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DEVELOPMENT OF SUGARS IN SAMPLES OF RIPENING PLANTAIN (*MUSA PARADISIACA*)

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SUMMARY

The levels of sugars in three samples of ripening plantain were determined daily for a period of four days. It was found that on dry weight basis, the amount of reducing sugars (as invert sugar) and total sugars (as invert sugar) increased by 15.0% and 18.2% respectively over the four days period. On wet weight basis the reducing sugars (as invert sugar) increased by 5.9% whilst that of total sugars (as invert sugar) increased by 5.0%.

INTRODUCTION

Plantain (*Musa paradisiaca*) is one of the staple foods in Ghana. When unripe the plantain is cooked and eaten as ampesi or pounded into fufu. In the ripe state it can be used for ampesi and can also be fried and eaten as 'tatale', 'kelewele' or as 'kakro'. Sometimes the ripe plantain is roasted and eaten. Ripe plantain can also be mixed with corn-dough and cooked to make akpler and ashanku (Ga). Other dishes of plantain are described by Whitby (1968). A powder mix product of soft ripe plantain for making tatale has been developed by Dei-Tutu (1975).

Some sweetness develops when the plantain starts ripening due to enzymic hydrolysis of the carbohydrate to sugars. This article measures the amount of sugars produced in the plantain just when ripening starts and four days thereafter.

EXPERIMENTAL

Materials

Three samples of green matured unripe plantain (*Musa paradisiaca*) fingers (large variety) were bought from the market at Accra. The samples were left in the room at ambient temperature and kept under observation. The analytical samples for the start of experiment were taken from the plantain fingers at the time when the green colour of the plantains started turning yellow, that is when ripening started.

About 5cm lengths of the ripening plantain fingers were cut off and mashed up as the analytical sample while the rest of the fingers were left undisturbed under storage for a period of four days.

During the first, second, third and fourth days of the ripening plantain fingers, the analytical samples were taken by cutting and mashing up procedure as already described.

Methods

Moisture

About 5g of the mashed sample was dried in nickel dish in air-oven at 105°C to a constant weight. The difference between the weight of the wet and dry samples gave the moisture content.

Sugar determination

About 10g portion of the mashed ripening plantain was accurately weighed. It was carefully transferred into 250ml volumetric flask and was shaken. The mixture was then cleared with 5ml zinc acetate and 5ml potassium ferrocyanide solutions and made up to the mark. The mixture was filtered.

Reducing sugars

The reducing sugars (as invert sugar) were determined by the Lane and Eynon's Method (Pearson 1970). The filtrate was transferred into burette and was titrated against 10ml mixed Fehling's solution. From the titre, the percentage reducing sugars (as invert sugar) was calculated by reference to Invert Sugar Table.

Total sugars

The total sugars (as invert sugar) was carried out according to the Lane and Eynon's Method (Pearson 1970). The filtrate was first inverted by adding 1ml 50% HCl to a measured volume of the filtrate in 100ml flask. It was warmed between 68°C and 70°C in a water bath for 10 minutes. It was allowed to cool. The solution was then neutralised with NaOH solution using phenolphthalein as indicator. It was made up to the 100ml mark. The inverted solution was transferred into the burette and titrated against 10ml mixed Fehling's solution. The percentage total sugars (as invert sugar) was calculated from the titre by reference to Invert Sugar Table.

Table 1: Sugar Levels in Samples of Ripening Plantain (*Musa paradisiaca*)

Day of Ripening of Plantain	% Moisture	% Reducing Sugars (as invert sugar)		% Total Sugars (as invert sugar)	
		Wet Basis	Dry Basis	Wet Basis	Dry Basis
Start	59.9	11.7	30.0	18.4	45.9
1	63.0	11.5	30.2	20.9	54.8
2	62.7	14.4	38.6	ND	ND
3	62.6	15.6	41.7	21.6	57.8
4	62.3	17.6	45.0	23.4	64.1

Figures represent average of three samples

ND means Not determined

RESULTS AND DISCUSSION

The result for sugar levels in ripening plantain samples over a period of four days are reported in Table 1.

Considered on the wet weight basis, the reducing sugars (as invert sugar) increased by 5.9% while the total sugars (as invert sugar) increased by 5.0% over four days' period of ripening.

On the dry weight basis, however, the reducing sugars (as invert sugar) increased by 15.0% and the total sugars (as invert sugar) also increased by 18.2% during four days period of ripening.

It is expected that the finding will benefit the diabetic patient who is at risk in eating foods with high sugar content.

The data on the sugar development of ripening plantain will also be useful to food technologist, nutritionists and dieticians.

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