Varied Root Crops Flour as Crust for Tart-Making

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Abstract

The study was conducted to determine the acceptability of cassava, sweet potato, gabi china and ubi flour as crust for tart-making. Specifically, it aimed to determine the qualitative description (appearance, aroma, taste and texture) of the flour; find out which of the crust for tart-making from root crops is most acceptable in appearance, aroma, taste and texture; find out if there is a significant difference in the acceptability of crust for tart-making from the root crops. This study used the Completely Randomized Design (CRD) using four (4) treatments in three replications.

The evaluation of the product was done by (5) Food Technology professors, (3) HRM professors and (2) HE teachers.

In terms of appearance, cassava and sweet potato used as crust for tart making was "Liked Very Much"; gabi china was "Liked Moderately" and ubi flour was "Liked Slightly". In terms of aroma, cassava was "Liked Very Much"; sweet potato flour was "Liked Moderately", gabi china flour was "Liked Slightly", and ubi flour was "Neither Liked or Disliked" In terms of taste, cassava was "Liked Very Much"; sweet potato was "Liked Moderately", gabi china flour was "Liked Slightly", and ubi flour was "Neither Liked or Disliked". Considering texture, cassava was "Liked Vey Much", sweet potato flour was "Liked Moderately", gabi china was "Liked Moderately" and ubi flour was "Liked Slightly" by the evaluators.

The four kinds of flour from the root crops made into crust for tart-making was "Liked Very Much" by the evaluators, considering the four sensory qualities.

There were significant differences in the acceptability of the flour from the root crops made into crust tart-making in favor of cassava flour.

Keywords: Cassava, Sweet Potato, Gabi China and Ubi

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INTRODUCTION

High consumption of root crops nowadays have become a part of the daily menu of some Filipino folks because of the many good things said about it. Root crops are good sources of fibers, vitamins, minerals, carbohydrates, a little protein and very low fat, making it a very nutritious source of food. Before, people have it as their breakfast, lunch or supper and have enjoyed long life span.

Sometimes, one can also hear some people telling others to go home and "plant camote" which connote that something negative was done by a certain person and doing such activity will let him amend for that negative thing he has done. Yet, on the positive aspect, doing such thing can make him a more productive and useful person. Notably, according to Ponce, Bella On Line's Philippine Editor, Root crops are found to be essential to the body's wellness as these are teeming with vitamins most especially Vitamin C, Carbohydrates and minerals like calcium, iron and zinc which the body needs. An added bonus: root crops are also rich sources of soluble dietary fiber. Studies on dietary fiber have shown that to help lower bad cholesterol and help prevent tumor growth in the colon (http://www.bellaonline.com retrieved November 15, 2014).

Consuming root crops and its by-products is given big emphasis in the researchers conducted to keep abreast with the changing taste and palate of the different age brackets of the consumers plus the addition of some health conditions of some folks such as diabetes, hypertension, cancer and many other diseases caused by consumption of food products produced by the modern world. It is on this premise that this research on varied root crops flour: sweet potato (camote), purple yam (ubi), cassava (kamoteng kahoy) and tannia (gabi tsina/palawan) as crust for tart- making was conducted.

Generally, this study was conducted to determine the acceptability of varied root crops flour as crust for tart-making. Specifically, it aimed to: Determine the qualitative description in terms of appearance, aroma, taste and texture of the flour from the varied root crops (cassava, sweet potato, gabi china and ubi); Find out which of the crust for tart-making from the varied root crops flour is the most acceptable in terms of appearance, aroma, taste and texture; and Find out if there is a significant difference in the acceptability of the crust for tart-making from the varied root crops flour (cassava, sweet potato, gabi china and ubi).

RESEARCH METHODOLOGY

A. Procedures in making Root Crops Flour
(casssava, sweetpotato, gabi china, Ubi)

The cassava tubers were washed, peeled, and rewashed. Then, were sliced thinly using a peeler and shredder and were soaked in enough water to remove parts of the starch. Then, the sliced cassava tubers were drained and spread in an aluminum tray. Next, were dried under the sun until it became crisp and brittle. Using a rice grinder, it was grounded and was made to pass through a fine sifter and, finally, were packed in a dry and clean container.

B. Procedures in making Tart Crust

The sifted flour and sugar were combined in a mixing bowl. Butter was added and cut with a pastry blender until the mixture resembled a coarse meal. Egg was added on the mixture and then tossed with a fork until blended to hold the mixture together. The dough was formed into small balls and flattened with a rolling pin. The flattened dough was made to fit into the greased tart shells. The tart shell was filled with the filling. In a moderate temperature, it was baked until done. Upon cooling, the tart were carefully removed from shell and were individually wrapped in colored cellophane.

c. Procedures in making Tart filling

The crushed pineapple, condensed milk and evaporated milk were combined in a mixing bowl. Then, the mixture was placed in an electric blender and was blended until it became smooth. The blended mixture was then placed in a non-stick pan and the rest of the ingredients were added. The mixture was cooked with continuous stirring until it became thick. Then, it was set aside for later use.

STATISTICAL TOOLS

The Statistical Package for Social Sciences (SPSS) software was used to generate and process all the data needed in the study.

Mean was used to determine the acceptability in terms of the four (4) sensory qualities of the varied root crops flour as crust for tart-making.

The Analysis of Variance (ANOVA) was used in order to analyze the differences of the products in the four sensory qualities tested.

RESULTS AND DISCUSSIONS

Qualitative descriptions of the four kinds of flour as crust for tart-making in terms of appearance

Table 1 shows the qualitative description of the four kinds of flour as crust for tart-making in three replications in terms of appearance.

Table 1. Qualitative descriptions of the four kinds of flour as crust for tart-making in terms of appearance.

Kinds of Flour	First Replication		Second Replication		Third Replication		Grand Mean	Qualitative Description
	Mean	Qualitative Description	Mean	Qualitative Description	Mean	Qualitative Description		
Ubi	5.80	LS	5.30	NL/DL	5.80	LS	5.63	LS
Gabi China	6.90	LM	7.00	LM	7.20	LM	7.03	LM
Sweetpotato	7.70	LVM	7.70	LVM	7.40	LVM	7.60	LVM
Cassava	8.10							

Legend:

LVM -Liked Very Much LM - Liked Moderately
LS - Liked Slightly NL/DL - Neither Liked or Disliked

In the first replication, the data showed that the means of the four kinds of flour as crust for tart-making ranged from 5.80 to 8.10. The highest mean of 8.10 with a qualitative description of "Liked Very Much" was the cassava. This was followed by sweet potato with a mean of 7.70 and described also as " Liked Very Much, followed by gabi china with a mean of 6.90 with the qualitative description of "Liked Moderately" and the ubi got the lowest mean of 5.80 with a qualitative description of "Liked Slightly".

In the second replication, the means of the four kinds of flour as crust for tart-making ranged from 5.30 to 8.10. The highest mean of 8.10 with a qualitative description of "Liked Very Much" was still the cassava. This was followed by sweet potato with a mean of 7.70 with a qualitative description of "Liked Very Much" also, followed by gabi china with a mean of 7.00 with a qualitative description of "Liked Moderately", and the lowest mean of 5.30 with a qualitative description of "Neither Liked or Disliked" was on the ubi.

In the third replication, the means of the four kinds of flour as crust for tart-making ranged from 5.80 to 8.10. The highest mean of 8.10 with a qualitative description of "Liked Very Much" was still cassava, followed by sweet potato with a mean of 7.40 with a qualitative description of "Liked Very Much" and gabi china having a mean of 7.20 with a qualitative description of "Liked Slightly". Ubi got the lowest mean of 5.80 with a qualitative description of "Liked Slightly".

Among the four (4) kinds of flours made into crust for tart-making, cassava got the highest grand mean of 8.10 in the three replications and was described as "Liked Very Much".

Qualitative descriptions of the four kinds of flour as crust for tart-making in terms of aroma

The qualitative descriptions of the four kinds of flour as crust for tart-making in three replications in terms of aroma are shown in Table 2. In the first replication, the data revealed that the means of the four kinds of flour as crust for tart-making ranged from 4.70 to 7.70. The highest

mean of 7.70 with a qualitative description of "Liked Very Much" was the cassava. This was followed by sweet potato having a mean of 7.10 with a qualitative description of "Liked Moderately". Gabi china had a mean of 6.30 with a qualitative description of "Liked Slightly" and ubi got the lowest mean of 4.70 with a qualitative description of "Neither Liked or Disliked" by the evaluators.

Table 2. Qualitative description of the four kinds of flour as crust for tart-making in terms of aroma.

Kinds of Flour	First Replication		Second Replication		Third Replication		Grand Mean	Qualitative Description
	Mean	Qualitative Description	Mean	Qualitative Description	Mean	Qualitative Description		
Ubi	4.70	NL/DL	4.60	NL/DL	4.80	NL/DL	4.70	NL/DL
Gabi China	6.30	LS	6.30	LS	6.40	LM	6.33	LS
Sweetpotato	7.10	LM	7.10	LM	6.90	LM	7.03	LM
Cassava	7.70	LVM	7.70	LVM	7.50	LVM	7.63	LVM

Legend:

LVM -Liked Very Much LM - Liked Moderately
LS - Liked Slightly NL/DL - Neither Liked or Disliked

In the second replication, the mean of the four flour as crust for tart-making ranged from 4.60 to 7.70. The highest mean of 7.70 with a qualitative description of "Liked Very Much" was still the cassava. It was followed by sweet potato with a mean of 7.10 with a qualitative description of "Liked Moderately" and gabi china got a mean of 6.30 with a qualitative description of "Liked Slightly". The lowest mean of 4.60 with a qualitative description of "Neither Liked or Disliked" was on ubi.

In the third replications, the mean of the four kinds of flour as crust for tart-making ranged from 4.80 to 7.50. The highest mean of 7.50 with a qualitative description of "Liked Very Much" was still the cassava, followed by the sweet potato having a mean of 6.90 with a qualitative description of "Liked Moderately". Gabi china with a mean of 6.40 with a qualitative description of "Liked Moderately".

The lowest mean of 4.80 had a qualitative description of "of "Neither Liked or Disliked" was on the ubi.

According to the data, Cassava got the highest grand mean of 7.63 in the three replications described as "Liked Very Much" by the evaluators.

Qualitative descriptions of the four kinds of flour as crust for tart-making in terms of taste

Table 3 discloses the qualitative description of the four kinds of flour as crust for tart-making in three replications in terms of taste. In the first replication, the mean of the four kinds of flour as crust for tart-making ranged from 5.00 to7.40. The highest mean of 7.40 with a qualitative description of "Liked Very Much" was on cassava. This was followed by sweet potato having a mean of 7.20 with a qualitative description of "Liked Moderately". Gabi china had a mean of 5.70 with a qualitative description of "Liked Slightly". The lowest mean of 5.00 with a qualitative description of "Neither Liked or Disliked" was on ubi.

Table 3. Qualitative description of the four kinds of flour as crust for tart-making in terms of taste.

Kinds of Flour	First Replication		Second Replication		Third Replication		Grand Mean	Qualitative Description
	Mean	Qualitative Description	Mean	Qualitative Description	Mean	Qualitative Description		
Ubi	4.70	NL/DL	4.60	NL/DL	4.80	NL/DL	4.70	NL/DL
Gabi China	6.30	LS	6.30	LS	6.40	LM	6.33	LS
Sweetpotato	7.10	LM	7.10	LM	6.90	LM	7.03	LM
Cassava	7.70	LVM	7.70	LVM	7.50	LVM	7.63	LVM

Legend:

LVM -Liked Very Much LM - Liked Moderately
LS - Liked Slightly NL/DL - Neither Liked or Disliked

In the second replication, the mean of the four kinds of flour as crust for tart-making ranged from 4.90 to 7.30. The highest mean of 7.30 with a qualitative description of "Liked Very Much" was on cassava. This was followed by sweet potato having a mean of 7.00with a qualitative description of "Liked Moderately". Gabi china had a mean of 5.80 with qualitative description of "Liked Slightly". Ubi had a lowest mean of 4.90 with a qualitative description of "Neither Liked or Disliked".

In the third replication, the mean of the four kinds of flour as crust for tart-making ranged from 5.10 to 7.20. The highest mean of 7.20 with a qualitative description of "Liked Moderately" was on cassava, followed by the sweet potato with a mean of 7.00 with a qualitative description of "Liked Moderately" also. Gabi china had a mean of 6.20 with a qualitative description of "Liked Slightly". The lowest mean of 5.10 with a qualitative description of "Neither Liked or Disliked" was on ubi.

The results showed that among the four kinds of flour made into crust for tart-making, cassava got the highest grand mean of 7.30 in three replications described as "Liked Very Much" in terms of its taste.

Qualitative descriptions of the varied root crops flour as crust for tart- making in terms of texture

Table 4 displays the qualitative description of the varied root crops of flour as crust for tart-making in terms of texture. In the first replication, the data displayed that the means of the four kinds of flour as crust for tart-making ranged from 6.30 to 7.70. The highest mean 7.70 with a qualitative description of "Liked very Much" was on cassava. This was followed by the sweet potato with a mean of 7.20 with qualitative description of "Liked Moderately" and gabi china with a mean of 6.60 with a qualitative description of "Liked Moderately" also. Ubi got a lowest mean of 6.30 with a qualitative description of "Liked Slightly".

Table 4. Qualitative descriptions of the four kinds of flour as crust for tart-making in terms of texture.

Kinds of Flour	First Replication		Second Replication		Third Replication		Grand Mean	Qualitative Description
	Mean	Qualitative Description	Mean	Qualitative Description	Mean	Qualitative Description		
Ubi	6.30	LS	6.00	LS	6.20	LS	6.16	LS
Gabi China	6.60	LM	6.80	LM	6.60	LM	6.66	LM
Sweetpotato	7.20	LM	7.20	LM	7.10	LM	7.16	LM
Cassava	7.70	LVM	7.70	LVM	7.40	LVM	7.60	LVM

Legend:

LVM -Liked Very Much LM - Liked Moderately
LS - Liked Slightly NL/DL - Neither Liked or Disliked

In the second replication, the means of the four kinds of flour as crust for tart-making ranged from 6.00 to 7.70. The highest mean 7.70 with a qualitative description of "Liked Very Much" was on cassava. This was followed by the sweet potato with a mean of 7.20 with qualitative description of "Liked Moderately" and gabi china with a mean of 6.80 with a qualitative description of "Liked Moderately" also. Ubi got a lowest mean of 6.00 with a qualitative description of "Liked Slightly".

In the third replication, the highest mean 7.40 with a qualitative description of "Liked Very Much" was on cassava. This was followed by the sweet potato with a mean of 7.10 with qualitative description of "Liked Moderately" and gabi china with a mean of 6.60 with a qualitative description of "Liked Moderately" also. Ubi got a lowest mean of 6.20 with a qualitative description of "Liked Slightly" by the evaluators.

The four kinds of flour as crust for tart-making were described qualitatively as "Liked Very Much" in three replications in terms of texture as seen on Table 4 with the highest grand mean of 7.60 was on cassava.

Acceptability of the Varied Root Crops Flour As Crust for Tart Making Considering The Four Sensory Qualities

Table 5 shows the acceptability of the varied root crops flour as crust for tart making considering the four sensory qualities such as appearance, aroma, taste and texture. The highest mean of 7.67 was on cassava flour with a qualitative description of "Liked Very Much" by the evaluators. The second to the highest mean of 7.22 was on sweet potato flour with a qualitative description of "Liked Moderately" and gabi china flour had mean of 6.48 with a qualitative description of "Liked Moderately" also. Ubi got the lowest mean of 5.38 with a qualitative description of "Neither Liked or Disliked" by the evaluators.

Table 5. Acceptability of the four kinds of flour as crust for tart-making considering the four sensory qualities.

Factors	Ubi		Gabi China		Sweet Potato		Cassava	
	Mean	Qualitative Description	Mean	Qualitative Description	Mean	Qualitative Description	Mean	Qualitative Description
Appearance	5.63	LS	7.03	LM	7.60	LS	8.10	LS
Aroma	4.70	NL/DL	6.33	LS	7.03	NL/DL	7.63	NL/DL
Taste	5.00	NL/DL	5.90	LS	7.07	NL/DL	7.30	NL/DL
Texture	6.17	LS	6.67	LM	7.17	LS	7.63	LS
Total Mean	21.50		25.93		28.7		30.66	
Average Mean	5.38	NL/DL	6.48	LM	7.22	LM	7.67	LVM

Legend:

LVM -Liked Very Much LM - Liked Moderately
LS - Liked Slightly NL/DL - Neither Liked or Disliked

Table 5 shows the acceptability of the varied root crops flour as crust for tart making considering the four sensory qualities such as appearance, aroma, taste and texture. The highest mean of 7.67 was on cassava flour with a qualitative description of "Liked Very Much" by the evaluators. The second to the highest mean of 7.22 was on

sweet potato flour with a qualitative description of "Liked Moderately" and gabi china flour had mean of 6.48 with a qualitative description of "Liked Moderately" also. Ubi got the lowest mean of 5.38 with a qualitative description of "Neither Liked or Disliked" by the evaluators.

Difference in the Acceptability of the Varied Root Crops Flour as Crust for Tart-Making Considering the Four Sensory Qualities

Table 6 reveals that there were significant differences in the acceptability of the varied root crops flour as crust for tart-making considering the four sensory qualities such as appearance, aroma, taste and texture. This was so, because the F-value of 26.298 had a P-value of 0.000 which was less than 0.05 alpha. This result implies that the acceptability of the four varied root crops flour as crust for tart-making was different from each other when the four sensory qualities were taken into consideration.

Table 6. Difference in the acceptability of the kinds of flour as crust for tart-making considering the four sensory qualities.

Source Variation	Sum of Square	Df	Mean Square	F-ratio	p-value	remarks
Between Groups	1441.493	3	480.497	26.298	0.0000	s.
Within Groups	2119.500	116	18.272			
Total	**3560.992**	**199**				

The Tukey HSD post hoc test showed that the difference lie between cassava and gabi china and ubi, all in favor of cassava. Significant differences were also found between sweet potato and ubi and gabi china, all in favor of sweet potato. The same differences were found in between gabi china and ubi, in favor of gabi china.

The results implied that cassava as crust for tar-making was the most acceptable among the three flours considering the four sensory qualities such as appearance, aroma, taste and texture during the evaluation of the finished products by the evaluators.

CONCLUSIONS

Among the four root crops flour, cassava flour as crust for tart-making is the most acceptable in terms of four sensory qualities as to appearance, aroma, taste and texture.

Among the four treatments used in the study, cassava flour made into crust for tart-making was the most acceptable considering the four sensory qualities.

Flour from cassava that was used in crust for tart-making was the most acceptable.

RECOMMENDATIONS

Cassava and sweet potato flour are recommended as crust for tart-making.

Bakers, homemakers, teachers, students and consumers are encouraged to use cassava, camote, gabi china and ubi flours in making other baked products.

The flour from the varied root crops may be subjected to shelf life test and nutritional analysis considering potentials for commercialization of production and technology utilization.

Finally, it is recommended that further studies and applications of root crops flour may be conducted in order to produce more varied food products as a source of livelihood.

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