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Comparative study of wine produced from cocoa sweatings and cocoa powder

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ABSTRACT
Objective: To compare the chemical and physical attributes of wine produced from cocoa powder (CPW) to wine from cocoa sweating (CSW).
Methodology and results: Both wines were produced in the winery room of the Cocoa Research Institute of Nigeria (CRIN). Cocoa sweating was collected from the pod-breaking unit of the fermentary and the juices were used for wine production. Cocoa powder wine was processed using cocoa powder. Further processing involved dilution of the juice and powder with water-glucose syrup, then fermentation using yeast (S*. cerevisiae*). Wines were decanted and allowed to undergo an aging process after which they were bottled, pasteurized and cooled. Chemical analysis and organoleptic characterization of the wines was carried out alongside commercially available wines. The organoleptic appraisal used a 9-point hedonic scale ranging from 9 (like extremely) to 1 (dislike extremely) and was carried out using 100 untrained panelists, all accustomed to wine drinking. Wine from sweating (CSW) has a pH of 3.65 as compared to 3.10 for wine from powder (CPW). The alcohol content of CSW is 11% while that of CPW is 8%. CPW has light brown color, sweet and sour taste, with brilliance, aromatic flavor and a clear sparkle, while CSW has a colorless appearance, sour taste and is slightly turbid. Sensory evaluation results showed that CPW was more acceptable in color, brilliance and taste than the CSW.
Conclusion and application of findings: Two different types of wine could be produced from cocoa. The CPW with low alcohol content is sweet and would target consumers who prefer sweet taste and could be served as table wine. CSW with high alcoholic content would be more preferable for people that cherish high alcohol content. Developing wines from cocoa would increase value addition opportunities available to farmers and further augment their incomes.

Key words: Cocoa, powder, sweating, wine, chemical analysis, organoleptic appraisal

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INTRODUCTION

Traditionally, wine in developed countries is produced from ripe grape fruits (V*itus vinifera*) using yeast *Sacharomyces cerevisiae* var. *ellipsode* to enhance fermentation (Larmond, 1977). Wine can however be produced from other crop products that are rich in sugar since wine fermentation is essentially a result of anaerobic biological degradation of glucose, fructose, sucrose and galactose while ethanol, carbon dioxide and a number of other flavouring

compounds are produced (Lawal & Jayeola, 2007). Such crop products include apples, tubers and vegetables. Currently, processes are being developed to produce wine from cocoa, cashew, coffee, kola nut and tea at the Cocoa Research Institute of Nigeria (CRIN). There is renewed interest by many scientists from non-grape producing regions of the world to produce wine from other sugary substrates, e.g. apples, mango, banana and citrus, which have been tried successful (Akoma & Onuoha, 2000).

In Nigeria, work on the extraction of pulp surrounding cocoa beans for the production of wine has been initated (Akinwale, 2000). Recently, wine has also been produced from tea, with the aim of finding alternative uses for this crop, and also to reduce importation of wine into the country (Jayeola, 2004). This study investigated the possibility of producing wine from cocoa sweating and powder.

MATERIALS AND METHODS

The materials used were cocoa sweating, cocoa powder, sucrose, water, yeast and preservatives. The equipment includes fermenting vats, hydrometer, weighing scale and bottles. The wines were produced at the winery section of the crop processing and utilization division of CRIN.

Cocoa sweating was collected during the breaking of the pods at the fermentary unit while cocoa powder was obtained from cocoa industries in Nigeria. Amounts of 20mls/g of the pulp and cocoa powder were made up to 20L with syrup in a glass Jar. The dilutions were pasteurized, cooled and mixed with 0.02% (w/v) metabisulphite and 0.08% (w/v) ammonium sulphite to inhibit growth of bacteria and wild yeast. The mixture was seeded with 2% (v/v) of S*acharomyces cerevisiae* as described by Jayeola (2004). The fermenting vats containing the must were plugged with cotton wool and foil paper. The treatments were allowed to ferment for two weeks. After two weeks, the unaged wines were siphoned aseptically into another 20L capacity fermenting vats which hadd been sterilized with 5% (w/v) Sodium metabisulphate. The wine was allowed to age for six months after adding 0.02% preservative.

Alcohol content was estimated by volume of specific gravity and total soluble solids were determined using Abbe 60 Refractometer and expressed as Brix value. pH was measured using pH meter (model 7020 Electric Ltd, England), while the % extract soluble solids, total solid and specific gravity (20°C) were determined according to the method of AOAC (1990).

Sensory evaluation was carried out on the two wines and compared with a commercial wine. The parameters assayed for are color, aroma, taste and overall acceptability. A 9-point hedonic scale ranging from 9 (like extremely) to 1 (dislike extremely) was employed. Data were subjected to ANOVA test.

RESULTS AND DISCUSSION

The chemical properties of the two wines are presented in Table 1. The final pH of cocoa powder wine was 3.10 and 3.65 for cocoa sweating wine, while alcohol content was 8 and 11 %, respectively. The higher alcohol content of wine from sweating could be due to the presence of natural yeast and sugar in the sweating which could cause spontaneous fermentation. The selected commercially available wine had a lower alcohol content of 7.1 %.

Cocoa powder wine has a light brown colour, sweet and sour taste, aromatic flavour and showed brilliance when put in glasses. Cocoa sweating wine is colorless with sour taste, aromatic flavour and it was slightly turbid in glasses. Sensory evaluation results (Table 2) showed that cocoa powder wine compared well to the commercially available control in terms of taste, color, brilliance and over all acceptability while wine from cocoa sweating was least accepted. This could be due to the sour taste and less brilliance of the wine when put in glasses. However, wine from sweating was preferred by consumers who like high alcohol content.

The two wines developed in this study are distinctly different and could be developed from different consumer groups. Cocoa powder wine would be suitable as a table wine, targeting consumers who prefer sweet-taste. Production of these two wines from different cocoa products would increase value addition opportunities for cocoa farmers and increase incomes. It would further reduce waste from loss of cocoa sweating during pod breaking and also create other uses of cocoa powder, besides its use as a beverage.

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Table 1: Chemical properties of wine produced from Cocoa Sweating (CSW) and Cocoa Powder (CPW) compared to a control commercial wine (CCW).

	pH	Specific Gravity (20°C)	% Extraction	%Total Solids (20°C)	%Total Acid w/v (tertaric)	%Fixed Acid (w/v)	Volatile Acid (w/v % Acetic)	% Alcohol (w/v)
CPW	3.65	0.960b	2.820ab	5.00c	1.060a	1.040a	0.060a	11.00a
CSW	3.10c	1.020ab	1.890c	8.00a	1.040b	1.010a	0.020b	8.00b
CCW	3.40b	1.035a	3.00a	6.00b	1.000c	0.820b	0.035b	7.10c

Table 2: Sensory evaluation of wine from cocoa powder (CPW) and cocoa sweating (CSW) compared to a commercially available wine (CCW).

Sample	Colour	Taste	Brilliance	Aroma	Over all acceptability
CPW	8.2a	7.0a	8.0a	7.0b	7.0a
CSW	6.0b	6.2b	5.0b	8.0a	6.0b
CCW	7.0a	7.0a	8.0a	7.0b	7.0a

Means with different letters along the columns are significantly different of $P \leq 0.05$.

REFERENCES

Akinwale TO, 2000. Extraction of pulp from fresh cocoa beans for wine production. Annual report of the Cocoa Research Institute of Nigeria Ibadan, 2000: pp.75.

Akoma O. and Onuoha SA, 2000. Quality Characteristics of Elonuwor - A Nigerian wine produced form the yellow pulp of *Parkia biglobosa* using traditional (NUPE) Juice extraction technique. Proceeding of the 24th Annual NIFST Conference 20-24th November 2000. Bauchi.

AOAC, 1990 (Association of Analytical Chemists). Official Method of Analysis, Washington D.C. USA. 1990

Jayeola CO, 2004. Production and Evaluation of wine from locally available infused Tea. 28th Annual conference of NIFST 2004. Pg. 69.

Larmond E, 1977. Laboratory methods for sensory evaluation of food. Canada Department of Agriculture, Ottawa, Canada.

Lawal JO. and Jayeola CO, 2007. Economic analysis of cocoa wine produced from cocoa powder. Journal of Food, Agriculture and Environment 3: 76 - 77.