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Effect of different pre-treatments on quality of banana powder

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ABSTRACT

An experimental study was performed to determine the effect of different pre-treatments on quality of banana powder. Basrai banana powder was prepared from mature unripe fruits collected from local market of Akola, Maharashtra. Different pre-treatments like hot water treatment, potassium metabisulphite (0.5% and 1%) and combination of hot water and potassium metabisulphite treatment were imparted to banana slices before preparing powder. Physico chemical observations like moisture, pH, TSS, titrable acidity, ascorbic acid, reducing sugar, total sugar and non-reducing sugar of the powder were recorded and the data obtained was analyzed using FCRD design. The pre-treatment 1% potassium metabisulphite for 5 min showed best result in respect of different quality parameter.

Key word: Banana powder, hot water treatment, physicochemical analysis, potassium metabisulphite.

India's wide range of agro-climatic conditions and soil types make it suitable for the production of diverse varieties of fruits and vegetables,including temperate, tropical and sub-tropical crops. Banana (*Musa* AAA cv. Basrai) is an important fruit of world especially of tropics including India which belongs to family Musaceae. Banana is also known as ''Adam's fig''. Owing to its multifaceted uses from underground stem upto the male flower, it is referred as *Kalpatharu* (Chadha, 2007). Banana is considered as most cheapest and nourishing fruit among all the fruits. It is well known for its several medicinal properties. Banana is considered to be best for diabetes and also for those suffering from gastritis. Banana is highly nutritive and easily digestible as compared to the other fruits. Banana is also a rich source of energy which provides the energy of 67-137 cal/100gm fruit (Chadha, 2007).

With the production of 74.878 million tones of fruits, India ranks second next to China which produces about 122.184 million tons (Anon, 2011). Nowadays, banana has to face so many problems from harvesting to reaching at consumer. Total wastage is nearly 20-25% per year which is around 1300 crore of rupees (NRCB, 2011). This become very serious as far as the economy is concern this results in a situation of high yielding without high income. It is therefore imperative to develop suitable technology for preservation and processing of such surplus produce of banana. Banana powder is rich in nutrient and it has many medicinal values, so intake of banana powder is very good for health. Many processed product can be made from banana powder *i.e.* Infant food, noodle, energy drink *etc*. It can be used in bakery and confectionery industries, in treatment of coaliac disease and in intestinal disorders.

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MATERIALS AND METHODS

The research was done at Department of Horticulture, Dr. Panjabrao Krishi Vidya Peeth, Akola, Maharashtra during 2012-2013. The banana fingers were washed with tap water then cleaned with help of muslin cloth and kept for drying. Banana fingers were peeled immediately and sliced into 4mm thickness circular pieces with sharp knife. Then banana slices were pre-treated with hot water at 60°C for 10min (T_2), KMS 0.5% for 10 minutes(T_3), KMS 1.0% for 5 minutes(T_4), Hot water treatment + KMS 0.5 % for 10 minutes(T_5), Hot water treatment + KMS 1.0% for 5 minutes(T_6) and control(T_1). After the completion of given pre-treatment period (5 and 10 min.) slices were sieved out in stainless steel sieve, before drying to drain out excess water. After sieving, the slices were dried at 60°C using cabinet and solar dryer for 7hr and 5hr respectively to bring the moisture below 10%. Powder was prepared from slices and powder was packed in 200 gauge polythene packets. The powder then stored at room temperature and biochemical analysis was done for the parameters *viz*. total soluble solids, titraable acidity, ascorbic acid, total sugars, reducing sugars, non-reducing sugar, pH, moisture% by the methods described by Rangana (1979) at 30 days interval upto 120 days for determining the quality parameters and the data obtained was analyzed using One way analysis of variance design. You are to show the results of this tests on different parameters in tables.

Table 1: Treatment observation in quality parameters on 1st day of storage

Treatments	Moisture (%)	pH	Titraable acidity (%)	Ascorbic acid (mg.100g^{-1})	Total soluble solid	Reducing sugar (%)	Total sugar (%)	Non-reducing sugar (%)
T_1	6.63	6.02	0.38	10.46	2.09	0.36	0.70	0.32
T_2	6.96	6.13	0.51	7.94	2.48	1.13	1.81	0.68
T_3	6.08	5.67	0.68	13.82	2.96	1.63	2.33	0.69
T_4	5.94	5.43	0.69	26.16	2.64	1.56	2.42	0.91
T_5	6.64	5.61	0.50	20.69	2.79	0.85	1.35	0.51
T_6	6.5	5.44	0.65	21.13	2.28	1.10	1.76	0.66
SEm(±)	**0.07**	**0.01**	**0.02**	**0.08**	**0.09**	**0.03**	**0.04**	**0.02**
LSD(0.05)	**0.21**	**0.04**	**0.05**	**0.24**	**0.27**	**0.08**	**0.11**	**0.05**

Table 3: Treatment observation in quality parameters on 120th day of storage

Treatments	Moisture (%)	pH	Titraable acidity (%)	Ascorbic acid (mg/100g)	Total soluble solid	Reducing sugar (%)	Total sugar (%)	Non-reducing sugar (%)
T_1	9.36	6.03	0.25	7.91	2.44	0.48	0.90	0.42
T_2	8.42	6.13	0.36	5.75	2.83	1.28	2.05	0.77
T_3	8.28	5.67	0.51	11.77	3.47	2.34	3.34	1.00
T_4	7.80	5.44	0.55	22.19	2.95	2.30	3.69	1.39
T_5	8.15	5.61	0.34	16.49	3.16	1.01	1.61	0.60
T_6	8.08	5.44	0.48	17.18	2.61	1.25	2.01	0.76
SEm(±)	**0.09**	**0.01**	**0.01**	**0.38**	**0.07**	**0.01**	**0.01**	**0.01**
LSD(0.05)	**0.26**	**0.04**	**0.04**	**1.12**	**0.21**	**0.04**	**0.03**	**0.03**

RESULTS AND DISCUSSION

There were significant differences in moisture among the pre-treated banana powder. Moisture content of banana powder increased with advancement of storage period in all treatments. Pre-treatment T_4 recorded lowest moisture content (5.94%) whereas maximum moisture was found in blanched sample T_2 (6.96%) followed by control sample T_1 (6.63%) at 1st day of storage. But after 120 days of storage, control T_1 recorded maximum (9.36%) moisture than blanched treatment whereas minimum moisture recorded in treatment T_4 (7.80%). Banana powder exhibited constant pH throughout the storage period. However there was significant difference in pH content among all treatments. Lowest pH (5.43) was recorded in T_4 whereas T_2 showed highest pH 6.13. Similar result also obtained by Emperatríz (2008) and Mahendran *et al.* (2008).

Titraable acidity was decreased gradually on advancement of storage period in all treatments. At the 1st day of storage maximum acidity (0.69%) was recorded in treatment T_4 whereas minimum acidity (0.38%) was recorded in T_1. At the 120th day of storage control T_1 recorded lowest acidity (0.25%) whereas pre-treatment T_4 recorded maximum (0.55%) titraable acidity. Similar results of decreased in titraable acidity content with advancement of storage period were recorded by Suresh and Sagar (2009) in dehydrated mango slices. Ascorbic acid was decreased gradually with advancement of storage period. At 1st day of storage maximum ascorbic acid (26.16%) recorded in T_4 and minimum (7.94%) was recorded in T_2. At 120th day of storage Maximum ascorbic acid (22.19%) was recorded in T_4 and lower ascorbic acid (5.75%) was obtained in T_2. Similar result of maximum loss of ascorbic acid in blanching followed by control was

well agreed by Riemer *et al*. (1977) and Taiwo *et al.* (2009).

On advancement of storage period TSS of banana powder increased gradually. All treatments showed significant difference in TSS content. At 1st day of storage maximum TSS (2.96%) was found in T_3 whereas minimum TSS (2.09%) was found in T_1. At 120th day of storage highest TSS (3.47%) was observed in T_3 whereas lowest TSS (2.44%) was obtained in control. Reducing sugar increased with advancement of storage period. At 1st day of storage maximum reducing sugar (1.63%) recorded in T_3 whereas minimum reducing sugar (0.36%) recorded in T_1. At 120th day of storage highest reducing sugar (2.34%) was recorded in T_3 whereas minimum (0.48%) was recorded in control. It was well supported by Suresh and Sagar (2009) in dehydrated mango slices.

Total sugar content increased with passage of storage period. At 1st day of storage maximum total sugar (2.42%) recorded in T_4 whereas minimum total sugar (0.70%) was recorded in T_1. At 120th day of storage highest total sugar (3.69%) was obtained in T_4 whereas lowest (0.90%) was recorded in control. Ullah and Elahi (1977) also reported similar result of increase in total sugar with advancement of storage of dried banana slices. Non-reducing sugar content cv increased during storage period. At 1st day of storage maximum non-reducing sugar (0.91%) recorded in T_4 whereas minimum non-reducing sugar (0.32%) recorded in T_1. At 120th day of storage highest non-reducing sugar (1.39%) was obtained in T_4 whereas lowest (0.42%) was recorded in control.

The pre-treatment T_4 recorded highest titraable acidity, ascorbic acid, total sugar and non reducing sugar whereas lowest pH and moisture content. From this experiment it was concluded that pretreatment T_4 was best treatment among all pretreatment.

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