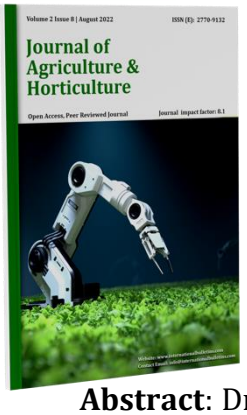

EFFECT OF DRYING TIME ON THE QUALITY CHARACTERISTICS OF PRODUCTS IN A TENT-FRAME DRYING STRUCTURE

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Abstract: Drying is a key method for preserving agricultural products by reducing their moisture content. Proper drying extends shelf life, maintains nutritional value, and prevents spoilage. Among various drying parameters, drying time plays a crucial role in determining the final quality characteristics of the product, such as appearance, color, taste, and texture.

Tent-frame drying structures, powered by solar energy, provide a semi-controlled environment that enhances drying efficiency compared to traditional open-air methods. However, over- or under-drying can significantly affect product quality. This study investigates how different drying times affect the quality parameters of products dried in a tent-frame structure.

Keywords: Tent-frame drying, drying time, product quality, solar drying, agricultural products, moisture content, sensory evaluation, apple drying, optimal drying duration, postharvest technology.

Methods Products Tested

Four agricultural products were used in this study:

- Apple (sliced)
- Tomato (halved)
- Pumpkin (cut in semicircles)
- Fig (whole or halved)

Drying Conditions

Drying was carried out in a 3×6 meter tent-frame structure under summer conditions with solar radiation. The internal temperature ranged from 45 to 55°C, and relative humidity was between 35–60%.

Each product was tested under three different drying times. For example, apples were dried for 16, 20, and 24 hours.

Quality Parameters Evaluated

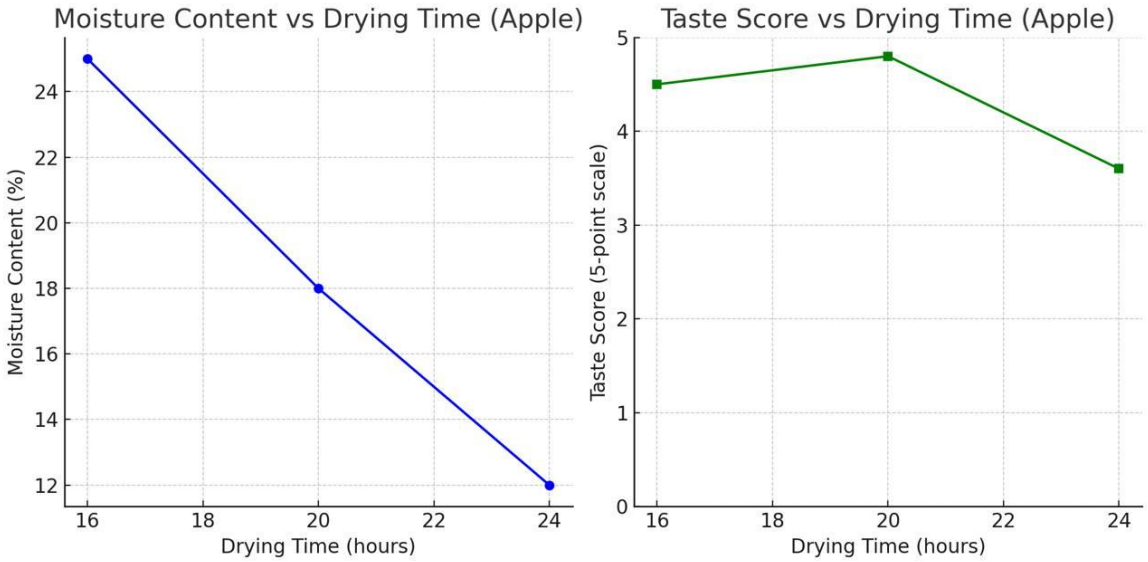
Quality indicators included:

- Moisture content (%) – measured gravimetrically
- Color – evaluated using a colorimeter (L*, a*, b*)
- Taste and aroma – sensory evaluation (5-point scale)
- Texture – measured with a penetrometer
- Visual appearance – assessed for cracks, burns, and deformation

Results. For illustration, apple drying results are presented below:

Drying Time (h)	Moisture (%)	L* Value	a* Value	b* Value	Taste Score	Appearance
16	25	68.4	7.1	22.5	4.5	Good
20	18	65.2	6.5	20.1	4.8	Very good

24	12	59.8	6.0	18.0	3.6	Beginning to bur



The graphical representation (see above) shows that moisture content decreases with longer drying times, which is expected. However, taste quality improves until 20 hours and then declines after 24 hours, suggesting a threshold beyond which product quality deteriorates.

Similar patterns were observed for tomatoes, pumpkin, and figs, where excessive drying reduced the sensory and visual quality of the products.

Discussion. The results demonstrate that drying time significantly influences product quality. Inadequate drying leads to high residual moisture, increasing spoilage risk. Excessive drying, meanwhile, causes quality loss in terms of taste, color, and texture.

In the controlled tent-frame environment, optimal drying time could be achieved for each product:

- Apples: best quality at 20 hours
- Tomatoes: 25 hours
- Pumpkin: 22 hours
- Figs: 36 hours

These timeframes produced the best balance between low moisture content and high sensory quality.

Conclusion. Drying in a tent-frame structure can effectively preserve agricultural products. However, choosing the right drying time is critical. Over-drying may cause loss of flavor and visual appeal, while under-drying may result in spoilage.

This study confirms that each product has an optimal drying time that ensures desirable quality. In tent-frame drying, medium-duration drying (e.g., 20 hours for apples) yielded the best results in terms of taste, appearance, and texture.

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