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Evaluating postharvest physical properties of strawberry, sweet orange and ginger

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Abstract
Physical composition of fruits and ginger was carried out at the Horticulture Processing Laboratory, Department of Fruit Science, IGKV, Raipur (C.G.) during the year 2023-2024 and 2024-2025. Physical composition of strawberry, sweet orange and ginger was evaluated viz., fruit weight, fruit volume, fruit diameter and juice content were assessed and ginger rhizome weight, rhizome volume, rhizome diameter and juice content were analyzed.

Keywords: Strawberry, sweet orange, ginger, physical composition, fruit traits, juice content

Introduction
Strawberry (*Fragaria* x *ananassa* Duch.) is one of the most important temperate fruit but it can also be grown in sub-tropical climate, originated from France. It belongs to the family Rosaceae. Commercially grown strawberry (*Fragaria* x *ananassa* Duch.) is monoecious octaploid (2n = 56) hybrid between *Fragaria chiloensis* and *Fragaria virginiana* (Bowling 2000) with a basic chromosome number (x) = 7. It is a major soft fruit around the world (Biswas *et al.*, 2007) [5], short-day herbaceous perennial plant that can successfully be grown at optimum day temperatures of 22 °C to 25 °C and night temperatures of 7 °C to 13 °C (De and Bhattacharjee, 2012) [6]. Sweet orange (*Citrus sinensis* L. Osbeck) is extensively processed by the manufacturing industry in order to obtain natural juices, pulps, and candies. Ginger (*Zingiber officinale* Roscoe) is a perennial herb with thick tuberous rhizomes. It has been widely used as a spice and flavouring agent in food and beverages.

Material and Methods
The present investigation was carried out at Horticulture Processing Laboratory, Department of Fruit Science, IGKV, Raipur (C.G.) during the experimental year 2023-2024 and 2024-2025. Physical parameters of strawberry, sweet orange and ginger was evaluated.

Fruit Weight (g)
Fruit weight of Strawberry, Sweet orange and ginger were counted manually and were recorded for their corresponding weights by the use of digital weighing balance (Ishida Co. Ltd., Japan) with an accuracy of 0.001 g.

Fruit volume (cc)
Volume of fruit was measured by water displacement method. Twenty five randomly selected fruits were dipped in a measuring cylinder containing water. The amount of water displaced or increase in level of water in measuring cylinder was expressed as volume of fruit. Average fruit volume was calculated and expressed as micro litres.

Fruit diameter (cm)
The diameter of the fruits was determined with the help of a vernier calliper and expressed in cm at three different positions viz., top, middle and bottom. This process was repeated thrice to get an average value.

Juice content (%)

Juice of Strawberry Sweet orange Fruits and Ginger was extracted manually. Fruits were tied in double folded muslin cloth and juice was extracted by pressing. Juice percentage was calculated as follows:

$$\text{Juice yield (\%)} = \frac{\text{Weight of juice extracted}}{\text{Weight of fruit taken}} \times 100$$

Results and Discussion

Physical composition of strawberry

The data obtained on physical composition of strawberry fruits revealed that, the average fruit weight (23.59 & 25.67 g), fruit volume (22.87 & 24.98 cc), fruit diameter (2.98 & 3.14 cm), juice content (22.76 & 24.58%) depicted in Table 1. These results were in close agreement with the findings of Belakud *et al.* (2015) [2] Bhagat & Panigrahi (2020) [3], Yashasvi *et al.* (2021) [13], Belakud *et al.* (2015) [2] in strawberry.

Physical composition of sweet orange

The physical parameters of sweet orange fruits were marked for the following variables namely fruit weight, fruit volume, fruit diameter, juice content. The data demonstrated on physical composition of sweet orange revealed that fruit weight (165.67 & 176.11 g), fruit volume (179.87 & 185.68 cc), fruit diameter (63.45 & 66.57 cm), juice content (40.87 & 48.35%) depicted in Table 2. These results were in close agreement with the findings of Odeyemi *et al.* (2018) [11], Gangakhedkar *et al.* (2021) [7], Selvan S *et al.* (2021) [12], Jamil *et al.* (2015) [8].

Physical composition of ginger

The physical parameters of ginger rhizome were marked for the following attributes *viz*., rhizome weight (60.28 & 61.34 g), rhizome volume (62.39 & 63.58 cc), rhizome diameter (5.87 & 6.12 cm), juice content(55.87 & 59.02%) depicted in Table 3.Similar finding found were Akhtar *et al.* (2013) [1], Duru *et al.* (2025) [7], Jayashree & Visvanathan (2011) [9], Hadi *et al.* (2020) [10].

Table 1: Physical parameters of strawberry

S. No.	Characters	Mean value	
(A.)	Physical composition	2023	2024
1.	Fruit weight (g)	23.59	25.67
2.	Fruit volume (cc)	22.87	24.98
3.	Fruit diameter (cm)	2.98	3.14
4.	Juice content (%)	22.76	24.58

Table 2: Physical parameters of sweet orange

S. No.	Characters	Mean value	
(A.)	Physical composition	2023	2024
1.	Fruit weight (g)	165.67	176.11
2.	Fruit volume (cc)	179.87	185.68
3.	Fruit diameter (cm)	63.45	66.57
4.	Juice content (%)	40.87	48.35

Table 3: Physical parameters of ginger

S. No.	Characters	Mean value	
(A.)	Physical composition	2023	2024
1.	Rhizome weight (g)	60.28	61.34
2.	Rhizome volume (cc)	62.39	63.58
3.	Rhizome diameter (cm)	5.87	6.12
4.	Juice content (%)	55.87	59.02

Conclusion

Strawberry exhibited the lowest fruit weight and volume but the highest juice to weight ratio. Their soft structure and high pulp content make them ideal for fresh juice and beverage formulation. Sweet oranges showed the fine fruit weight and volume. Ginger, being a rhizome differed significantly from the fruits in terms of structure, having physical hardiness.

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