and to prevent fruit drop in, plant growth regulators like Gibberellic Acid (GA) @ 30 ml / litre of water is recommended.

Though fig starts bearing fruits from the second year, the commercial harvesting will be done from the third year. The yield will increase with increase in canopy size of the tree and stabilize during the eighth year. The economic life of the fig plant is about 35 years. The harvesting season begins in the month of February - March and is over by May - June. The fruits can be harvested in 2-3 day intervals manually. The fruits should be picked when they become soft and wilt at the neck portion. If the fruits are picked before the proper maturity stage, milky latex exudes.

Fresh fruits are highly perishable. Slightly immature fruits should to be harvested for transporting to distant markets. Ripe fruits are harvested /detached from the tree either by twisting the neck at the stem end or by cutting it or gathering after they drop. Yield ranges from 180 to 360 fruits per tree. Fully ripe fresh figs can be kept fresh for about a week at 0 °C with 90% relative humidity. To preserve in a dried state, first the fig fruits are soaked in boiling salt water for half a minute and then subjected to sun drying for a few hours. Then they are dried under shade for nearly 8 days and stored in the polythene containers.

Another form of preservation of dried form of fig is drying them in an electric dryer at the temperature of 70 – 72 °C with prior sulphur fumigation

Biography

Dr. Ertan was born in 05.05.1967 in Izmir/ Turkey. She had a bachelor degree from Ege University in Turkey, in 1988 and Master of Science degree from the Department of Horticulture, the Ege University, İzmir, Turkey in 1990. She is a Researcher at Fig Research Institute, in Aydın, Turkey. Mean time she did her PhD in the same department on “the storage of figs has commercially valuable varieties”. Now She is working on the storage of fresh and dried figs. She has carried out many projects related to figs since 2002.

His main research area is Postharvest Physiology and, Postharvest Logistics Performance