Morpho-Physicochemical Studies Of Kusum (Schleichera Oleosa (Lour.) Oken): A Potential Multipurpose Tree Species

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Abstract:

Kusum (*Schleichera oleosa* (Lour.) Oken) belongs to Sapindaceae family, is an underutilised multipurpose tree species. Kusum is also known as a lac tree through its cultivation for lac which gives livelihood security to lakhs of farmers. Botanically, kusum fruits are single-seeded and sometimes two-seeded berry, succulent yellow aril, dry indehiscent, apex pointed, hard-crustaceous, smooth, or slightly spiny. Pulp of kusum has a potential source of antioxidant properties. The present investigation was carried out to estimate physical and chemical properties of kusum at the laboratory of department of Fruit Science, Faculty of Horticulture, at Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal during 2021-22. A set of 30 fruits with 10 fruits per replication were taken for this experiment. It was observed that average fruit weight (7.41g), fruit length (2.5cm), diameter (2.19cm), fruit volume (7ml), fruit pulp weight (2.93g), seed weight (1.35g), and peel weight (2.71g), seed length (1.69cm), diameter (1.38cm) and edible fruit percentage was 39.54%. The results showed that it contains an average of 20.07 °Brix total soluble solids, 0.33% titrable acidity, 14.28% total sugar, 8% reducing sugar, 5.96 non-reducing sugar, 142.5 mg/100g of pulp ascorbic acid and total carotenoid 1.35 mg/100g pulp. The result shows that kusum fruit is a promising food source with nutritional value. This fruit could fulfil the dietary needs of persons living in rural areas.

Keywords: Kusum, multipurpose tree, fruit weight, carotenoid and seed

INTRODUCTION

Kusum (*Schleichera oleosa)* belongs to Sapindaceae family, is an underutilised multipurpose tree species which provides food, fuel, timber, feed, pharmaceutical and raw materials of industries to livelihood of the farmers. Kusum is also known as a lac tree through its cultivation for lac which gives livelihood security to lakhs of farmers in states like Chhattisgarh, Orissa, Jharkhand, Andhra Pradesh and West Bengal (Saha *et al.*, 2010). Besides the lac production, several edible and non-edible oils are extracted from the Kusum (Kundu and Schmidt, 2011). Traditionally the bark of kusum is used as folk medicine, which cures pain, infection, skin disease, inflammations, leprosy, and "Kapha" (i.e., mucus, phlegm) (Pokhrel *et al*., 2015; Khan *et al*. 2017; Kirtikar and Basu, 2006). Menorrhoea, malaria and dysentery are also treated by the paste of bark with water (Sarkar *et al.,* 2020). The oil extracted from seed also have medicinal value and act as a substitute source of biodiesel (Kumar and Pali, 2013; Thind *et al*., 2011). Botanically, kusum fruits are single seeded and sometimes two seeded berry (Kundu *et al*., 2011; Saha *et al.,* 2010), broadly ovoid to ellipsoid shaped, succulent yellow aril, dry indehiscent, apex pointed, hard-crustaceous, smooth or slightly spiny. This experiment was conducted to determine the morpho-physicochemical parameters of kusum, as there are very few or no reports regarding the physicochemical properties of this fruit in West Bengal.

Figure 1: Kusum fruit

MATERIALS AND METHODS

Yellow fruits of *S. oleosa* were collected from the forest of Bankura. After the harvest, uniform size and maturity fruits were washed in running water and brought to the laboratory of department of Fruit Science, Faculty of Horticulture, at Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal during 2021-22. A set of 30 fruits with 10 fruits per replication were taken for this experiment. The fruits were estimated for their physico-chemical parameters (fruit weight, fruit length, fruit diameter, total soluble solids, total sugar, ascorbic acid, titrable acidity and total carotinoid). The fruit weight, peel weight and seed weight were measured by electronic (digital) balance. Fruit length, fruit diameter, seed length, seed diameter and peel thickness were estimated by digital vernier calipers. Fruit volume was estimated by water dispersal method. Total soluble solids (TSS) content was measured by hand refractometer. The titratable acidity (TA), ascorbic acid content, reducing sugar and total sugar (TS) were estimated by the method suggested by A.O.A.C. (1995). Total carotenoid of fruit pulp was measured by procedure followed by Jagadeesh *et al*. (2007).

RESULT AND DISCUSSION

Morpho-physical property

It was observed that the average plant height was 26.25m, and bark thickness was 9mm. The leaves were 8.50 cm long, alternate, globous, and swollen at base. Different physical parameters viz., fruit weight, peel weight, seed weight, Fruit length, fruit diameter, seed length, seed diameter and peel thickness are presented in Table 1. Observation recorded that the average fruit weight was 7.41 g among which 2.93g of pulp weight, 1.35g seed weight and 2.71g of peel weight. Fruit length and diameter were 2.50cm and 2.19cm respectively where fruit volume is 7ml. The seed length and diameter were 1.69cm and 1.38cm. Fruit edible percentage was 39.54% and pulp juice recovery percentage was 66.55%. The finding was similar with Goswami and Singh (2017); Saha *et al.* (2010); Palanuvej and Vipunngeun (2008).

Tab.1: Morpho-physical property of Kusum

Parameters	Mean	Parameters	Mean
Plant height (m)	26.25	**Seed length (cm)**	1.69
Bark thickness (mm)	9	**Seed diameter (cm)**	1.38
Leaf length (cm)	8.50	**Pulp weight (g)**	2.93
Fruit weight (g)	7.41	**Peel weight (g)**	2.71
Fruit length (cm)	2.50	**Peel thickness (cm)**	0.09
Fruit diameter (cm)	2.19	**Edible %**	39.54
Fruit volume (ml)	7.00	**Juice recovery %**	66.55
Seed weight (g)	1.35		

Biochemical properties of fruit

The quantity of several biochemical parameters of kusum fruit were determined and presented in Table 2. The result showed that the fruit contained average 20.07 °Brix total soluble solids, 0.33% titrable acidity, 14.28% total sugar, 8% reducing sugar, 5.96 non-reducing sugar and 142.5 mg 100 g-1 of pulp ascorbic acid. It recorded high moisture content (75.26%) with total carotenoid 1.35 mg/100g pulp.

Tab.2: Biochemical properties of Kusum

Parameters	Mean	Parameters	Mean
TSS (°Brix)	20.07	**Acidity (%)**	0.33
Total sugar (%)	14.28	**Non-reducing sugar (%)**	5.96
Reducing sugar (%)	8.00	**Moisture (%)**	75.26
Vit C (mg/100g)	142.5	**Total Carotene (mg/100g)**	1.53

CONCLUSION

The results of the experiment suggest that kusum fruit is a promising food source with nutritional value. It has rich source of ascorbic acid and total carotene. Therefore, this fruit could be used to fulfill the dietary needs of persons living in rural areas.

FUTURE SCOPE: As fruit quality is one of the most important aspects of the fruit industry, this fruit can be used to make a variety of value-added products.

Conflict of Interest: The authors declared that no competing interests exist.

Author contributions. Conceived and designed the analysis: Tanmoy Mondal and Sanghamitra Layek; Collected the data: Tanmoy Mondal and Sanghamitra Layek; Contributed data or analysis tools: Tanmoy Sarkar and Samarpita Roy; Performed the analysis: Rajdeep Mohanta and Fatik Kumar Bauri; Wrote the paper: Tanmoy Mondal and Tanmoy Sarkar.

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