

Evaluation of Phenolic Content in Maldah Cultivar of Mango (*Mangifera indica*. L.) of Digha (Patna, Bihar)

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Abstract: Some ripe mangoes were collected from the mango orchard located at Digha in Patna district, in Patna of Bihar. The pulp and peels of these mangoes were separated and they were lyophilized and stored at 20°C and thereafter they were analyzed separately for total phenolics in the pulp and the peels of these mangoes of Maldah Cultivar (principle). The total content of phenolics in the pulp and peels of the ripe Maldah mangoes were estimated using folin-ciocatten reagent at 75 nm in an UV-Vis Spectrophotometer using galic acid for expressing the standard curve and subsequently the total result was expressed as mg GAE (Galic Acid Equivalent/100g of fresh weight). Surprisingly the result shows the greater content of phenolics in peels in respect of the pulps.

Keywords: Galic acid equivalent, Maldah, Phenolic.

1. Introduction

The study of phenolics content in mango has been the current interest research because mango (*Mangifera indica*. L.) has been found nutritionally rich fruit with many health promises [1]-[4].

Mangoes are tropical fruits which are considered to be a good source of dietary fibre (DF) and phenolic compounds (PCs). Particularly mango peels have been found a rich source of phenolic compounds some workers [5] have reported the digestibility and release of mango peel extract emulsion containing carboxy methyl cellulose. Some workers [6] have developed mango based fruit bars from whole mango which were evaluated for their nutritional composition the bio accessibility of phenolic compounds (PCs) during gastrointestinal digestion and the PC metabolites after invitro colonic fermentation. They have identified phenolic compounds in the bars in the form of phenolic acid such as galic acid, cinnamic acid such as ferulic, coumaric and caffeic acid, falvanoid such as quercetin and Xanthones as magniferin and mangiferin galate. The potential functioning feature of these natural fruit have been indicated by the antioxidant capacity associated with the PCs profile along with the high DF (dietary fibre) content. Now-a-days, the study of phenolic compounds in fruits in general and in mangoes in particular has drawn a lot of attention owing to their potential capacity in preventing

cancer and heart diseases [7].

Mangoes are processed into several eatable products like nectar, puree, pickles, canned dried slices, leather etc to prolong its availability in the market. Peels, produced as major byproduct during the processing are generally not utilized for any commercial purposes and discarded as waste, though in several varieties they have been found to contain higher antioxidants [8]-[10]. Recently antioxidant activity and phenolic contents of mango flesh and peel extracts have been reported [11]. Several reports have been made regarding antiproliferative activities, tyrosinase inhibitory activities, antihemorrhagic, antidermonecrotic activity, antibacterial activity of mango flesh and peels [12]-[16]. Thus keeping in mind the great nutritional and biochemical importance of mango (*Mangifera indica*. L.) the most important commercial tropical fruits worldwide in term of production, marketing and consumption. In present paper we report the evaluation of phenolic content of Maldah cultivar of mango of Digha, Patna.

2. Methodology

The fruits of *Mangifera indica* L. of Maldah cultivar were purchased from mango orchard at Digha (Patna) in fully green matured (GM) stage and were authenticated by the expert taxonomist and the voucher specimens. The GM (green mature) mangoes were rapped with two layers of newspaper and were placed in a paper box to allow them to ripen at room temperature. After 3 or 4 days all the GM mangoes got ripened with yellow colour. Thereafter the flesh (pulp) and peel of all the mangoes were separated carefully. For the estimation of phenolics in the pulp and peels of their fully ripe stage of these cultivars, their extracts were prepared using ethanol about 0.5 – 1g of peels and about 20g of pulp were separately homogenized with 100 ml of 95% ethanol at high speed for about 1 min the homogenates were then placed in water bath at 85°C for 1 hour and were occasionally shaken. It was cooled at room temperature and was filtered through whatman filter paper no. 4. The extracts of pulps and peels were used for the estimation of total phenolics using the method reported by singleton et al. [17] and Ponrmorad et al. [18]. For the process Folin ciocalteu

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Table 1
Values of Different Physicochemical Properties of Maldah Cultivars of Digha (Patna)

S. No.	Parts of Mango	Colour	pH	MC	Colour Parameter			RS	Total Phenolics
					L*Value	a*Value	b*Value		
1.	Pulp of Green matured (GM) Maldah Cultivars	Off White	4.35	74.82%	85.69	5.83	19.12	14.32(a)	35.35(b)
2.	Pulp of Fully ripe (FR) stage of Maldah Cultivars	Yellow	6.34	74.80%	78.92	3.32	41.04	17.00(a)	72.84(b)
3.	Peel of Green Matured (GM) Maldah Cultivars	Green	5.20	67.50%	60.00	19.01	30.62	Not Significant	125.40(b)
4.	Peel of fully ripe (FR) stage of Maldah Cultivars	Yellowish Green	5.81	70.00%	72.34	03.16	44.86	Not Significant	339.87(b)

reagent was used at 750 nm in an UV Vis Spectrophotometer and the gallic acid (3,4,5-trihydroxybenzoic acid) has been used to prepare the standard curve and results were expressed as milligram gallic acid equivalent (GAE) per 100g of fresh weight. The Folin ciocalteu reagent was purchased from merck and gallic acid was purchased from sigma Aldrich and were used as obtained. Before estimation of total phenolic contents some physicochemical properties of Maldah cultivars were also determined. Such as the moisture content of this cultivar was measured by method of AOAC [19], colour was analyzed using calorimeter, pH of the sample was determined with pH meter using the reported method [20] and reducing sugar content of this cultivar was determined by the method reported by Neilson [21].

3. Result and Discussion

The values of different parameters determined in the present study of Maldah Cultivar of Digha have been presented in table 1.

Here

(a) = Mg glucose per gram of sample and

(b) = Mg GAE per 100 gram of sample

MC = Moisture Content

RS = Reducing Sugar

The mangoes harvested at the GM stage recorded pH for peels 5.20 while pulp of GM Maldah cultivars was found 4.35 it shows that peels of the GM Maldah cultivars is less acidic than their pulp. The peels of fully ripe Maldah cultivars recorded pH 5.81 which is greater than peel of GM Mango. The pulp of GM Maldah cultivars was recorded 4.35 while that of the fully ripe Maldah cultivars was found 3.64 showing its less acidic character than the GM stage. The value is in good agreement with the reported values for different cultivars of mangoes in Thailand [22]. The moisture content has been found 67.50% and 74.82% for peels and pulp of GM Maldah cultivars while for peels and pulp of fully ripe (FR) mango it have been found 70.00% and 74.82% respectively. The values indicate a slight increase of moisture content from peels pulp in both GM and FR stage of Maldah cultivars. The values are found in the range of values reported by L. G. Po [23]. The value of colour parameter reveals that the L* value of the peels of Maldah cultivars got increased distinctively from 60.00 to 72.34 when the GM stage changed into FR stage while for the mango pulp the L* value got decreased from 85.69 in GM stage to 78.92 in FR stage. The other two parameters of colour a* and b* got

increased both in peels and pulps with increasing ripeness these parameters are indicative of green colour of mango in GM stage and yellow colour in FR stage. This may be due to the greater content of chlorophyll i.e. green colour pigment in GM stage of Maldah cultivars [24] so far contents of reducing sugar is concerned it negligible in peels. But for pulps it is found to have increased from GM stage to FR stage which is good accord with results reported by Noratto *et al.* [25]. The perusal of the data of total phenolics in the peels and pulps of GM Maldah and FR Maldah reveals that in both GM and FR stages of this mango, the peels contain more phenolic compounds than the pulps at the same time it is also apparent from the data in Table – 1 that the total phenolics is much greater in the pulp of FR stage than in GM stage of the maldah cultivars. At the same time, it is also remarkable that the total phenolics significantly get increased in peels with ripening of the GM Maldah cultivars. Similar that data of phenolic contents have been reported for other cultivars of mango like Ambica, Neelam, Mallika, Amrapali *etc.* [26]-[29].

4. Conclusion

On the basis of the foregoing study of Maldah cultivar of mango (*Mangifera indica*. L.), it may be concluded that there is significant changes in the different properties of green matured (GM) stage of this mango with increasing ripening. A significant conclusion may also be drawn that the content of total phenolics is higher in peels of the Maldah cultivars than the pulp at any stage of fruit.

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