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*Short Communication*

# Comparative study of cocoa-sweat and that of pure honey

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**The comparative study of cocoa-sweat and that of pure honey were carried out to show whether the taste of former could be accepted as an alternative to the later, using the hedonic scale of sensory evaluation. The fructose components of cocoa-sweat were compared with that of pure honey, using spectrophotometer absorbency method. The cocoa-sweat concentrated for 10 min had a closed value of fructose content (2.69%) as against 3.41% of pure honey. The cocoa-sweat concentrated for 20 and 30 min had higher fructose content of 9.31 and 9.46% respectively, as against 3.41% of pure honey. From the sensory evaluation tests, the cocoa-sweat concentrated for 20 and 30 min were highly acceptable with mean values if 27.3 and 28.8 respectively, as compared to the sweat concentrated for 10 min that had 24.6 mean value. The sweat concentrated for 10 min was recommended for use as a natural source of sweetener in place of sugar, in the absence of pure honey.**

**Key word:** Comparative study, cocoa-sweat and pure honey.

## INTRODUCTION

Cocoa tree belongs to the family *Sterculianceae* and the genus *Theobrma*. There are twenty species in the genus but only *Theobroma* is cultivated widely. Recently, with the application of molecular marker, Cocoa was reclassified to belong to the family *Malvaceae* (Alvenson et al., 1999). The cocoa industry in Nigeria owed its development in the early days almost exclusively to the initiative and enterprise of Nigeria peasant farmers. The early growth of cocoa industry in Western Nigeria was phenomenal. From a total of only 183 hectares in 1900, total hectarage of cocoa planted increased to about 4,082 in 1912; 400,000 in 1945; 408,163 in1958 and 650,000 hectares in 2004 (Sanusi and Oluyole, 2005). Presently, fourteen out of the thirty-six States in Nigeria produce cocoa and they are grouped into three categories according to their level of production. The high producing States: Ondo, Cross Rivers and Osun; medium producing States: Edo, Ogun, Oyo, Ekiti, Abia, Delta and Akw-Ibom; as well as low producing States: Kwara, Kogi, Taraba and Adamawa (Adegeye, 2000).

Daramola (2004) reported that Nigerian cocoa output has declined from over 300,000 to 155,000 tonnes with average annual growth rate declining from 8.3% during the 1992 - 1996 to 1.8% during the 1997 - 2001 periods. The present decline in cocoa production in Nigeria is a major concern to Nigerian scientists/agriculturists. It has been reported that one of the ways of enhancing sustainability of cocoa production of the world is through waste/by-products (BPs) management (CBN Annual Report, 1998).

Some of the cocoa plantations and processing factories have been extensively studied with encouraging results in livestock feeds in Nigeria. These include studies on cocoa pods husk (CPH) for poultry feeds (Hamzat and Babatunde, 2006), for Clarias catfish feeds (Hamzat et al., 2006), for cocoa bean shell in West Africa Dwarf (WAD) of goat (Babayemi et al., 2006), etc. According to Nworgu et al. (2003), the potential availability and nutritive value of this BPs made them suitable for inclusion into the ration of these livestock species. This research is aimed at exploiting the utilization of cocoa-sweat as an alternative to honey.

## MATERIALS AND METHODS

Ripen cocoa pods were harvested from cocoa farms in Ifedore local government area in Ondo State, Nigeria. The cocoa beans were gathered in locally made sweat boxes (baskets) that were placed

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**Table 1.** Sensory evaluation test of cocoa-sweat and pure honey.

| Sample | Appearance | Colour | Taste | Viscosity | General acceptance | Mean |
|---|---|---|---|---|---|---|
| Cocoa-sweat A | 5.5 | 6.0 | 5.5 | 5..7 | 6.1 | 5.76a |
| Cocoa-sweat B | 5.1 | 5.8 | 5.3 | 5.6 | 6.1 | 5.58a |
| Cocoa-sweat C | 5.0 | 5.5 | 5.2 | 5.4 | 5.9 | 5.40a |
| Pure honey | 6.8 | 6.5 | 6.3 | 6.0 | 6.5 | 6.42a |

Means followed by the same letter along columns are not significantly different at 5% probability level (Duncan's New Multiple Range Test). A = Cocoa-sweat dehydrated for 30 min; B = Cocoa-sweat dehydrated for 20 min; and C = Cocoa-sweat dehydrated for 10 min.

**Table 2**. Fructose content analysis using absorbency of 0.5 g of samples.

| Sample | Absorbency | Fructose content (%) |
|---|---|---|
| Cocoa-sweat A | 1.892 | 9.46a |
| Cocoa-sweat B | 1.862 | 9.31a |
| Cocoa-sweat C | 0.538 | 2.69b |
| Pure honey | 0.682 | 3.41b |

Means followed by the same letter along columns are not significantly different at 5% probability level (Duncan's New Multiple Range Test). A = Cocoa-sweat dehydrated for 30 min; B = Cocoa-sweat dehydrated for 20 min; and C = Cocoa-sweat dehydrated for 10 min.

on another clean container where the cocoa-sweat was collected. Immediately after collection, the Cocoa–sweat was filtered using a two fold of cheese cloth to remove any debris and immediately dehydrated by boiling, to avoid fermentation. Using different time limits (30, 20, and 10 min), 1 L of the sweat were separately dehydrated by boiling over low fire in a clean pot. Each dehydrated sweat was kept in clean bottles separately and taken to the laboratory for analysis. Pure honey was also bought from honey farmers in the same locality. Sensory evaluation test was carried out on the cocoa-sweat and pure honey, based on hedonic scale (AOAC, 1990). The fructose content of the cocoa-sweat was analyzed, using spectrophotometer absorbency method as described by Dubois et al. (1956); and compared with that of pure honey. The results obtained were subjected to statistical analyses using the Duncan Multiple Range Test.

## RESULTS AND DISCUSSION

The sensory evaluation test showed that the dehydrated cocoa-sweat samples (A, B and C) had mean values of 28.80, 27.30 and 24.60 respectively, as against 33.30 mean value of pure honey (Table 1). There was no significant difference between the mean value of each sample and that of pure honey.

The fructose content of the cocoa-sweat varied with the duration of time it was dehydrated. Samples 'A' and 'B' had higher fructose contents of 9.46 and 9.31% respectively, than that of pure honey (3.41%); while that of sample 'C' was 2.69% (Table 2). However, there was no significant difference in their general acceptability and the mean values in the sensory evaluation tests. Earlier report showed that honey from Nigeria contains 3.0% fructose (Ikediobi et al., 1985). The result of this research showed a close fructose content of 2.69% in the cocoa-sweat dehydrated for 10 min. There was no significant difference on comparing cocoa-sweat concentrated for 10 min with pure honey (Table 2). Also, the sensory evaluation tests showed that there was no difference in the taste and general acceptability of the various samples when compared with that of pure honey (Table 1). Also, there was no difference in fructose content of samples 'A' and 'B', as well as that of sample 'C' and pure honey. But there was significant difference in fructose content when samples 'A' and 'B' were compared with sample 'C' and pure honey separately. This is an indication that dehydration of the cocoa-sweat for longer period results in higher fructose content than that of pure honey.

The dehydration of cocoa-sweat for 10 min to get the sweetener is recommended, to ensure that the fructose content is not more than that of pure honey.

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