SHORT COMMUNICATION

Determination of quality parameters of pulp and peel of different mango varieties under Chhattisgarh Plains zone

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ABSTRACT

The pulp represents the quality of any mango variety which determines its market price and demand but mango peel is also used as a by-product in the food industry, hence finding out its biochemical properties is a very important factor based on which we can use the pulp of that mango variety and then its by-product peel. The fruit quality parameters like total soluble solids (TSS), titratable acidity and total sugar content in the pulp and peel of ten mango varieties were evaluated and quantified. Pulp (%) was found to be highest in Chhattisgarh Swarnprabha (78.10%) and peel (%) was found to be lowest in Langra (10.79%) variety. Whereas in biochemical properties, total soluble solids (^{0}Brix) of pulp and peel were found to be highest in Chhattisgarh Gaurav variety (22.74°B) and (4.79°B), titratable acidity was found to be best in Chhattisgarh Achar (0.74%) and (0.21%) and total sugar was found to be best in Chhattisgarh Swarnprabha (17.71%) and (4.79%).

***Keywords**:* Mango variety, peel, physico-chemical characteristics, pulp

Mango fruit possesses high nutritional and therapeutic values and it has high demand both domestic and foreign markets. Plant-derived products are an important source of bioactive substances such as dietary fiber, vitamins, minerals, and various physic-chemicals such as polyphenols and carotenoids, which contribute to its potential health-promoting properties with amazing health benefits (Jain and Shankaran 2024). Pulp content in mango fruits is a very important factor that determines the quality of the variety. Mango is rich sources of many nutrients and phyto-chemicals such as carotenoids, vitamins, acids, polyphenols and prebiotic dietary fiber that have nutritional and medicinal effects (Rajasekaran and Soundarapandian 2024). Studies on fruit quality can be helpful in selecting better quality fruits. Mango peels, dried mango peel, amchur and mango shake are particularly sustainable sources of bioactive compounds with antibacterial, enzymatic, and antioxidant properties (Kučuk *et al.*, 2024). Nutrients present in pulp and peel of mango fruit vary among mango varieties, there is no such published report on biochemical properties present in pulp and peel of different mango varieties grown in plain region of Chhattisgarh. In this context, the present study was carried out to investigate the physico-chemical characteristics of pulp and peel of ten mango varieties grown in Chhattisgarh.

Fresh and healthy 10 varieties of mature mango fruits were taken from Horticulture Farm, Department of Fruit Science, College of Agriculture, IGKV, Raipur, Chhattisgarh during the year 2019-20 and 2020-21. Ten varieties were Chhattisgarh Swarnaprabha, Chhattisgarh Pawan, Chhattisgarh Achar,

Chhattisgarh Raj, Chhattisgarh Gaurav, Chhattisgarh Nandiraj, Dashehari, Langra, Mallika and Amrapali. Mango fruits were cleaned in 0.5% chlorine solution to remove impurities and foreign matter and then washed thoroughly with water. Then the fruits were dried under shade to remove excess water. Mango fruits were ripened at room temperature in the laboratory and after ripening the fruits were transferred to the laboratory of the department. The ripe mangoes were peeled from the fruits using a sterilized knife and carefully separated from the pulp. The peels were then dried using an oven dryer (50 ^{0}C) and the dried mango peels obtained were subsequently ground into fine powder. Mango peel powder was kept at room temperature (15–24^{0}C) in a sealed plastic bag that was 75µm thick. It was then analyzed for a number of physicochemical characteristics. The investigation was carried out following Randomized Block design; each variety was considered as a treatment, so there were 10 treatments. For each variety 9-mature mango fruits were collected of uniform size that was replicated three times with three fruits in each replication.

Total Soluble Solids (TSS) content of the fruits was estimated with the help of a hand refractrometer (0 to 32°Brix) and the values were corrected at 20°C. One drop of the fruit juice was placed on the glass disc of the refractrometer and TSS was observed and noted for different treatments. The glass disc was thoroughly cleaned after each operation and TSS was expressed as °Brix. The total titratable acidity was determined by titrating fruit juice against 0.1 N NaOH in the presence of phenolphthalein indicator. The appearance of light pink colour was taken as the end point. The result was expressed in terms of per cent acidity of the fruit pulp. Total sugar was estimated as per the method described by Lane and Eynon, A.O.A.C (1990). A quantity of 50 ml lead free filtrate was taken in a 100 ml volumetric flask to which 5 ml of concentrated HCl was added, mixed well and then kept for 24 hrs at room temperature. Acid was then neutralized with NaOH using a drop of phenolpthalein as an indicator till the pink colour persisted for at least few seconds. Then volume was made up to 100 ml. Total sugars were then estimated by taking this solution in a burette and titrating it against standard Fehling's solution mixture of A and B (1:1) using methylene blue indicator, taking brick red colour as the end point. The statistical analysis was carried out for each observed character under the study using MS-Excel, OPSTAT. The data generated from these investigations were analyzed as described by Gomez and Gomez (1984) by applying completely randomized design (CRD) with three times replicated. Data were subjected to analysis of variance (ANOVA) by using OPSTAT online software. The mean difference at 5 per cent level of significance (LOS). Critical difference (CD) at 5 per cent level of probably it was used for comparison among treatments.

The pooled data of two years of all parameters have been presented in the Table 1. Pulp per cent (%) was observed highest being Chhattisgarh Swarnprabha (78.10%) while the lowest was found in Mallika (60.45%). Peel per cent (%) was found to be lowest in mango cv. Langra (10.79 %) while it was highest in Mallika (20.26 %). The variation in pulp and peel percentage was found to vary considerably among varieties due to their genetic and climatic factors. Similar observations were also noted by Ahmed and Mohamed (2015); Sinha *et al.* (2020); Hada and Singh (2017a) and Jilani *et al.* (2010).

The highest total soluble solids in mango pulp and peel were found in Chhattisgarh Gaurav variety (22.47 ^{0}Brix) and (4.79 ^{0}Brix) and the lowest total soluble solids were observed in Chhattisgarh Achar (13.10 ^{0}Brix) and (3.80 ^{0}Brix) . Variation in TSS in varieties of mango pulp and peel was also noted by Kankhare *et al.*(2019) ; Trong *et al.* (2020) and Tanu *et al.* (2020) and they mentioned that this variation was due to the genetic structure as well as weather conditions of mango varieties.

Chhattisgarh Achar variety had the highest titratable acidity (0.74%) and (0.21%) and lowest found in Langra (0.19 %) & (0.16%). The similar trend was reported by some researchers like Kankhare *et al* (2019) and Shinde *et al.*(2015).

The total sugar content in was highest in both pulp & peel of mango variety Chhattisgarh Gaurav (17.71%) & **(**4.79 %) respectively and the lowest was found in Chhattisgarh Achar (10.04%) & (3.80 %). This finding confirms the results of Tanu *et al.* (2020); and Shinde *et al.*(2015) that total sugar content varied across pulp which may be a genetic character of the variety. The finding is also similar to Serna-Cock *et al.* (2016).

It can be conclude that among the different mango varieties grown in plain area of Chhattisgarh; we found that Chhattisgarh Swarnprabha showed highest pulp content (78.10 %) and while Langra had the maximum peel content (10.79 %). The TSS and Total sugar in peel were found to be highest Chhattisgarh Gaurav variety, while titratable acidity showed highest in the variety Chhattisgarh Achar. By knowing the biochemical properties of pulp and peel, value added products may be prepared accordingly.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Table 1: Studies on mango pulp, peel content and their bio-chemical parameters viz., total soluble solids (°B), titrable acidity (%) and total sugar (%) of mango varieties

Varieties	Pulp (%)	Peel (%)	TSS of pulp (°B)	TSS of peel (°B)	Acidity of pulp (%)	Acidity of peel (%)	Total sugar of pulp (%)	Total sugar of peel (%)
Chhattisgarh Swarnaprabha	78.10	13.84	18.06	4.79	0.45	0.19	15.72	4.79
Chhattisgarh Pawan	67.10	18.54	16.41	4.11	0.34	0.17	15.64	4.11
Chhattisgarh Achar	77.58	11.12	13.10	3.80	0.74	0.21	10.04	3.80
Chhattisgarh Raj	73.23	10.81	17.00	4.01	0.43	0.16	14.24	4.01
Chhattisgarh Gaurav	76.20	11.88	22.47	4.79	0.46	0.17	17.71	4.79
Chhattisgarh Nandiraj	72.55	11.86	17.42	4.10	0.24	0.17	14.64	4.10
Dashehari	71.82	13.60	16.7	4.36	0.20	0.18	14.70	4.36
Langra	76.45	10.79	20.00	3.92	0.19	0.16	14.35	3.92
Mallika	60.45	20.26	17.04	4.18	0.26	0.17	13.72	4.18
Amrapali	75.56	12.58	18.16	4.16	0.20	0.19	14.68	4.16
SE(m) ±	**0.42**	**0.71**	**0.77**	**0.14**	**0.04**	**0.01**	**0.56**	**0.14**