

**TRAINING MANUAL
FOR THE
PRODUCTION OF
CASSAVA - BASED BAKERY PRODUCTS**

Edited By

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Six (6) organisations from Ghana and the United Kingdom are collaborating in the project. They are:

Food Research Institute (Ghana)

Forest Research Institute of Ghana

National Board for Small Scale Industries

Natural Resources Institute (U.K.)

University of Ghana - Department of Nutrition and Food Science and
Ministry of Food and Agriculture.

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1.0 INTRODUCTION

Cassava is an important food crop in Ghana. Its roots form a major item in the diet of many Ghanaian homes in both the rural and urban areas. Cassava roots are boiled and eaten as ampesi or the boiled roots are pounded into fufu. The roots are also processed into fermented dough and used in the preparation of banku or akple.

Again the roots can be processed into chips, dried and milled into powder and used for konkonte.

Bakery products like bread, pie, cake, doughnuts among others have also become important food items for the average Ghanaian. These products are prepared from wheat flour, which is imported.

Research has shown that flour made from cassava can be used wholly or in various proportions in the preparation of the bakery products.

The production of High Quality Cassava Flour and its use in the preparation of various bakery products are some of the outcomes of the on-going collaborative project on "Development of New Market Opportunities, to Increase the contribution that Cassava Makes to Sustainable Rural Livelihoods". The collaborative institutions are Food Research Institute, Forest Research Institute of Ghana, Natural Resources Institute of the United Kingdom, National Board for Small Scale Industries, Ministry of Food and Agriculture and the Nutrition and Food Science Department of the University of Ghana. The research project is funded by the Department for International Development (DFID).

This manual is to demonstrate the preparation of popular bakery products based on tested recipes by food scientists and professional bakers.

It is hoped that caterers, bakers and other professionals in the food industry will find the recipes very useful so as to popularise the use of High Quality Cassava flour in bakery products.

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2.0

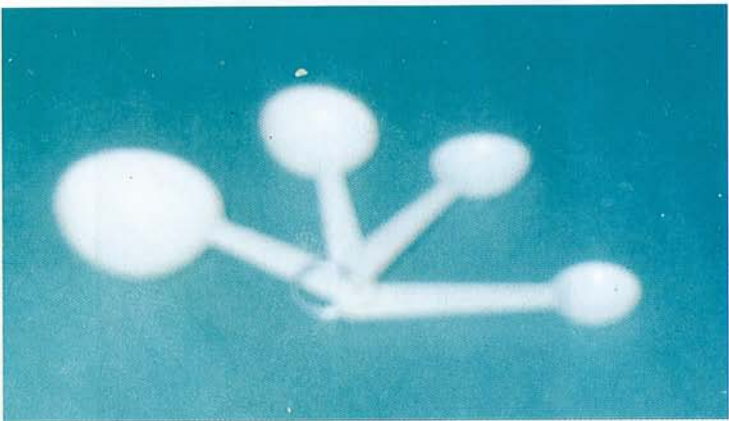
**MEANS OF MEASUREMENT OF INGREDIENTS
FOR BAKERY PRODUCTS**

Fig 1



Margarine cup

Fig 2



Tablespoon and Teaspoon

Fig 3



Kitchen Scale

Fig 4



Measuring Jar

WEIGHTS, VOLUMES & MEASURES CONVERSION TABLE

Item/Ingredient	Measure	Approximate Weight/ Volume
Cassava Flour	1 margarine cup	292g
Wheat Flour	1 margarine cup	390g
Sugar	1 margarine cup	545g
Margarine	1 margarine cup	450g
Salt	1 level tablespoonful	10g
Bicarbonate of Soda	1 level tablespoonful	10g
Baking powder	1 level tablespoonful	10g
Cassava Flour	1 margarine cup	250g
Finely chopped garlic	1 teaspoon	10g
Yeast	1 teaspoon	3g
Margarine	1 teaspoon	5g
Sugar	1 teaspoon	10g
Grated nutmeg	1 teaspoon	130g
Milk	1 tablespoon	15ml
Vegetable oil	1 tablespoon	15ml
Vanillia Essence	1 teaspoon	5ml
Water	1 Beer Bottle	625ml

Note: The prices of ingredients and outputs in the manual were based on current prices in Ghana in the first quarter of 2002.

Foreign Exchange Conversion used was US \$1.00 = ₵7,600.

3.0 RECIPES

PRODUCT 3.1: 30% CASSAVA FLOUR BREAD



Ingredients	Weight/Volume	Measure
• Cassava Flour.....	420g.....	1½ margarine cup
• Wheat Flour.....	180g.....	¾ margarine cup
• Granulated Sugar.....	100g.....	10 tablespoonful
• Bakery Yeast.....	20g.....	6 teaspoonfuls
• Smooth Salt.....	7g.....	1½ teaspoonful
• Margarine.....	150g.....	15 tablespoonfuls
• Milk.....	85ml.....	6 tablespoonfuls
• Grated Nutmeg.....	10g.....	3 teaspoonfuls
• Water.....	375ml	

Method of Preparation

- Weigh all ingredients except yeast, salt and water into mixing bowl.
- Dissolve quantity of salt required in water.
- Add to mixture in bowl
- Stir to mix thoroughly
- Dissolve yeast in water and add to the mixture
- Mix to get stiff dough.
- Send to machine for kneading into smooth dough.
- Cut into required sizes and roll.
- Put into well-greased baking pans.
- Allow to rise until the size is double.
- Bake in pre-heated oven or an oven set at 200°C for 15 to 20 minutes
- Remove and allow to cool and wrap.

Output

16 loaves (200g each) at suggested price of ₦1,000 each.

PRODUCT 3.2: CASSAVA FLOUR QUEEN CAKES



Ingredients	Weight/ Volume	Measure
• Cassava Flour.....	600g.....	2 margarine cups
• Granulated sugar.....	400g.....	$\frac{1}{2}$ margarine cup
• Margarine.....	450g.....	1 margarine cup
• Egg.....	50g.....	10 average
• Vanilla Essence.....	20ml.....	4 teaspoonfuls
• Grated Nutmeg.....	10g.....	3 teaspoonfuls
• Baking Powder.....	15g.....	$1\frac{1}{2}$ teaspoonfuls
• Milk.....	45ml.....	3 tablespoonfuls
• Water.....	100ml.....	

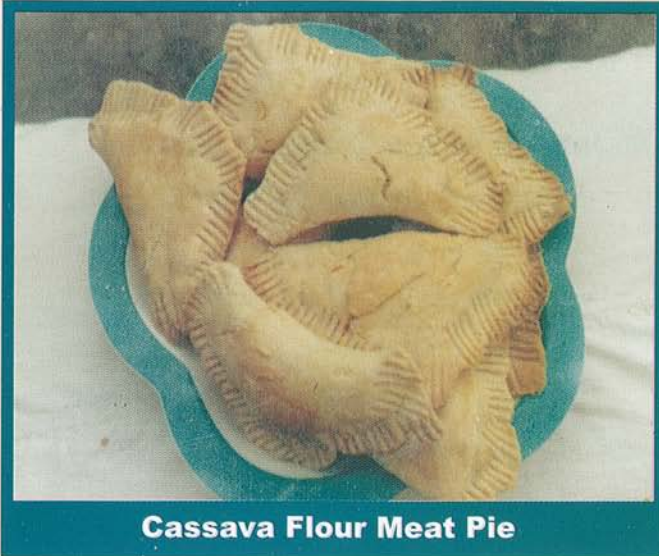
Method of Preparation

- Mix margarine and sugar in a bowl.
- Cream until light and fluffy.
- Whisk egg in a bowl until light and fluffy.
- Add egg to the cream
- Fold the flour and beaten eggs into the cream.
- Stir together till it becomes thick.
- Add flavors and grated nutmeg.
- Stir thoroughly.
- Add baking powder.
- Grease baking pans and fill $\frac{2}{3}$ full with mixture.
- Bake in relatively warm oven until lightly or evenly brown.

Output

70 cakes (25g each) at 41,000 each.

PRODUCT 3.3: CASSAVA FLOUR MEAT PIE



Cassava Flour Meat Pie

Ingredients	Weight/ Volume	Measure
• Cassava Flour.....	210g.....	1 margarine cup
• Margarine.....	50g.....	10 teaspoonfuls
• Eggs.....	1.....	
• Smooth salt.....	20g.....	2 tablespoonfuls
• Minced Meat.....	750g.....	
• Finely chopped onions.....	20g.....	2 teaspoonfuls
• Finely chopped garlic.....	3g.....	1 teaspoonfuls
• Black pepper.....	7g.....	2 teaspoonfuls
• White pepper.....	7g.....	2 teaspoonfuls
• Oil.....	50ml.....	2 tablespoonfuls

Method of Preparation

- Weigh out 150g of the 210g of cassava flour.
- Weigh margarine and salt into a clean bowl and mix.
- Put 50g cassava flour in 60 ml of boiling water and fold in gently 4 times
- Pour the cooked flour into the remaining weighed-out ingredients.
- Mix thoroughly with fingertips, until the mixture resembles breadcrumbs.
- Whisk the egg and add to the mixture.
- Mix to obtain a stiff dough, which leaves the sides of the bowl clean.
- Roll out to about $\frac{1}{4}$ inches thickness.
- Cut into rounds with a big biscuit cutter.
- Put a tablespoonful of meat filling (or fish filling) into one side, fold the other side over and press edges to close with a fork.
- Brush with beaten egg and bake in a hot oven for 30 minutes.

Output

15 pieces (150g each) at ₦2,000 each.

**PRODUCT 3.4: 50% CASSAVA FLOUR
"DROPPED DOUGHNUTS"**



Cassava Flour Dropped Doughnuts

Ingredients	Weight/ Volume	Measure
• Cassava Flour.....	300g.....	1 margarine cup
• Wheat Four.....	300g.....	1 margarine cup
• Granulated sugar.....	150g.....	15 tablespoonfuls
• Bakers yeast.....	8g.....	3 teaspoonfuls
• Grated nutmeg.....	5g.....	1 teaspoonful
• Smooth salt.....	10g.....	1 tablespoonful
• Baking powder.....	10g.....	1 tablespoonful
• Oil for deep frying.....	500ml.....	1 litre bottle
• Water.....	500ml.....	$\frac{1}{2}$ litre bottle

Method of Preparation

- Pour 2 cups of cassava flour into two cups of boiling water.
- Remove from fire and turn 4-5 times.
- Mix the remaining cassava flour and wheat flour in a bowl.
- Mix the combined flours with sugar, nutmeg and baking powder.
- Dissolve yeast in water and add to the mixture.
- Add boiled cassava flour and mix together.
- Mix into stiff dough, which leaves the side of the bowl clean.
- Mould into doughnut shapes.
- Fry in oil until golden brown.

Output

40 pieces (60g) at ₱500 each.

PRODUCT 3.5: CASSAVA FLOUR DOUGHNUTS



Ingredients	Weight/ Volume	Measure
• Cassava Flour.....	200g.....	$\frac{3}{4}$ margarine cup
• Sugar.....	50g.....	5 tablespoonfuls
• Margarine.....	20g.....	3 teaspoonfuls
• Egg.....	1.....
• Baking Powder.....	10g.....	1 tablespoonful
• Grated Nutmeg.....	1.5g.....	$\frac{1}{2}$ teaspoonful
• Oil for deep frying.....	500ml.....	$\frac{1}{2}$ litre bottle

Method of Preparation

- Pour $\frac{1}{2}$ cup (50g) of cassava flour into $\frac{1}{2}$ cup of boiling water
- Remove from fire and turn 4-5 times.
- Mix the remaining cassava flour with margarine, sugar, nutmeg and baking powder.
- Add boiling cassava flour and mix together.
- Whisk egg until light and add to the mixture.
- Mix into stiff dough, which leaves the sides of the bowl clean.
- Mould into doughnut shapes.
- Fry in oil until golden brown.

Output

12 pieces (35g each) at ₦500 each.

PRODUCT 3.6: CASSAVA FLOUR COOKIES



Ingredients	Weight/ Volume	Measure
-------------	----------------	---------

- | | | |
|-------------------------|------------|-----------------------------|
| • Cassava Flour..... | 200g..... | $\frac{2}{3}$ margarine cup |
| • Margarine..... | 100g..... | $\frac{1}{4}$ margarine cup |
| • Granulated sugar..... | 100g..... | $\frac{1}{3}$ margarine cup |
| • Smooth salt..... | 0.3g..... | Pinch |
| • Grated Nutmeg..... | 1.5g..... | $\frac{1}{2}$ teaspoonful |
| • Baking Powder..... | 10g..... | 1 tablespoonful |
| • Water..... | 100ml..... | |

Method of Preparation

- Sift cassava flour and baking powder into a bowl. Add sugar salt and grated nutmeg.
- Mix thoroughly.
- Mix Margarine into the flour.
- Add enough water to make a stiff dough (should not stick on the side of the bowl).
- Roll out on board covered with flour and cut into shapes with biscuit cutters and make holes in it.
- Bake in hot oven until light brown all over.

Output

30 pieces (50g) at ₦350 each.

PRODUCT 3.7: CASSAVA FLOUR BISCUIT



Ingredients	Weight / Volume	Measure
• Cassava Flour.....	100g.....	$\frac{1}{3}$ margarine cup
• Margarine.....	50g.....	10 teaspoonfuls
• Granulated sugar.....	50g.....	5 tablespoonfuls
• Gratedcoconut.....	50g.....	5 tablespoonfuls
• Egg.....	1.....	
• Baking powder.....	5g.....	1 tablespoonful
• Water.....	100ml.....	

Method of Preparation

- Cream sugar and margarine until light and fluffy.
- Add cassava flour, baking powder and the grated coconut
- Mix to stiff paste.
- If too stiff, add some water.
- Roll out on floured board.
- Cut into shapes and arrange on a greased cookie tray.
- Prick with a fork to prevent the dough from rising.
- Bake until evenly brown.

Output

45 pieces at ₱200 each

PRODUCT 3.8: CASSAVA FLOUR 'BOFROT'



Ingredients	Weight / Volume	Measure
• Cassava Flour.....	300g.....	1 margarine cup
• Wheat Flour.....	300g.....	1 margarine cup
• Bakers yeast.....	5g.....	1½ teaspoonful
• Baking powder.....	7g.....	1½ teaspoonful
• Milk.....	85ml.....	½ tin
• Smooth salt.....	7g.....	1½teaspoonful
• Vanilla essence.....	15ml.....	3 teaspoonfuls
• Margarine.....	100g.....	10 tablespoons
• Oil for deep frying.....	1000 ml.....	1 litre bottle
• Water.....	As required	

Method of Preparation

- Pour water into a bowl, add salt and sugar, and stir until dissolved
- Add baking powder.
- Add dissolved yeast.
- Add vanilla essence and margarine.
- Add cassava flour and stir gradually till you have light smooth paste.
- Add wheat flour gradually till paste looks thicker.
- Let it stand for 15 minutes.
- Deep fry in oil.

Output

24 pieces (50g) at ₱1000 each.

PRODUCT 3.9: CASSAVA WHEAT SWEET BUD



Ingredients	Weight / Volume	Measure
• Cassava Flour.....	1,752g.....	6 margarine cup
• Wheat Flour.....	7,020g.....	
• Margarine.....	450g.....	24 margarine cups
• Granulated sugar.....	1,090g.....	1 tin
• Nutmeg (grated).....	3pieces.....	2 margarine cups
• Salt.....	40g.....	
• Flavour.....	20g.....	2 teaspoonfuls
• Bicarbonate of Soda.....	20g.....	2 tablespoonfuls
• Eggs.....	200gm.....	4
• Baking powder.....	20g.....	2 tablespoonfuls

Method of Preparation

- Mix wheat and cassava flour in a bowl.
- Add margarine and rub together till smooth.
- Add baking and soda powder and stir.
- Dissolve sugar and salt in water.
- Add flavour to mixture
- Mix into a stiff dough. Mould with your hands and deep fry in hot oil
- Deep fry in oil.

Output

12 pieces at ₦500 each.

PRODUCT 3.10: CASSAVA FLOUR STRIPS



Cassava Flour Strips

Ingredients	Weight/ Volume	Measure
• Cassava Flour.....	100g.....	$\frac{1}{3}$ margarine cup
• Cowpea flour.....	250g.....	$\frac{4}{5}$ margarine cup
• Ground onions.....	90g.....	9 tablespoonful
• Smooth salt.....	10g.....	1 tablespoonful
• Water.....	200ml.....	
• Oil for deep frying.....	800 ml.....	$\frac{1}{3}$ litre bottle

Method of Preparation

- Pour $\frac{1}{2}$ cup (50g) of cassava flour into $\frac{1}{2}$ cup of boiling water.
- Remove from fire and turn 4-5 times immediately.
- Mix the remaining flour with cowpea flour, ground onions and salt.
- Add the boiled cassava flour and mix together to get stiff dough.
- Mix into stiff dough, which leaves the sides of the bowl clean.
- Knead with hands until smooth
- Roll evenly on board sprinkled with flour.
- Cut into strips.
- Fry in deep oil until brown.

Output

800g of strips at ₦14,000

PRODUCT 3.11: CASSAVA FLOUR CHINCHIN



Cassava Chinchin

Ingredients	Weight / Volume	Measure
• Cassava Flour.....	400g.....	1½ margarine cup
• Margarine.....	40g.....	
• Sugar.....	150g.....	½ margarine cup
• Eggs	100gm.....	2
• Grated nutmeg.....	3g.....	1 teaspoonful
• Vanilla essence.....	10ml.....	2 teaspoonful
• Baking powder.....	10g.....	1 tablespoonful
• Water.....	100ml.....	
• Oil for deep frying.....	500ml.....	½ litre bottle

Method of Preparation

- Put 1 cup (100g) of cassava flour into 1 cup of boiling water, remove from fire and turn 4-5 times immediately.
- Mix the remaining flour with margarine, sugar, nutmeg and baking powder.
- Add boiled cassava flour and mix together to get stiff dough.
- Whisk eggs until light and add to mixture. Mix into stiff dough, which leaves the sides of the bowl clean.
- Knead lightly with your hands and until smooth.
- Roll evenly on board already sprinkled with flour.
- Cut into bits
- Fry in deep oil until brown.

Output

800g quantity at ₦11,000

PRODUCT 3.12: CASSAVA SAUSAGE ROLLS



Cassava Sausage Rolls

Ingredients	Weight/ Volume	Measure
• Cassava Flour.....	200g.....	1 margarine cup
• Margarine.....	50g.....	10 teaspoonfuls
• Eggs.....	50gm.....	1 medium
• Salt.....	5g.....	1 teaspoonful
• Sausage Meat.....	240g.....	

Method of Preparation

- Weigh out 150g of cassava flour, margarine, and salt into a bowl and mix.
- Put 50g cassava flour in $\frac{1}{4}$ cup of boiling water and fold in gently 4 times
- Pour the cooked flour into the remaining weighted ingredients
- Mix thoroughly with fingertips, until the mixture resembles breadcrumbs. Whisk the eggs and add to the mixture.
- Mix to obtain a stiff dough which leaves the sides of the bowl clean. Roll the pastry into an oblong shape
- Season sausage meat with white pepper, black pepper, curry and salt.
- Divide into 8 pieces and shape into long strips
- Put sausage into the pastry.
- Fold the pastry over the sausage meat.
- Moisten the ends and seal by pressing the edges together.
- Brush pastry with beaten egg to give a glazed finish.
- Bake in a hot oven until relatively brown.

Output

800g quantity at ₦11,000

PRODUCT 3.13: CASSAVA FLOUR PANCAKE



Ingredients

Weight/ Volume

Measure

- | | | |
|-------------------------------|---------------|------------------|
| • Cassava Flour | 1,752g..... | 6 margarine cups |
| • Margarine | 450g..... | 1 margarine tin |
| • Granulated sugar..... | 1,090g..... | 2 margarine cups |
| • Nutmeg | 3pcs..... | |
| • Smooth salt | To taste..... | |
| • Milk | 170g | 1 tin |
| • Egg | 300 gm..... | 6 medium sizes |
| • Oil for shallow frying..... | 200ml..... | |
| • Water..... | 625 ml..... | 1 beer bottle |

Method of Preparation

- Pour 1 beer bottle of water into a bowl.
- Add margarine and grated nutmeg.
- Whisk all the eggs and add to the sugar solution.
- Add the milk
- Add cassava flour and stir to have a smooth light paste
- Fry as how an egg is fried.

Output

100 pieces at 4500 each

4.0

PROFITABILITY OF THE USE OF CASSAVA FLOUR OVER WHEAT FLOUR

4.1 *Price Variations In Cassava Flour vis a vis Wheat Flour.*

The recipes for the use of cassava flour and wheat flour were tried by professional bakers and caterers in Accra, at Atebubu in Brong Ahafo region, at the laboratories of the Food Research Institute (FRI) and during the writing of Business Plans (BP) for the project

The prices of ingredients as pertaining at the first quarter of the year 2002 were used in the calculation of the cost as shown in Appendix 1. The cost of ingredients in the preparation of the various products using cassava flour is shown. The cost of a kilogramme of cassava flour and wheat flour used in the preparation were as follows:

Wheat flour	₵3,000/kilo
Cassava flour at Atebubu	₵2,000/kilo
Sold in Accra and other coastal cities	₵2,700/kilo
Cassava flour using dried cassava from Brong Ahafo	₵3,500/kilo
Cassava flour using dried cassava from Gt. Accra	₵3,500/kilo
Cassava flour used in the Business plans	₵3,500/kilo

4.2 *Which is profitable - Using Cassava Flour or Wheat Flour?*

Using the Appendix 1 on the cassava flour cost/benefit analysis for 18 bakery products in Ghana, it can be stated that it is more profitable to use cassava flour than wheat flour in the preparation of a number of bakery products as revealed in the studies conducted.

It was more profitable to produce certain bakery products using cassava flour rather than wheat flour based on the recipes.

The bakery products were: 50% cassava bread ,30% cassava flour bread , 100% cassava flour biscuits ,30% cassava flour biscuits, 40% cassava flour biscuits,100% cassava flour cake, 30% cassava flour 'togbee', coconut biscuits, bofrot and 30% cassava flour cake.

The profit margins ranged from 163% and 137% to 10% and 1%. The other bakery products that are not profitable using cassava flour are strips,50% cassava flour togbee , ring doughnut, meat pie, chin chin, sweetbud and pancake.

CASSAVA FLOUR PROFITS COST / BENEFIT ANALYSIS FOR 18 PRODUCTS IN GHANA

FACTOR	50% CASSAVA FLOUR ^a BREAD	30% CASSAVA FLOUR ^b BREAD	100% CASSAVA FLOUR ^c BISCUIT	30% CASSAVA FLOUR ^d BISCUIT
Cost less cassava flour	6170	6010	2610	3480
Cassava flour Atebubu	600	360	400	120
Cassava flour Atebubu- Accra	810	486	540	162
Cassava flour Business Plan	1050	630	700	162
Cassava flour FRI	1800	1080	1200	360
Total Atebubu	6770	6370	3010	3600
Total Accra	6980	6496	3150	3642
Total BP	7220	6640	3310	3642
Total FRI	7970	7090	3810	3840
Profit Atebubu	12230	9630	7490	6900
Profit Accra	12020	9504	7350	6858
Profit BP	11780	360	7190	6858
Profit FRI	11030	8910	6690	6660
Profit Atebubu %	263	207	146	134
Profit Accra %	258	204	143	133
Profit BP %	253	201	140	133
Profit FRI %	237	192	130	130
Profit Atebubu % +/-	+163%	+107%	+46%	+34%
Profit Accra % +/-	+158%	+104%	+43%	+33%
Profit BP % +/-	+153%	+101%	+40%	+33%
Profit FRI % +/-	+137%	+92%	+30%	+30%

a = Recipe used by bakers in Takoradi (Ghana)

b = recipe used by bakers in Atebubu (Ghana)

c = 100% cassava flour this formulation will not work in practice because the biscuit will be too brittle.

d = 40% cassava flour, recipe used by Linabel Catering Services, Accra

e = 30% cassava flour, recipe used by Rose's Bakery Accra

f = 100% cassava flour held together with coconut

FACTOR	40% Cassava	100% Cassava	30% Cassava	Coconut
	Flour Biscuit ^e	Flour Cake	Flour Togbee	Biscuit ^f
Cost less cassava flour	3470	17650	6585	2250
Cassava flour Atebubu	160	1200	360	200
Cassava flour Atebubu- Accra	216	1620	486	270
Cassava flour Business Plan	280	2100	630	350
Cassava flour FRI	480	3600	1080	600
Total Atebubu	3630	18850	6945	2450
Total Accra	3686	19270	7071	2520
Total BP	3750	19750	7215	2600
Total FRI	3950	21250	7665	2850
Profit Atebubu	6870	51150	15555	6550
Profit Accra	6814	50730	15429	6480
Profit BP	6750	50250	15285	6400
Profit FRI	6550	48750	14835	6150
Profit Atebubu %	134	120	11g	115
Profit Accra %	133	119	118	114
Profit BP %	131	117	117	112
Profit FRI %	127	114	113	108
Profit Atebubu % +/-	+34%	+20%	+19%	+15%
Profit Accra % +/-	+33%	+19%	+18%	+14%
Profit BP % +/-	+31%	+17%	+17%	+12%
Profit FRI % +/-	+27%	+14%	+13%	+8%

FACTOR	Bofrot	30% Cassava Flour Cake	Titbits
Cost less cassava flour	13615	15560	8050
Cassava flour Atebubu	600	360	200
Cassava flour Atebubu - Accra	810	486	270
Cassava flour Business Plan	1050	630	350
Cassava flour FRI	1800	1080	600
Total Atebubu	14215	15920	8250
Total Accra	14425	16046	8320
Total BP	14665	16190	8400
Total FRI	15415	16640	8650
Profit Atebubu	9785	44080	2750
Profit Accra	9575	43954	2680
Profit BP	9335	43810	2600
Profit FRI	8585	43360	2350
Profit Atebubu %	113	103	104
Profit Accra %	110	103	101
Profit BP %	108	102	98
Profit FRI %	99	101	89
Profit Atebubu % +/-	+13%	+3%	+\$%
Profit Accra % +/-	+10%	+3%	+1%
Profit BP % +/-	+8%	+2%	-2%
Profit FRI % +/-	- 1%	+ 1%	- 11%

FACTOR	Strips	Chinchin	Sweetbud	Pancake
Cost less cassava flour	9400	8450	39960	19270
Cassava flour Atebubu	200	800	3504	3504
Cassava flour Atebubu- Accra	270	1080	4730	4730
Cassava flour business Plan	350	1400	6130	6130
Cassava flour FRI	600	2400	10512	10512
Total Atebubu	9600	9250	43464	22774
Total Accra	9670	9530	44690	24000
Total BP	9750	9850	46090	25400
Total FRI	10000	10850	50472	29782
Profit Atebubu	4400	1750	17536	27226
Profit Accra	4330	1470	16310	26000
Profit BP	4250	1150	14910	24600
Profit FRI	4000	150	10528	20218
Profit Atebubu %	100	109	61	45
Profit Accra %	98	92	57	43
Profit BP %	97	72	52	40
Profit FRI %	91	37	33	33
Profit Atebubu % +/-	0%	+9%	-39%	-55%
Profit Accra % +/-	-2%	-8%	-43%	-57%
Profit BP % +/-	-3%	-28%	-48%	-60%
Profit FRI % +/-	-9%	-91%	-63%	-67%

FACTOR	Togbee	Ring	Meat Pie
	50%	Doughnut	
Cost less cassava flour	6350	1750	21800
Cassava flour Atebubu	600	400	420
Cassava flour Atebubu- Accra	810	540	567
Cassava flour Business Plan	1050	700	735
Cassava flour FRI	1800	1200	126
Total Atebubu	6950	2150	22220
Total Accra	7160	2290	22367
Total BP	7400	2450	22535
Total FRI	8150	2950	23060
Profit Atebubu	13050	3850	7780
Profit Accra	12840	3710	7633
Profit BP	12600	3550	7463
Profit FRI	11850	3050	6940
Profit Atebubu %	100	104	95
Profit Accra %	98	100	94
Profit BP %	96	96	92
Profit FRI %	91	82	85
Profit Atebubu % +	0%	+4%	-5%
Profit Accra % +/-	-2%	0%	-6%
Profit BP % +/-	-4%	-4%	-9%
Profit FRI % +/-	-9%	-18%	-15%