

Studies on the Potential Acid Neutralizing Properties of Banana

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Introduction

Bangladesh has been blessed with a vast resources of medicinal plants Banana being a nutritious, widely consumed, available and cheap fruit in Bangladesh, it may be an important substitute for hyper acidity. A Scientific exploration of this resource may provide enormous potential and promises for the future. Considering this concept, we have investigated five varieties of bananas of Musa sapientum Linn (Shagar), Musa paradisica Linn. var. shabari (Shabari), Musa paradisica Linn. var. chapa (Chapa), Musa paradisica Linn. var. bangla (Bangla) and Musa paradisica Linn. var. bichi (Bichi) for their acid neutralizing properties^{1,2,3}. The banana plants belongs to Musaceae family and is considered to be tree-like herbs, native to Bangladesh, India, Nepal and widely cultivated in these regions. Banana is a nutritious fruit and rich in vitamins contents^{2,4}. Chloroform soluble components

of flowers of M. sapientum was reported to have significant hypoglycemic effect in normal rabbits^{5,6,7}. Green tender leaves are extensively used in indigenous surgical practice and juice of its stem is given for the relieve of otalgia and haemoptysis².

Materials and Methods

Plant materials : Banana samples were selected in three different riping state of 'Riping (R)' 'Completely riped (CR)' and 'Over riped (OVR)' from each of the five plants and were collected from the local market. Each of these samples were made a paste using motor-pestle.

Determination of acid neutralizing values : The neutralizing values were analysed by the British Pharmacopeia method⁸. Three gram banana paste from each of the 15 samples was taken into a conical flask. 40 ml of a mixture of equal volume of N/10 HCl and distilled water,

Calculations

Acid added to 3 gm banana paste
X

= 20 ml N/10 HCL
= 20 X 0.9485 ml N/10 HCL
= 18.97 ml N/10 HCL
0.9485 is the acid factor

Alkali required in back titration
X

= ml of N/10 NaOH consumed
in the titration
= ml of N/10 NaOH X 1.013
1.013 is alkali factor

Acid absorbed by the 3 gm
bananan paste

= (X-Y) ml of N/10 Hcl
= $\frac{X-Y}{3}$ ml of N/10 HCL

Acid neutralizing capacity

heated to 37°C, was added to the paste in the conical flask. The mixture was stirred continuously for 2 hour maintaining the temperature at 37°C. The excess acid was then titrated with N/10 NaOH to pH 3.5. Bromophenol blue was used as an indicator.

Results

The acid neutralizing property of banana sampled from five different species of Family Musaceae were investigated. All of the variety of banana were found to have promising neutralizing values. These values were compared with that of five standard pharmaceutical antacids (Aludrox, Gelusil, Maalox plus, Phosphaljel and Titalac). The results of investigation were explained in details in the Tables 1,2,3, and 4

Discussion

Fifteen banana samples, 3 from each of the five varieties of Shagar, Shabari, Chapa, Bangla and Bichi Kala were tested. Samples were collected in three riping state from each. Triplicate tests were done for each of the samples which were then averaged to have a standard quantity of alkali required in back titration of the acid (Table 1 & 2).

Most of the samples showed neutralizing values around 3.5 ml of N/10 HCL (Table 3). The samples 'CR' and 'OVR' were found to have approximately same values

but higher than that of 'R' samples. The 'OVR' sample of Shagar gave the highest neutralizing value and 'R' sample of Shabari gave the lowest values (Table 3).

The neutralizing capacities of the 'OVR' samples were compared with that of Aludrox suspension (Wyeth), Gelusil suspension (Park Davis), Maalox plus tablet (Rorer), Phosphaljel suspension (Wyeth) and Titalac tablet (Riker) (Table 4)^{9,10}. Compared to these pharmaceutical antacids, the neutralizing capacity of a single banana in general (Approx. 200 gm) was equivalent to 5 to 11 doses or Tablets but in case of Phosphaljel (Wyeth), it was equivalent to 43 to 53 doses. This is a quite significant finding. This is the first report on acid neutralizing properties of banana.

Further investigations on this plants will be worthy.

Summary

Banana from five different species of Musaceae were examined for acid neutralizing properties. Samples were taken in three riping state 'Riping (R)', Completely riped (CR), and 'Over riped (QVR)'. The later two "CR' and "OVR' showed relatively higher neutralizing values than that of the first one "R'. These neutralizing values were compared with that of five pharmaceutical antacids and the findings were quite promising.

Table 1. Average value (in ml) of N/10 NaOH required in back titration

Name of banana	R	CR	OVR
Shagar	7.5	7.56	6.83
Shabari	15.53	9.3	9.16
Chapa	8.06	7.25	7.11
Bangla	12.01	8.65	8.46
Bichi	10.6	8.98	9.06

R= Riping banana

CR= Completely riped banana

QVR= Over riped banana

Table 2. *N/10 NaOH required (Y) ml and acid absorbed (X-Y) ml by 3 gram paste*

Name of banana	R		CR		OVR	
	Y	X-Y	Y	X-Y	Y	X-Y
Shagar	7.56	11.38	7.65	11.32	6.91	12.06
Shabari	15.73	3.24	9.42	9.55	9.27	9.7
Chapa	8.16	10.81	7.34	11.63	9.20	9.77
Bangla	12.16	6.81	8.76	10.21	8.56	10.41
Bichi	10.73	8.24	9.09	9.88	9.17	9.8

R = Riping banana Y= ml of NaoH X1.013

CR = Completely riped banana X= 18.97 ml

OVR = Over riped banana

Table 3. *Acid neutralizing values (Ml of N/10 HCL) of the banana*

Name of banana	R	CR	OVR
	(X-Y)/3	(X-Y)/3	(X-Y)/3
Shagar	3.97	3.77	4.02
Shabari	1.08	3.18	3.23
Chapa	3.60	3.87	3.25
Bangla	2.27	3.40	3.41
Bichi	2.74	3.29	3.26

(X-Y)/3 ml of N/10 HCL= Acid neutralizing capacity

R= Riping banana

CR= Completely riped banana

OVR= Over riped banana

Table 4. Comparison of the acid neutralizing properties of the banana (OVR) with that of pharmaceutical antacids.

Name of banana	ml of 0.1N HCl gm banana (ml)	HCl consumed-banana (200 gm) in ml.		1 banana equivalent to No. of tablets or of 5 ml dose of antacids.				
		0.1 N	mEq.	A	G	M	P	T
Shagar	4.02	804	80.4	6	7	9	53	11
Shabari	3.23	646	64.6	5	5	8	43	9
Chapa	3.25	650	65.0	5	5	8	43	9
Bangla	3.41	682	68.2	5	5	8	45	9
Bichi	3.26	652	65.2	5	5	8	45	9

A= Aludrox (Wyeth) 5 ml; G= Gelusil (Park Davis) 5 ml;
M= Maalox plus (Rorer) tab; P= Phosphaljel (Wyeth) 5 ml
T= Titrilac (Riker) tab.

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