

Physico-Chemical Property, Sensory Quality & Acceptability of Vacuum-Fried EVIARC Sweet Jackfruit (*Artocarpus heterophyllus* Lam.) Pulp as Influenced by Fruit Maturity and Other Fruit conditions

**Roberta D. Lauzon, Jennelyn F. Vinculado, Lorina A. Galvez,
Felix J. Amestoso and Dennis Antonio C. Varron**

Visayas State University, Visca, Baybay City, Philippines



Australian Government

Australian Centre for
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What is Jackfruit?



- Scientifically known as *Artocarpus heterophyllus* Lam.
- Locally known as “*Lanka*” or “*Nangka*”
- The fruit contains fair amount of important nutrient and vitamins.

Table 1. Nutritional composition of jackfruit.

Sr. No.	Composition	Young Fruit	Ripe Fruit	Seed
Source: Arkroyd and others (1966), Narasimham (1990), Gunasena & Others (1996), Azaad (2000)				
A. Proximate analysis				
1	Water (g)	76.2 to 85.2	72.0 to 94.0	51.0 to 64.5
2	Protein (g)	2.0 to 2.6	1.2 to 1.9	6.6 to 7.04
3	Fat (g)	0.1 to 0.6	0.1 to 0.4	0.40 to 0.43
4	Carbohydrate (g)	9.4 to 11.5	16.0 to 25.4	25.8 to 38.4
5	Fibre (g)	2.6 to 3.6	1.0 to 1.5	1.0 to 1.5
6	Total sugars (g)	-	20.6	-

Table 1. (continuation)

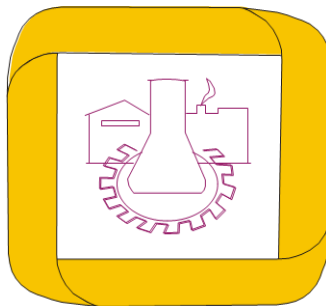
Sr. No.	Composition	Young Fruit	Ripe Fruit	Seed
B. Minerals and vitamins				
1	Total minerals (g)	0.9	0.87 to 0.9	0.9 to 1.2
2	Calcium (mg)	30.0 to 73.2	20.0	
3	Magnesium (mg)		27.00	54.0
4	Phosphorus (mg)	20.0 to 57.2	38.0 to 41.0	38.0 to 97.0
5	Potassium (mg)	287 to 323	191 to 407	246
6	Sodium (mg)	3.0 to 35.0	2.0 to 41.0	63.2
7	Iron (mg)	0.4 to 1.9	0.5 to 1.1	1.5

Table 1. (continuation)

Sr. No.	Composition	Young Fruit	Ripe Fruit	Seed
B. Minerals and vitamins				
8	Vitamin A (IU)	30	175 to 540	10 to 17
9	Thiamine (mg)	0.05 to 0.15	0.03 to 0.09	0.25
10	Riboflavin (mg)	0.05 to 0.2	0.05 to 0.4	0.11 to 0.3
11	Vitamin C (mg)	12.0 to 14.0	7.0 to 10.0	11.0



- Widely grown fruit crops in the Philippines
- One of the important crop of Eastern Visayas
- The fruit has great processing potentials



**Vacuum Fried
Jackfruit**

What is Vacuum Fried Jackfruit

- Processed from ripe jackfruit pulp**
- Crunchy and aromatic**
- Nutritious**
- All natural product**
- Highly acceptable among consumers**
- Potential export commodity**

Problems identified in vacuum fried jackfruit products

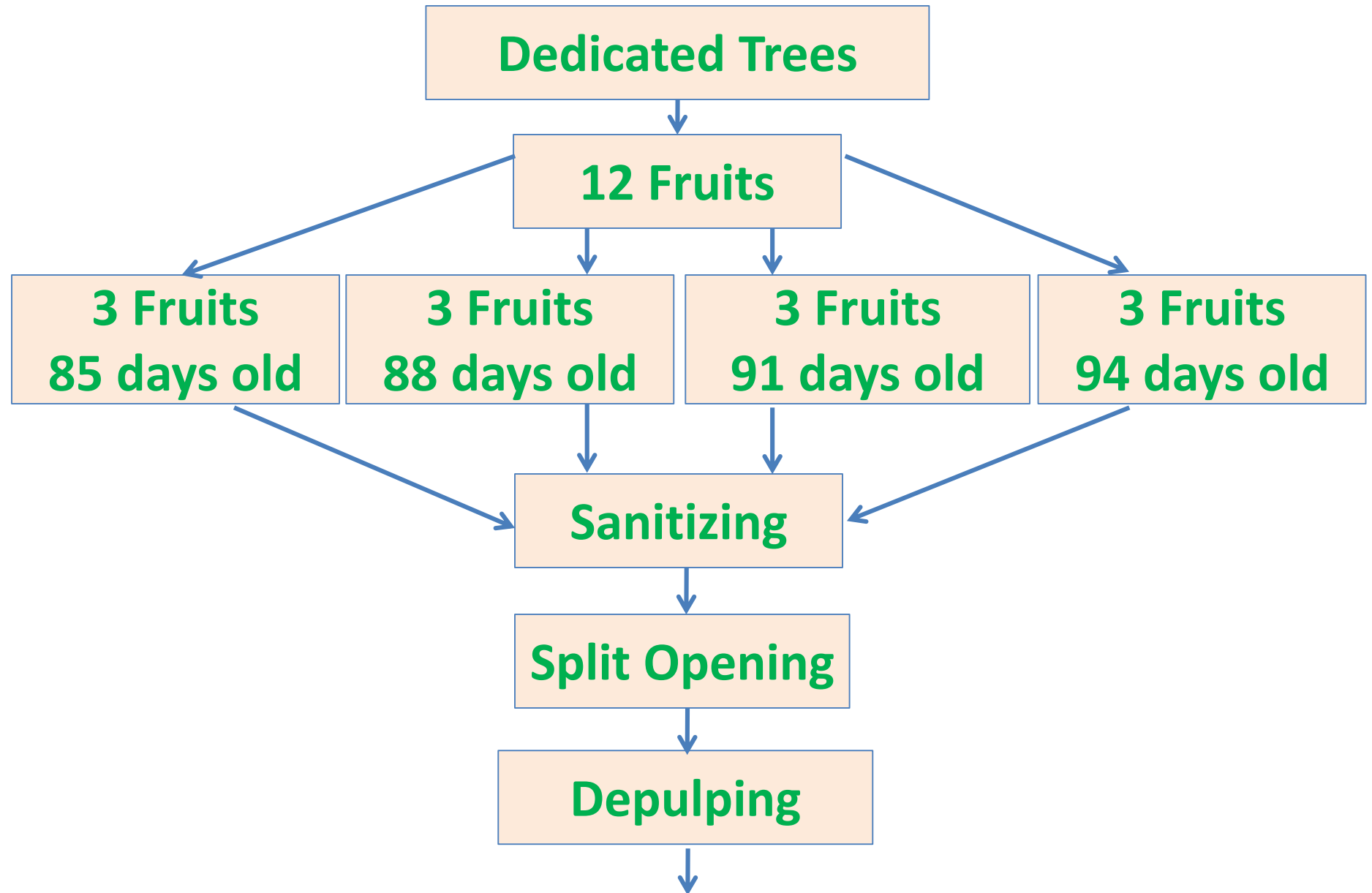
- Occasional browning of fried pulp**
- Non uniformity of sweetness**
- Less aromatic in some fried pulp**
- Softening of vacuum fried pulp**

Objectives of the Study

- To determine the right maturity of the pulp ideal for vacuum frying**
- Investigate other condition that influence the quality of vacuum fried jackfruit pulp**

Methodology

a) Effect of Maturity



Deseeding



**Steam
Blanching**



Freezing



**Vacuum
Frying**

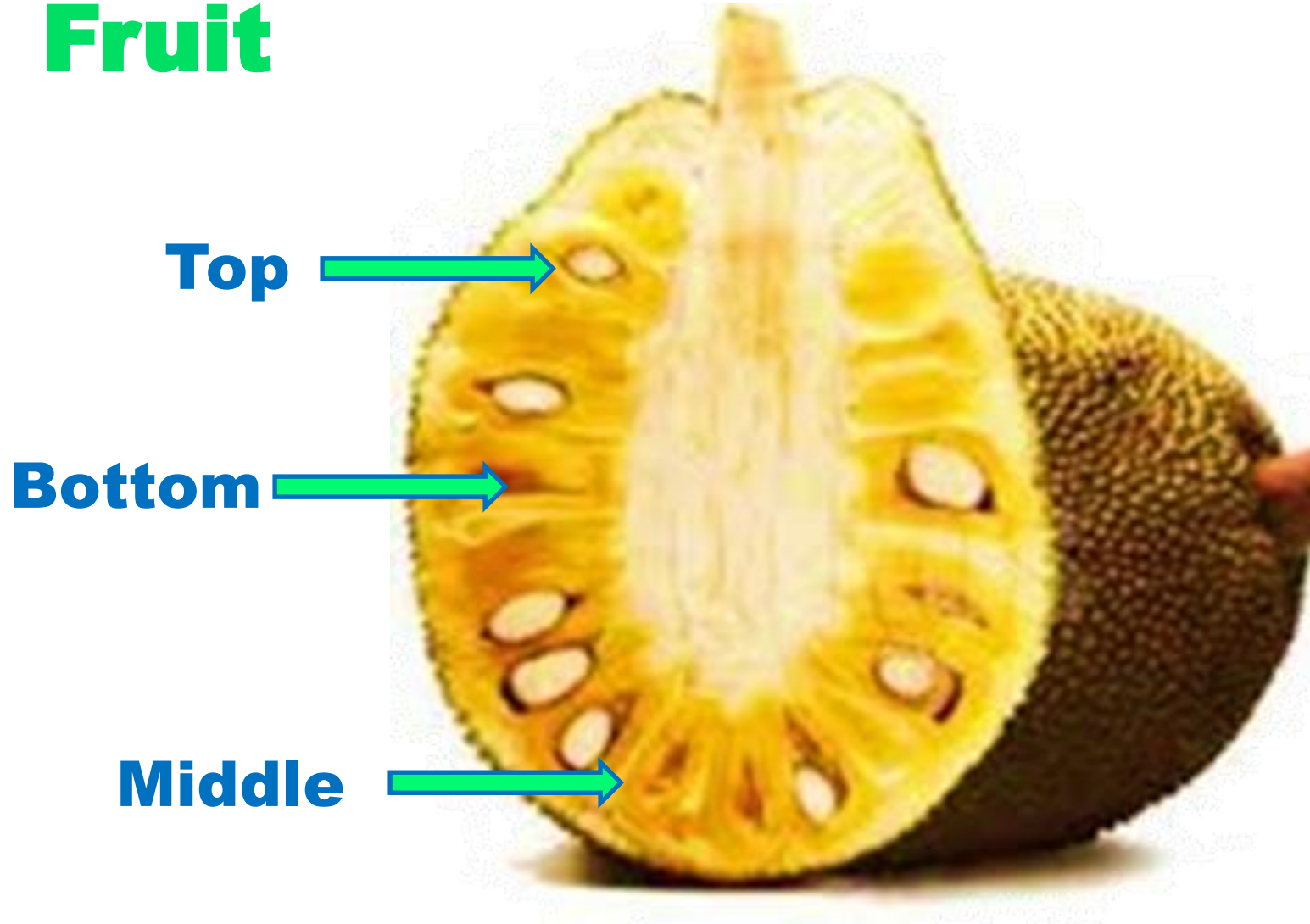


**Vacuum Fried
Jackfruit**

b) Effect of Fruit Location on Tree



c) Effect of Pulp Location in Fruit



d) Effect of Pulp Size

small

Big

Bigger



e) Effect of Thickness



Methodology.....

- *Vacuum fried pulp preparation

- *Product quality evaluation

 - sensory evaluation

 - consumer evaluation

Highlights of Results

a) Effect of maturity

Table 2. Physico-chemical properties of fresh jackfruit pulp as influenced by fruit maturity.

Maturity Days	Moisture Content**	Pectin*	pH*	TTA** (% AA)	TSS** (°B)
85	5.89 d	3.63 a	4.4 c	0.0596 d	16.93 d
88	6.63 c	2.67 b	4.9 b	0.1357 c	33.88 a
91	8.60 b	2.66 b	5.0 b	0.1603 b	30.33 b
94	12.82 a	2.62 c	5.3 a	0.2334 a	27.35 c

* - significant

** - highly significant

Table 3. Quality description of vacuum-fried pulp from EVIARC sweet jackfruit variety as influenced by fruit maturity.

Treatment	Days	Color	Aroma	Taste	Texture	Oiliness
1	85	Light yellow to dark yellow	Slightly perceptible jackfruit aroma	Slightly sweet	Very crispy	Not oily
2	88	Light yellow to dark yellow	Very perceptible jackfruit aroma	Moderately sweet	Very crispy	Not oily to slightly oily
3	91	Golden yellow to brownish yellow	Very perceptible jackfruit aroma	Moderately sweet	Very crispy	Not oily to slightly oily
4	94	Golden yellow to brownish yellow	Very perceptible jackfruit aroma	Moderately sweet	Very crispy	Not oily to slightly oily

Table 4. Mean¹ acceptability ratings² of the sensory attributes of vacuum-fried jackfruit pulp from EVIARC sweet jackfruit variety as influenced by fruit maturity.

Treatment	Days	Color**	Aroma**	Taste**	Texture ^{ns}	Oiliness**	Gen. Acc.
1	85	8.05	7.00	6.39	7.80	7.44	7.27
2	88	7.77	8.05	8.14	7.85	7.06	8.11
3	91	5.94	7.52	7.83	7.47	6.66	7.21
4	94	4.91	6.71	6.82	7.38	6.14	6.16

¹N = 24 * - significant ** - highly significant ns – not significant

² Range of scores

- 9 – like extremely

8 – like very much

7 – like moderately

6 – like slightly

5 – neither like nor dislike
- 4 – dislike slightly

3 – dislike moderately

2 – dislike very much

1 – dislike very much

Table 5. Consumers* acceptability towards vacuum-fried pulp from 88 days fruit compared with the existing product.

Sample	Consumers Response			
	Like	Dislike	No Comment	Total
Sample A	99	-	1	100
Sample B	92	2	6	100

* Students, faculty and staff of VSU, guest of the university

b) Effect of Fruit Location on Tree

Table 6. Physico-chemical properties of pulp as influenced by fruit location on tree.

Fruit Location	pH**	TSS** (°B)	TTA** (%)	Thickness^{ns} (mm)
Top	3.96 b	31.0 a	0.57 a	3.12
Middle	4.11 b	26.4 b	0.44 b	3.02
Lower	4.80 a	27.0 b	0.26 c	3.40

Table 7. Mean¹ acceptability ratings² of vacuum fried jackfruit as influenced by the location of fruit on tree.

Fruit Location	Sensory Attributes ^{ns}					
	Color	Aroma	Taste	Texture	Oiliness	Gen. Acc.
Top	7.20	7.13	7.90 a	7.10	7.50	7.8
Middle	7.18	7.10	7.67 b	7.13	7.54	7.7
Lower	7.10	7.11	7.60 b	7.09	7.50	7.7

¹ N = 24

² Range of scores:

- 9 – like extremely
- 8 – like very much
- 7 – like moderately
- 6 – like slightly
- 5 – neither like nor dislike

- 4 – dislike slightly
- 3 – dislike moderately
- 2 – dislike very much
- 1 – dislike extremely

Table 8. Consumers¹ acceptability toward vacuum-fried pulp from fruit located at the top, middle and lower portion of tree.

Sample	Consumers Response		
	Like	Dislike	No Comment
A (Top)	97	-	3
B (Middle)	96	-	4
C (Lower)	93	-	7
D (Control)	90	-	10

¹ N = 100 consumers from students, faculty, staff and employees of VSU.

c) Effect of Pulp Location on Tree

Table 9. pH, TSS, TTA and thickness of pulp as influenced by their locations in fruit.

Pulp Location	pH*	TSS* (°B)	TTA (%)	Thickness* (mm)
Upper	4.22 b	24.41 b	0.68	3.02 b
Middle	4.47 a	24.03 b	0.56	4.00 a
Lower	4.45 a	26.95 a	0.65	3.56 b

Table 10. Mean¹ acceptability ratings² of vacuum fried pulp as influenced by the location of pulp in the fruit.

Pulp Location	Sensory Attributes					
	Color ^{ns}	Aroma ^{ns}	Taste	Texture ^{ns}	Oiliness ^{ns}	Gen. Acc. ^{ns}
Upper (top)	7.30	7.50	7.81 a	7.15	7.57	7.60
Middle (center)	7.28	7.19	7.35 b	7.14	7.60	7.61
Lower (lower)	7.25	7.17	7.00 c	7.10	7.55	7.61

¹ N = 24

² Range of scores:

- 9 – like extremely
- 8 – like very much
- 7 – like moderately
- 6 – like slightly
- 5 – neither like nor dislike

- 4 – dislike slightly
- 3 – dislike moderately
- 2 – dislike very much
- 1 – dislike extremely

Table 11. Consumers¹ acceptability towards vacuum fried pulp taken from different locations in the fruit.

Sample/Pulp Location	Consumer Response		
	Like	Dislike	No Comment
A (upper/top)	97	-	3
B (middle)	98	-	2
C (bottom/lower)	98	-	2
D (control)	96	-	4

¹N = 100 consumer composed of students, staff and faculty of VSU.

Table 12. Quality description of vacuum-fried jackfruit as influenced by the thickness of pulp used.

Pulp Thickness	Sensory Attributes				
	Color	Aroma	Taste	Texture	Oiliness
Thin	Brownish yellow	Perceptible jackfruit aroma	Sweet	Very crispy	Slightly oily
Thick	Golden yellow to brownish yellow	Perceptible jackfruit aroma	Moderately sweet	Crispy to very crispy	Moderately oily
Thicker	Brownish yellow	Perceptible jackfruit Aroma	Sweet	Crispy	Slightly oily

Table 13. Mean¹ acceptability ratings² of the sensory attributes of vacuum-fried jackfruit as influenced by pulp thickness.

Thickness	Sensory Attributes ^{ns}				
	Color	Aroma	Taste	Texture	Oiliness
Thin	7.40	7.38	7.50	7.47	7.78
Thick	7.38	7.58	7.68	7.38	7.75
Thicker	7.63	7.63	7.63	7.45	7.35

¹N = 32

²Range of scores:

- | | |
|------------------------------|------------------------|
| 9 – like extremely | 4 – dislike slightly |
| 8 – like very much | 3 – dislike moderately |
| 7 – like moderately | 2 – dislike very much |
| 6 – like slightly | 1 – dislike extremely |
| 5 – neither like nor dislike | |

Table 14. Consumers¹ acceptability towards vacuum-fried jackfruit as influenced by pulp thickness.

Samples	Consumer Response (%)		
	Like	Dislike	No Comment
Thin (A)	90	-	10
Thick (B)	93	-	7
Thicker (C)	96	-	4
Control (D)	92	-	8

¹N = 100 respondents composed of students, faculty, staff and guests of VSU

d) Effect of Pulp Size

Table 15. Quality description of the sensory attributes of vacuum-fried pulp as influenced by fruit pulp size.

Pulp Size	Sensory Attributes				
	Color	Aroma	Taste	Texture	Oiliness
Small	Brownish yellow to brownish	Perceptible jackfruit aroma	Sweet	Crispy	Slightly oily
Medium	Brownish yellow	Perceptible jackfruit aroma	Sweet	Very crispy	Slightly oily
Large	Golden yellow	Perceptible jackfruit aroma	Bland	Crispy	Slightly oily

Table 16. Mean¹ acceptability ratings² of the sensory attributes of vacuum-fried jackfruit as influenced by pulp size.

Pulp Size	Sensory Attributes ^{ns}					
	Color	Aroma	Taste	Texture	Oiliness	Gen. Acc.
Small	7.40	7.73	7.67 a	7.77	7.57	7.57
Medium	7.28	7.68	7.50 a	7.87	7.67	7.55
Large	7.78	7.58	6.60 b	7.80	7.65	7.17

¹N = 32

ns = not significant

* - highly significant at $p \leq 0.005$

²Range of scores:

- 9 – like extremely

8 – like very much

7 – like moderately

6 – like slightly

5 – neither like nor dislike
- 4 – dislike slightly

3 – dislike moderately

2 – dislike very much

1 – dislike extremely

Table 17. Consumers¹ acceptability towards vacuum-fried jackfruit pulp as influenced by pulp size.

Sample	Consumers Response		
	Like	Dislike	No Comment
Small	98	-	2
Medium	95	-	5
Large	92	-	8
Control	89	-	11

¹N = 100 respondents composed of students, faculty, staff and guests of VSU

Conclusion

- **Maturity is more critical in relation to sensory attributes of the vacuum-fried jackfruit**
- **Other fruit condition has significant influence on pH, TSS and TA but the product is still acceptable among sensory panelists and consumers as well.**
- **88 days after fruit bagging is the best maturity period suitable for the production of vacuum fried jackfruit pulp.**

Acknowledgement

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Thank you

And

Good day !