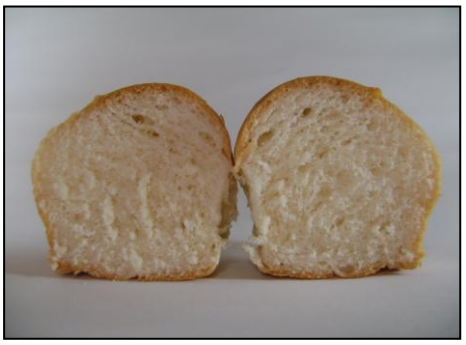
APPENDIXES

Appendix A.

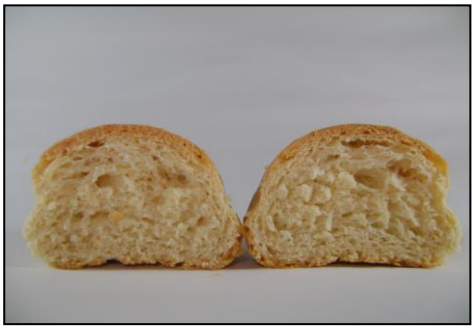
Photos on the external and internal part of bread samples

100% Wheat

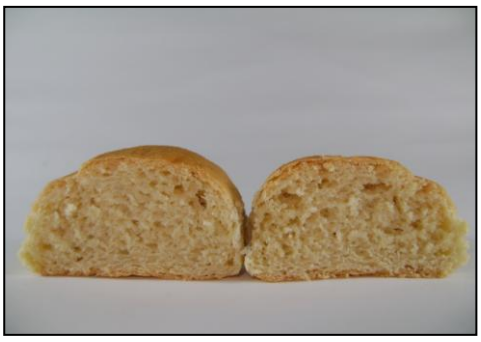


`10% Substitution

15% Substitution



20% Substitution



Appendix B

From left to right (100%) wheat bread, (90-10%), (85-15%) and (80-20%) wheat-cassava bread

Note: Not all breads of each group had the same volume. There were some variations. The pictures are taken according to the most common bread sample per group.

Appendix C
Triangle test tasting area

Appendix D
Triangle test working plan

Panelist #	Position	Coding	Expected Answer	Given Answer
1	ABB	325-485-723	325	
2	BAA	347-224-572	347	
3	AAB	224-572-347	347	
4	BBA	485-723-325	325	
5	ABA	224-347-572	347	
6	BAB	485-325-723	325	
7	BAA	347-224-572	347	
8	AAB	224-572-347	347	
9	BBA	485-723-325	325	
10	ABA	224-347-572	347	
11	BAB	485-325-723	325	
12	ABB	325-485-723	325	
13	AAB	224-572-347	347	
14	BBA	485-723-325	325	
15	ABA	224-347-572	347	
16	BAB	485-325-723	325	
17	ABB	325-485-723	325	
18	BAA	347-224-572	347	
19	BBA	485-723-325	325	
20	ABA	224-347-572	347	
21	BAB	485-325-723	325	
22	ABB	325-485-723	325	

23	BAA	347-224-572	347	
24	AAB	224-572-347	347	
25	ABA	224-347-572	347	
26	BAB	485-325-723	325	
27	ABB	325-485-723	325	
28	BAA	347-224-572	347	
29	AAB	224-572-347	347	
30	BBA	485-723-325	325	

Appendix E

Triangle test answer form

Triangle test	
Age: _____ Gender: □ male □ female Type of sample: Bread	Panellist number: _____
Instructions: 1. Taste the left sample. 2. Take a sip of water to neutralise you taste. 3. Taste the second sample. 4. Take a sip of water to neutralise you taste. 5. Taste the right sample. 6. Put a circle around the code of the sample, which is different. If no difference is apparent, enter your best guess.	
Put a circle around the code of the sample that is **different**. Sample codes: ___ _____ _____	
Comments: _____	

Appendix F

Paired preference test plan

Number of panellist	Order of brands	Number of brands	Given answer	Remarks
1	AB	592:349		
2	BA	349:592		
3	AB	592:349		
4	BA	349:592		
5	AB	592:349		
6	BA	349:592		
7	BA	349:592		
8	AB	592:349		
9	BA	349:592		
10	AB	592:349		
11	BA	349:592		
12	AB	592:349		
13	AB	592:349		
14	BA	349:592		
15	AB	592:349		
16	BA	349:592		
17	AB	592:349		
18	BA	349:592		
19	AB	349:592		
20	BA	592:349		
21	AB	349:592		
22	BA	592:349		
23	AB	349:592		
24	BA	592:349		

25	AB	349:592		
26	BA	592:349		
27	AB	349:592		
28	BA	592:349		
29	AB	349:592		
30	BA	592:349		

Appendix G

Answer form sheet paired preference test

Paired comparison test
Age: _____ Gender: □ male □ female Type of sample: Bread
Instructions: 1. Taste the left sample. 2. Take a sip of water to neutralise you taste. 3. Taste the right sample. 4. Put a circle around the code of the sample which you prefer most. 5. Please explain why you preferred the most that sample. 6. If no difference is apparent, enter your best guess.
Samples _____ _____ (Put a circle around the code of the sample which you prefer)
Comments: _____ _____

Appendix H

Critical number of correct responses in a triangle test (entries are X α,n)
Entries are the minimum number of correct response required for significance at the stated α-level (i.e., column) for the corresponding number of respondents, n (i.e., row). Reject the assumption of "no difference" if the number of correct responses is greater than or equal to the table value.

	α						
n	**0.40**	**0.30**	**0.20**	**0.10**	**0.05**	**0.01**	**0.001**
3	2	2	3	3	3	———	———
4	3	3	3	4	4	———	———
5	3	3	4	4	4	5	———
6	3	4	4	5	5	6	———
7	4	4	4	5	5	6	7
8	4	4	5	5	6	7	8
9	4	5	5	6	6	7	8
10	5	5	6	6	7	8	9
11	5	5	6	7	7	8	10
12	5	6	6	7	8	9	10
13	6	6	7	8	8	9	10
14	6	7	7	8	9	10	11
15	6	7	8	8	9	10	12
16	7	7	8	9	9	11	12
17	7	8	8	9	10	11	13
18	7	8	9	10	10	12	13
19	8	8	9	10	11	12	14
20	8	9	9	10	11	13	14
21	8	9	10	11	12	13	15
22	9	9	10	11	12	14	15
23	9	10	11	12	12	14	16
24	10	10	11	12	13	15	16
25	10	11	11	12	13	15	17
26	10	11	12	13	14	15	17
27	11	11	12	13	14	16	18
28	11	12	12	14	15	16	18
29	11	12	13	14	15	17	19
30	12	12	13	14	15	17	19

Source: Meilgaard et al.,2007, table 17.8 p.g 433.

Appendix I

Critical number of correct responses in a two-sided directional difference test (entries are X α,n)

Entries are the minimum number of correct responses required for significance at the stated α-level (i.e., column) for the corresponding number of respondents, n (i.e.,row). Reject the assumption of "no difference "if the number of correct responses is greater than or equal to the tabled value.

	α						
n	**0.40**	**0.30**	**0.20**	**0.10**	**0.05**	**0.01**	**0.001**
2	———	———	———	———	———	———	———
3	3	3	———	———	———	———	———
4	4	4	4	———	———	———	———
5	4	5	5	5	———	———	———
6	5	5	6	6	6	———	———
7	6	6	6	7	7	———	———
8	6	6	7	7	8	8	———
9	7	7	7	8	8	9	———
10	7	8	8	9	9	10	———
11	8	8	9	9	10	11	11
12	8	9	9	10	10	11	12
13	9	9	10	10	11	12	13
14	10	10	10	11	12	13	14
15	10	11	11	12	12	13	14
16	11	11	12	12	13	14	15
17	11	12	12	13	13	15	16
18	12	12	13	13	14	15	17
19	12	13	13	14	15	16	17
20	13	13	14	15	15	17	18
21	13	14	14	15	16	17	19
22	14	14	15	16	17	18	19
23	15	15	16	16	17	19	20
24	15	16	16	17	18	19	21
25	16	16	17	18	18	20	21
26	16	17	17	18	19	20	22
27	17	17	18	19	20	21	23
28	17	18	18	19	20	22	23
29	18	18	19	20	21	22	24
30	18	19	20	20	21	23	25

Source: : Meilgaard et al.,2007, table 17.12 p.g 437.

Appendix J

Expectation error: “This error occurs when the panellists are given more than enough information about the test before actually doing it. Too many facts or hints cause panellists to make a judgement on expectation rather than intuition”.(L. Postel et al.,1991).

Stimulus error: “It is important to mask all differences between the two samples. This is because people generally aspire to get the correct answer and any visible differences will “stimulate” error”. (L. Postel et al., 1991).

Logical error: “This error can cause panellists to evaluate samples according to particular qualities because they appear to one, legally associated with other characteristics”. (L. Postel et al., 1991).

Leniency error: “Error based on the panellists opinions of the researcher/s. Tests must be conducted in an organised, professional approach”. (L. Postel et al., 1991).

Central tendency error: “Occurs when panellists rate a sample mid-range to avoid extremes. Consequently, results may suggest that samples are more comparable than they are”. (L. Postel et al., 1991).

Suggestion effect: “The suggestion effect is basically the influence of other panellists by voicing their opinions or making known their reactions. Silence and separation of panellists by booth-like partitions help decrease the suggestion effect enormously ”. (L. Postel et al., 1991).

Positional Bias (order effect): “Usually the middle sample is chosen as odd. This is common in the triangle test, especially when the samples look close to identical. This can be avoided by presenting the samples randomly eg: in a triangle shape so that there is no middle sample”. (L. Postel et al., 1991).

Contrast effect and convergence error: “The juxtaposition of two noticeably diverse samples commonly causes the panellists to exaggerate the contrasts, hence the contrast effect. But this can also incur the opposite effect, whereby the significant difference can camouflage the more minute unlikeness's”. (L. Postel et al., 1991) Motivation: “Motivation of panel members affects their sensory acuity. It is therefore important to maintain the interest of the panellists. This can be achieved just by conducting the experiment in a professional, controlled manner, or even by offering a report of their results. Usually 1 ‘trained panellists are more motivated than those who are not”. (L. Postel et al., 1991).