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Establishment of Some Health Benefits in Consumption of Cocoa Powder among Secondary Schools Students in Southwest Nigeria

Jayeola Olayinka Christianah*, Aroyeun SO, Ogunwolu SO, Yahaya LE, Famuyiwa SB, Lawal JO, Williams OA, Olubamiwa O

* *End Uses Research Department, Cocoa Research Institute of Nigeria*

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***Corresponding author**: Jayeola Olayinka Christianah, End Uses Research Department, Cocoa Research Institute of Nigeria P.M.B. 5244, Ibadan. Email: yinktay@yahoo.com

Abstract

There are increasing literature evidence and anecdotal reports worldwide on the health benefits of cocoa powder consumption. Regular consumption of cocoa powder beverage (95-100% cocoa powder) has been shown to combat malaria, diabetes and increase wellness. The study specifically established reports of some health benefits of cocoa consumption such as; increase in wellness, educational performance and alertness through consumption of cocoa powder. The study was carried out in 4 states; Ogun, Oyo, Ekiti and Osun in Southwest Nigeria. Two thousand four hundred respondents; between the ages of 10-15 years were randomly selected from the class register of 12 secondary schools and where parent negated inclusion students were substituted. They were included for daily consumption of cocoa drink for 8 weeks. Permissions were obtained from parents and the ministries of education and health. Information was solicited using key interpretative methods; Participant observers, unstructured interview, recorded video and individual class results before and after. The study revealed that 50.17% were male while 49.83% were female, the mean scores of educational performance before was 4.70 + 1.39, and 6.8 + 2.17 after. Reports from participants' observers claimed improvement in class attendance, student educational performances; increase in wellness while 62.17% liked the taste, 64% preferred it to other drink and 81.65% like it as a daily drink. Responses were also documented from their Teachers and some parents who were persuaded for their wards inclusion wished the program be emulated by the government. It was concluded that consumption of cocoa powder and cocoa products will increase cocoa market and consequently achieve better price for cocoa farmers and combat some health challenges.

Keywords: Cocoa Powder; Health Benefit; Government; Southwest

Introduction

There are increasing literature evidence and anecdotal reports worldwide on the health benefits of cocoa powder consumption. Regular consumption in dark chocolate form (≥25% cocoa powder inclusion) or as beverage (95-100% cocoa powder) has been shown to combat malaria, diabetes and hypertension. These are three of the commonest killer diseases in Nigeria. Altogether they siphon billions of naira in treatment and management costs while hundreds of thousands of Nigerians die of them annually. Numerous studies have reported a relationship between the consumption of cocoa derivatives especially dark chocolate with beneficial health effects on cardiovascular diseases as a result of the antioxidant activity of procyanidins (Keen *et al* 2005, Cooper *et al* 2008). The anti-oxidants help to fight heart diseases, overcome erectile dysfunction and sexual weakness. It lowers blood pressure, prevents malaria as well as diabetes. The presence of flavanoids in cocoa also prevents fat-like substances in the blood stream from oxidizing and clogging the arteries. The regular intake of natural cocoa powder helps to boost immunity among consumers (Olubamiwa, 2007, Akinroye, 2010 and Jayeola, *et al* 2011).The tropical regions produce 75% of the world's cocoa production, only 4% of the cocoa is consumed by

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these regions. These regions also suffer the most from malaria, cardiovascular diseases and diabetes. There are numerous anecdotal reports and personal subjective observations of reduced episodic malaria, cardiovascular diseases and diabetes in people who daily drink natural unsweetened cocoa beverage (95-100%).

The objectives of this study are to:

- to increase local consumption of cocoa,
- develop cocoa taste in children,
- campaign for nationwide media outreach on the health benefits of cocoa powder consumption,
- Militate against glut in the international cocoa market and consequently achieve better price for cocoa farmers.

Materials and Methods

The promotion of cocoa powder consumption was carried out in four states in Nigeria as stated below:

4 Cocoa producing states	=	Ogun, Oyo, Ekiti and Ondo States
3 Schools/ state	=	3 x 4= 12 schools
500 pupil / school	=	200 x 12= 2,400 students

Schools Used

1. Anglican High School, Ado-Ekiti, Ekiti- States
2. Methodist Girls Grammar School, Ifaki, Ekiti- States
3. Amoye Grammar School, Ikere, Ekiti- States
4. Iganmode Junior Grammar School, Ota, Ogun State
5. Obanta Junior Comprehensive Secondary School, Awa-Ijebu, Ogun State
6. Rev. Kuti Memorial Secondary School, Isabo, Abeokuta, Ogun State
7. Ogbomoso High School, Ogbomoso, Oyo State
8. Baptist Community School, Isokun, Oyo, Oyo State
9. Lagelu Grammar School, Agugu, Ibadan, Oyo State
10. New Church Grammar School, Owo, Ondo State
11. St, Thomas Aquinas College, Akure, Ondo State
12. Gbolugi Grammar School, Ile-Oluji, Ondo State

Selection of Study Areas & Respondents

Multi stage sampling procedure

- Stage 1 : Purposive selection of 1 geo-political zone from 6.
- Stage 2 : random selection of 4 from 6 states.
- Stage 3 : purposive selection 3 schools from each state.
- Stage 4 : random selection of 200 students from a polled register of class JSS1&2 using table of random numbers.

Permissions

Pre-visit to each state to obtain approval from the Ministry of Education was done. After approval was given, the materials needed were procured and the cocoa was processed to be sweetened for acceptability by the students. The sweetened cocoa premixes was further analyzed by Ministry of Health to ensure its safety and was certify fit for consumption before the administration of the cocoa drink to the pupils

Project Design

The project was a time series of 8 weeks based on before and after. Respondents were substituted where parents negate inclusion Information were solicited using two sets of questionnaires; before and after Jingles were made on radio stations.

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Processing Into Cocoa Beverage

Pre mixes of cocoa powder and sugar were done with the help of Appetizing Food Company in order to have an homogenized products, the products was further Bagged at 3kg each sufficient to feed the students per day for a period of three months.

Chemical Analysis

The sweetened cocoa drink was analyzed for proximate analysis and mineral content was carried out using AOAC, 2000 and for microbiological assay, McFaddin, 1980 was used.

Methodology

The sweetened cocoa drink was demonstrated in schools and distributed to the students. This was done daily for a period of two months. Questionnaires were administered for the students before the commencement and after the school feeding.
Active participation of media houses in the dissemination of information on the health benefits of cocoa powder consumption was also done in Oyo, Ogun, Ondo and Ekiti States.

Results and Discussion

The results in **(Table 1 and 2)** showed the proximate and mineral composition of both the natural cocoa powder and the sweetened cocoa beverage, while **(Table 3)** showed the microbial assay of the beverages; it indicated that the product is wholesome and safe for consumption. **(Table 4)** showed the percentage frequency of respondents personal characteristic where some of the pupils indicated that they rarely consumed the cocoa drink and some have not tasted it before despite the fact that there fathers own cocoa farms. **(Table 5)** showed the respondent's wellness upon daily consumption of cocoa drinks for three months. The results indicated that the students visit to the clinic, illnesses, fever and body weakness was drastically reduced, even consumption of herbs and visits to the traditional healer were totally reduced. The Percentage representation of respondents' perception of cocoa drink was indicated in table 6, where the students affirmed that truly cocoa drink is good for their body and that they now liked the taste of cocoa which initially they are not used to.

There were positive confessions from the students, teachers and the parents on the good effect they have recorded from the day they have started drinking cocoa. Improvement in academic performance, memory retention, and decrease in absent is due to malaria attack and increase in overall wellness were among the benefits of cocoa powder consumption.

Parameter	Value	WHO/Codex Specification
Proximate Analysis		
%Crude Protein	8.14	15-Jun
%Crude Fat	2.76	2-5-7.5
%Crude Fiber	0.47	0.35-1.15
% Ash	3.24	3.00-4.50
% Moisture	7.28	3.0-5.0
Energy (Kcal/100g)	3.86	300 – 500
Mineral Analysis		
Ca mg/100g	80	50 – 100
Mg mg/100g	480	300 – 600
Na mg/100g	350	250 700
K mg/100g	2560	2000-3000

Table 1: Natural Cocoa Powder.

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Parameters	Value
%Crude Protein	8.16
%Crude Fat	2.75
%Crude Fiber	0.47
% Ash	3.27
% Moisture	6.83
Energy Kcal/100g	6.94
Chemical Analysis	
Ca mg/100g	640
Mg mg/100g	110
Na mg/100g	160
K mg/100g	290

Table 2: Sweetened Cocoa Powder.

Microbial Assay	Value
Lactobacillus count cfu/g	0
E. Coli count cfu/g	0
Total plate count cfu/g	1.37x102

Table 3: Microbial Assay of sweetened cocoa powder.

S/N	Personal Characteristics	Frequency	Percentage
1	Class		
	JSS 1	1341	55.88
	JSS 2	1059	44.12
2	Sex		-
	Male	1204	50.17
	Female	1196	49.83
3	Age		-
	10 - 12 years	341	14.21
	13 - 15 years	1829	76.21
	> 15 years	230	9.58
4	How often do you take cocoa drink		-
	Daily	291	12.13
	Once/twice a week	1250	52.08
	Rarely	582	24.25
	Not at all	277	11.54

Table 4: percentage frequency of respondent's personal characteristics.

S/N	Variables	Before		After	
		Frequency	Percentage	Frequency	Percentage
	Respondents' wellness				
1	Visit to Clinic				
	Frequently	1440	60	900	37.5
	Often	528	22	516	21.5
	Rarely	432	18	984	41
2	Illness prone to*				
	Headache	1800	75	1260	52.5
	Fever	2016	84	1020	42.5

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	tiredness	1584	66	984	41
	None	120	5	552	23
3	Getting weak				
	Frequently	1140	47.5	516	21.5
	Often	516	21.5	804	33.5
	Rarely	768	32	1080	45
3	Treatment method*				
	Self-medication	264	11	300	12.5
	See a Doctor	2016	84	1740	72.5
	Traditionally	1080	45	852	35.5

Table 5: Respondents' wellness.

S/N	Perceptional statements	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
1	Drinking it is good for my body	45.5	12	10	15.5	17
2	I did not notice any change in my health	21	11	6	27	35
3	Is just like other drink	45	11	11.5	9	23.5
4	I like the cocoa taste	35.5	29	15.5	7	13
5	I don't like the bitter taste	45	11	25.5	12.5	6
6	I like the bitter taste	22.5	11	10	20.5	36

Table 6: Percentage representation of respondents' perception of cocoa drink.

Conclusion

This project gave a landmark achievement in that it was discovered that many of the student had not gotten the opportunity to continuously take cocoa drink for such a period of time that led the student and teachers asking for more and the school becoming envy to other schools. More importantly, is the improvement recorded on their health and up scaling of the student intelligence. There had been confession from the students, teachers and parents on the positive effect recorded on the students that "cocoa drink had curbed sicknesses. Increased their intelligence and more importantly improved their attendance in schools." Parents and teachers are now soliciting for more and to be done for the whole schools in Nigeria. From this study, Cocoa drink intake resulted to

- Improvement on the health of the students
- Up scaling of the student intelligence.
- Regular attendance of students in schools

Recommendation

I therefore recommend that this project be repeated in other states and schools in all the cocoa producing areas in order to create likeness for the chocolate taste so as to boost the immune system and develop the unique chocolate taste into the taste buds of the pupils.

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