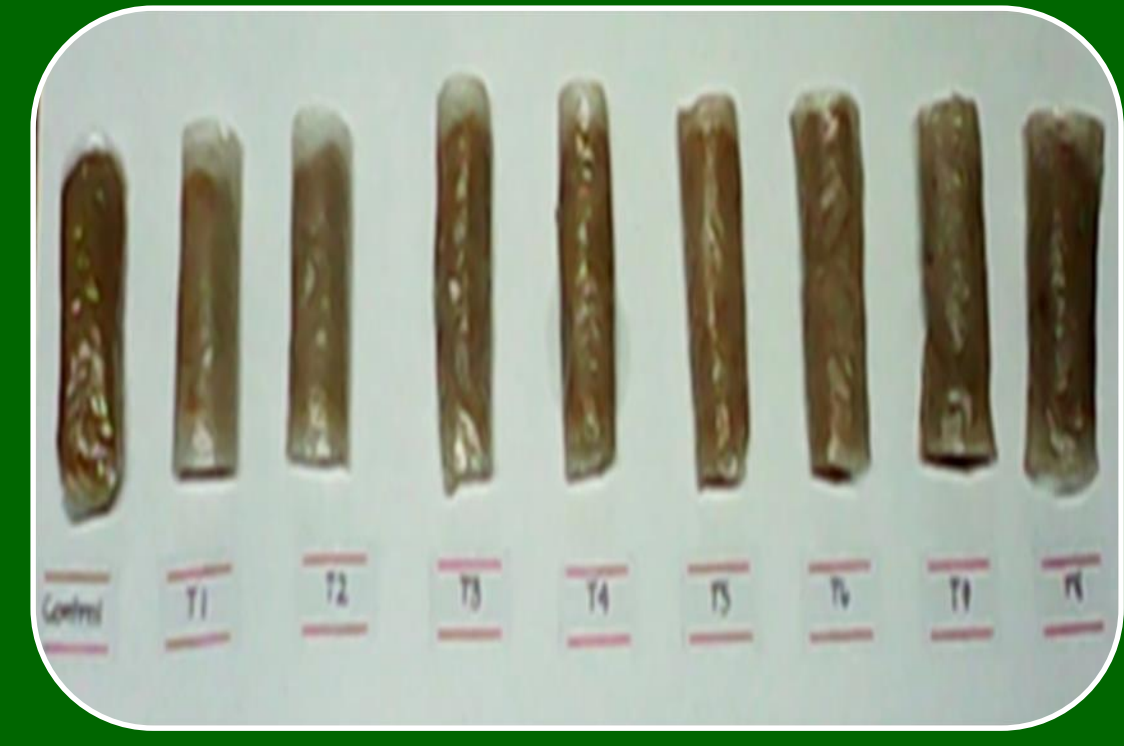


DEVELOPMENT AND EVALUATION OF DURIAN (*Durio zibethinus*) SEED FLOUR BASED EDIBLE FILM FOR FOOD APPLICATION

MYLENE A. ANWAR*¹ and TRACY R. BALTAZAR¹

¹Department of Food Science, College of Human Ecology, Central Mindanao University,
University Town, Musuan, Maramag 8710, Bukidnon, Philippines

E-mail address: myleneanwar0503@gmail.com





• **Waste
Materials**

**FOOD
TECHNOLOGISTS**

• **Product
Development**

• **Multi-purpose
and High-value
products**



OBJECTIVES

This study was conducted to develop edible film utilizing durian seeds.

Specifically, this study was conducted to:

1. identify the variables that significantly affect the quality of the edible film;
2. assess the edible film's physical properties (film thickness, pliability and transparency);
3. evaluate the level of acceptability through sensory evaluation based on product's color, aroma, texture, pliability, taste, and general acceptability.

MATERIALS AND METHODS

1. Procurement of Raw Materials



2. Durian Seed Flour (DSF) Production



3. Edible Film Production



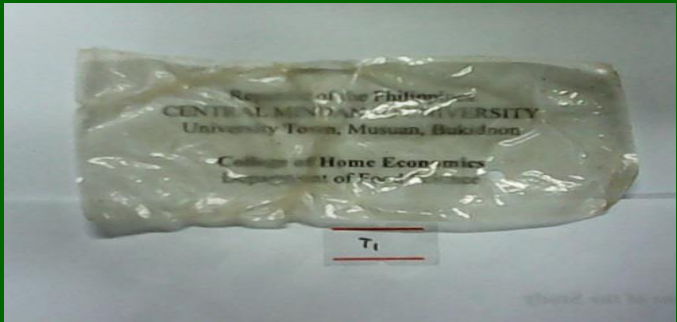
4. Variable Screening

Table 3. Plackett-Burman design matrix (7 variables – 8 run)

Run	V1	V2	V3	V4	V5	V6	V7
1	White	30g	4g	2g	200 ml	3 mins	1
2	White	30g	2g	4g	150 ml	3 mins	2
3	White	20g	4g	2g	150 ml	5 mins	2
4	Brown	30g	2g	2g	200 ml	5 mins	2
5	White	20g	2g	4g	200 ml	5 mins	1
6	Brown	20g	4g	4g	200 ml	3 mins	2
7	Brown	30g	4g	4g	150 ml	5 mins	1
8	Brown	20g	2g	2g	150 ml	3 mins	1

White – w/o inner seed coat Brown – w/ inner seed coat

5. Tests for Physical Properties



6. Sensory Evaluation

7. Statistical Analysis



8. Application

Application



RESULTS

1. Variable Screening

Table 5. Statistical analysis of Plackett-Burman design of each variables affecting sensory acceptability of edible films

Variables	Effect Estimates		
	Color	Aroma	Texture
Mean/Interc.	6.1125**	6.3917**	5.9625**
Durian Seed Flour Type	-1.1417**	-0.0333 ^{ns}	-0.2250 ^{ns}
Durian Seed Flour Level	0.0167 ^{ns}	-0.1833 ^{ns}	-0.3167 ^{ns}
Cassava Starch	0.0833 ^{ns}	0.0333 ^{ns}	0.0250 ^{ns}
Carrageenan	-0.6000*	-0.0500 ^{ns}	-0.0500 ^{ns}
Distilled Water	-0.0750 ^{ns}	0.0850 ^{ns}	0.1750 ^{ns}
Steaming Time	-0.2333 ^{ns}	-0.0333 ^{ns}	-0.0833 ^{ns}

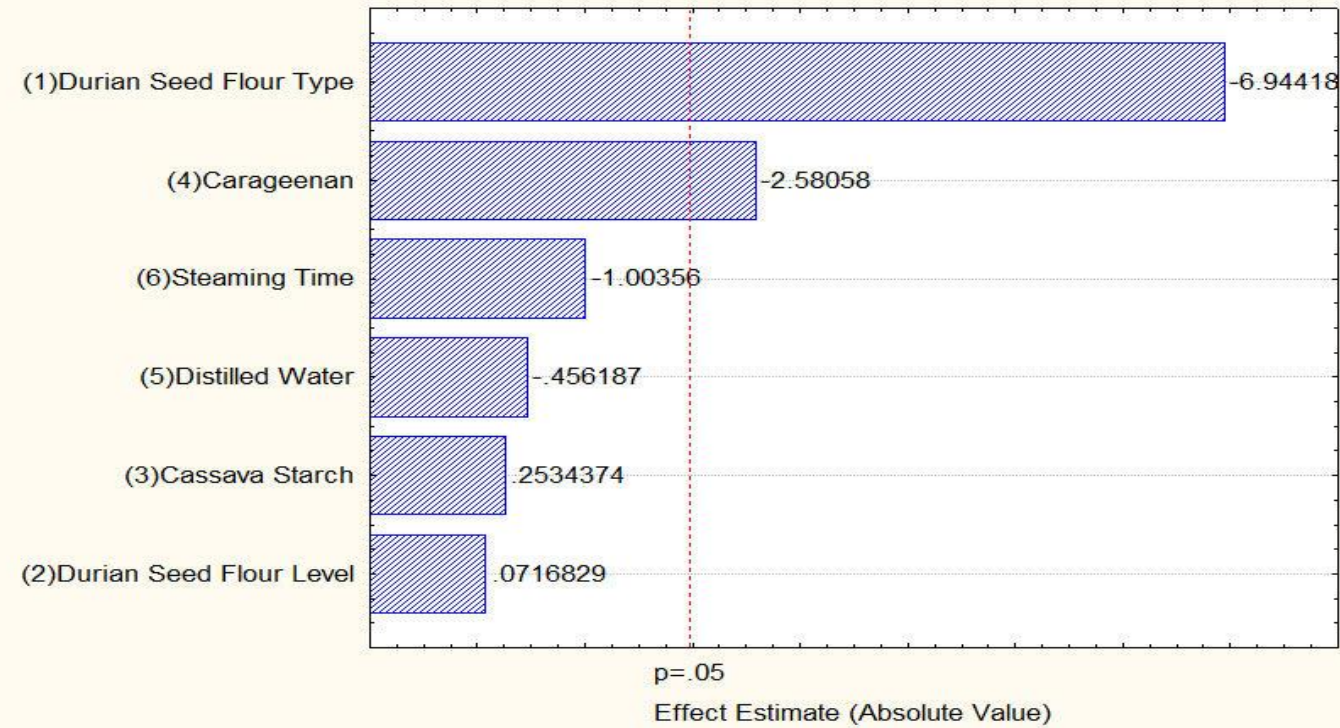
	Effect Estimates		
	Pliability	Taste	Gen. Acceptability
Mean/Interc.	5.8916**	6.3500**	6.5292**
Durian Seed Flour Type	-0.1833 ^{ns}	-0.0500 ^{ns}	-0.1583 ^{ns}
Durian Seed Flour Level	-0.6666*	-0.1000 ^{ns}	-0.4167**
Cassava Starch	0.2333 ^{ns}	0.0667 ^{ns}	0.2500 ^{ns}
Carrageenan	-0.0333 ^{ns}	-0.1500 ^{ns}	-0.2500 ^{ns}
Distilled Water	0.2500 ^{ns}	0.0167 ^{ns}	0.0750 ^{ns}
Steaming Time	-0.1000 ^{ns}	0.0167 ^{ns}	0.0833 ^{ns}

*significant (p<0.05)

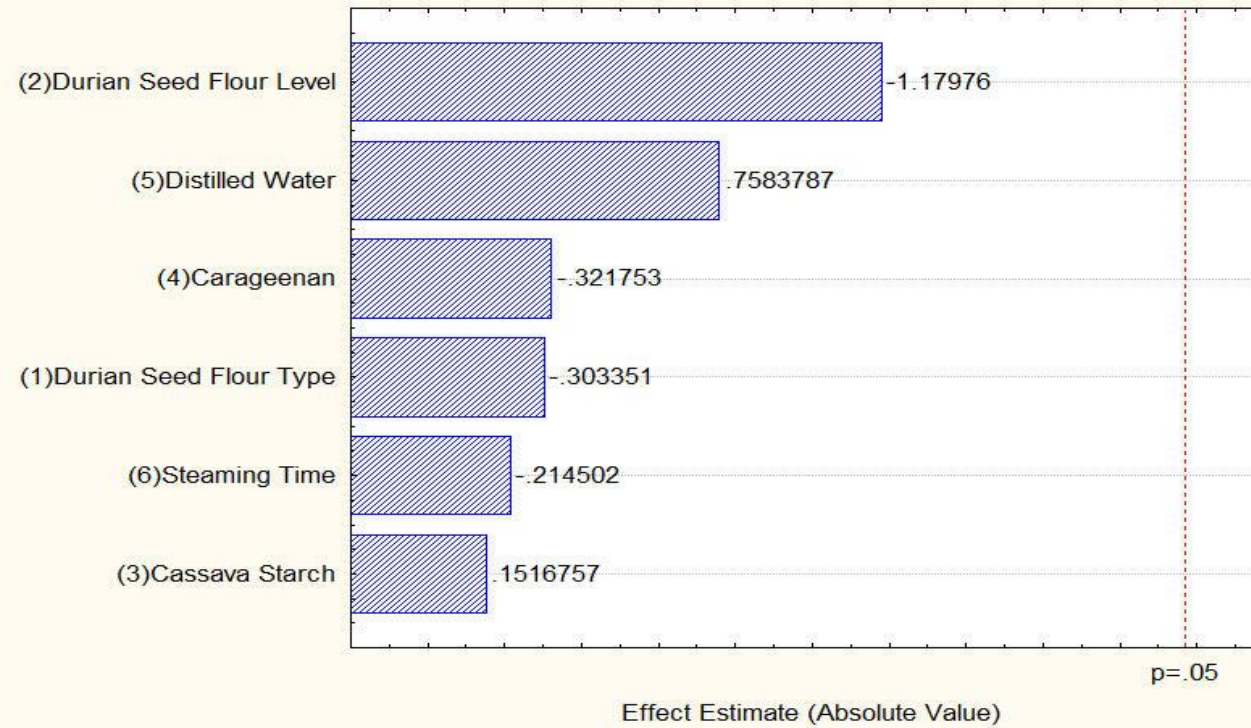
**significant (p<0.01)

^{ns} not significant

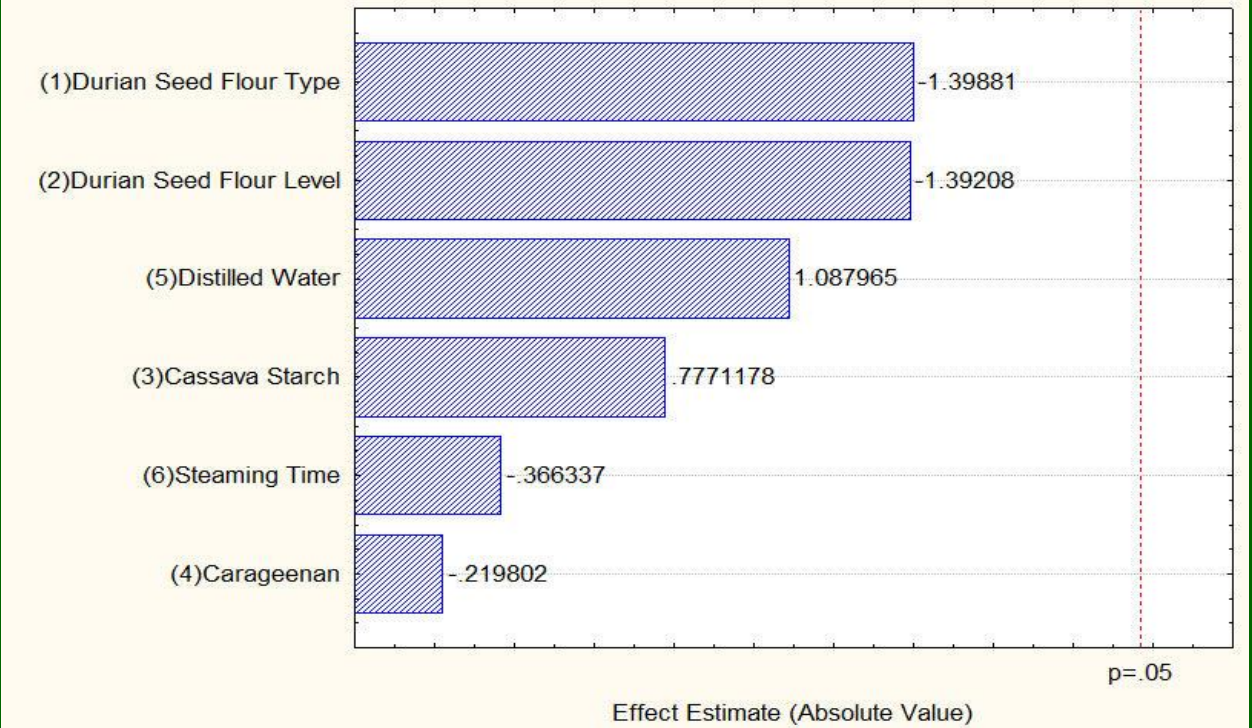
Pareto Chart of Standardized Effects; Variable: Color
7 Factor Screening Design; MS Residual=1.621763
DV: Color



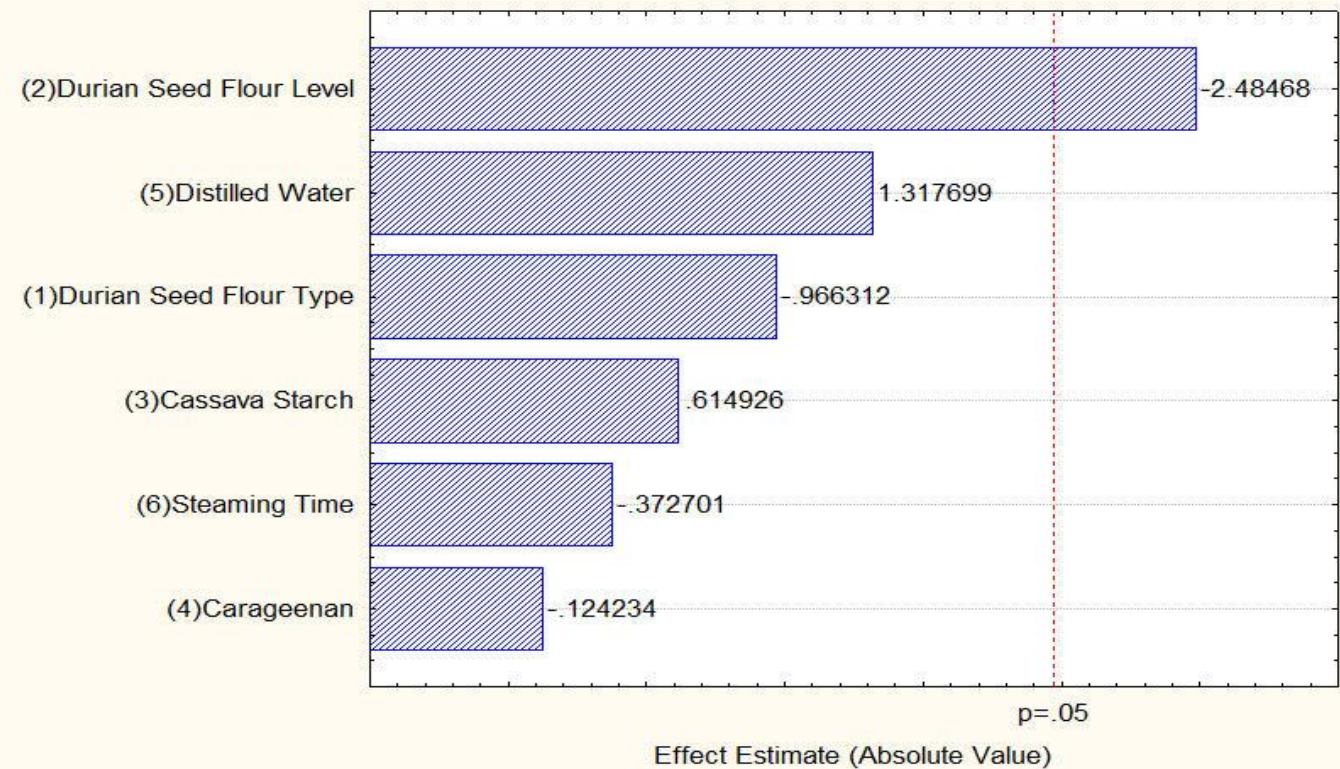
Pareto Chart of Standardized Effects; Variable: Aroma
7 Factor Screening Design; MS Residual=.7244635
DV: Aroma



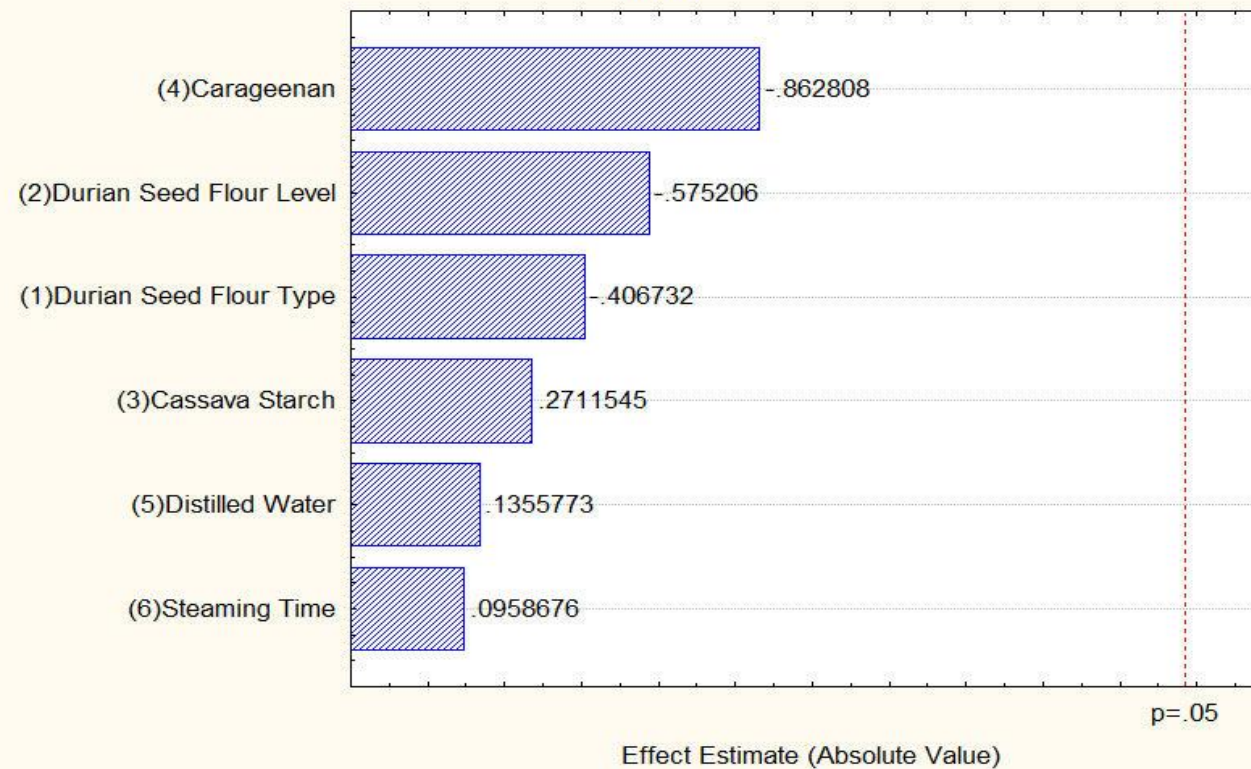
Pareto Chart of Standardized Effects; Variable: Texture
7 Factor Screening Design; MS Residual=1.552378
DV: Texture



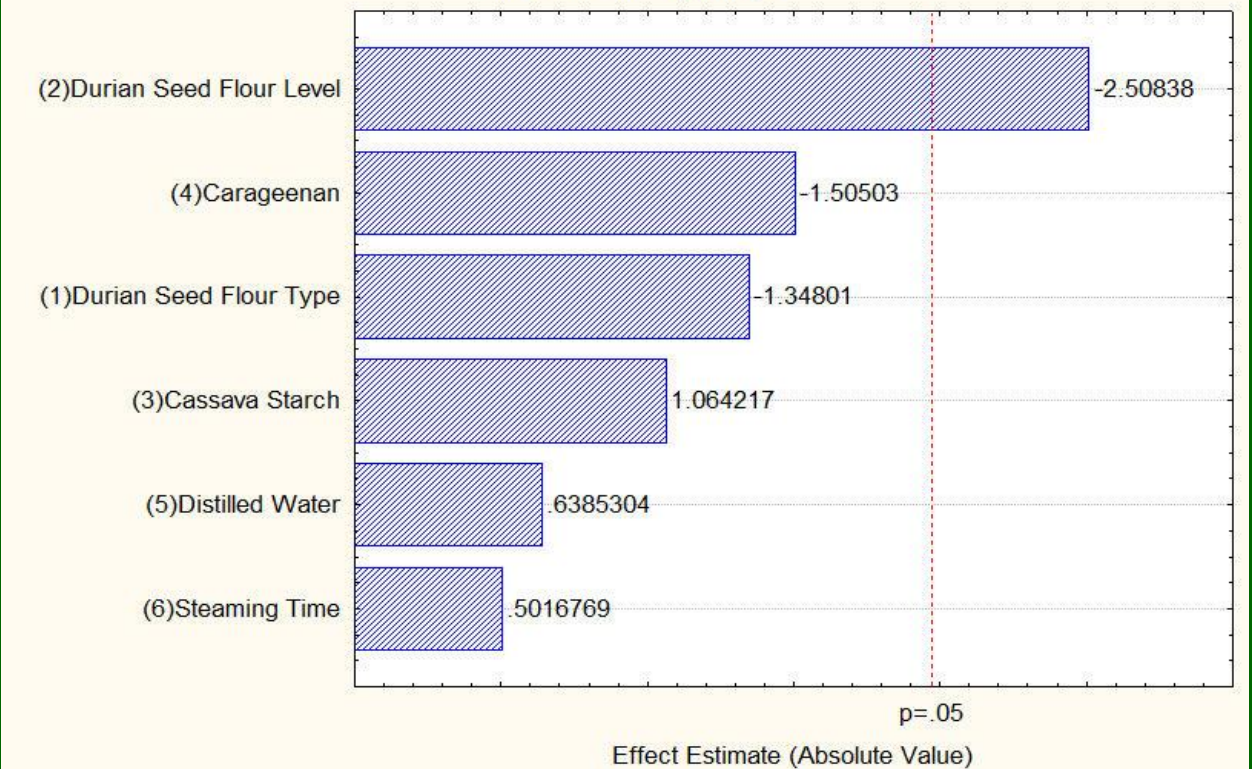
Pareto Chart of Standardized Effects; Variable: Pliability
7 Factor Screening Design; MS Residual=2.159728
DV: Pliability



Pareto Chart of Standardized Effects; Variable: Taste
7 Factor Screening Design; MS Residual=.9067239
DV: Taste



Pareto Chart of Standardized Effects; Variable: General Acceptability
7 Factor Screening Design; MS Residual=.8277718
DV: General Acceptability



2. Physical Properties

Table 4. Physical properties of edible films

Treatment	Average Film Thickness (mm)	Folding Test ¹	Transparency Test ²
T1	0.13	-	+
T2	0.14	-	+
T3	0.13	-	+
T4	0.15	+	-
T5	0.14	+	+
T6	0.12	-	+
T7	0.15	+	-
T8	0.12	-	+

¹ Positive (+) denote presence of cracks/ mechanical damages when folded

¹ Negative (-) denotes absence of cracks/ mechanical damages when folded

² Positive (+) denotes high text clarity and readability

² Negative (-) denotes low text clarity and readability

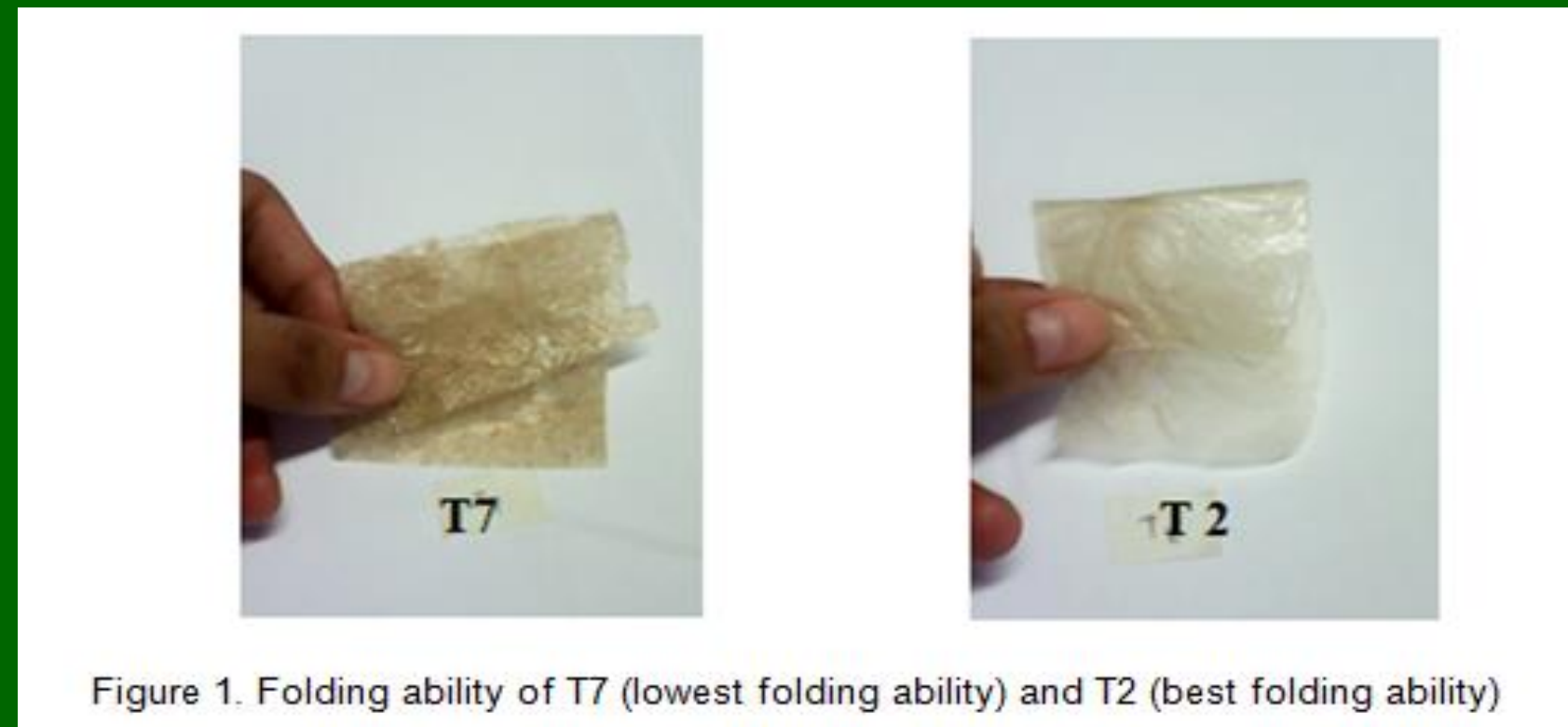


Figure 1. Folding ability of T7 (lowest folding ability) and T2 (best folding ability)

3. Sensory Acceptability of Edible Films

Table 6. Mean acceptability ratings based on 9-point Hedonic scale						
Treatment	Color	Aroma	Texture	Pliability	Taste	General Acceptability
T1	7.03	6.37	6.03	5.83	6.40	6.57
T2	6.67	6.33	6.13	5.80	6.30	6.40
T3	6.93	6.50	6.17	6.17	6.50	6.90
T4	5.73	6.37	5.80	5.57	6.37	6.40
T5	6.10	6.40	5.97	6.13	6.30	6.57
T6	5.43	6.57	6.40	6.53	6.37	6.73
T7	5.13	6.17	5.50	5.30	6.20	6.17
T8	5.87	6.40	5.70	5.83	6.37	6.50

SUMMARY OF FINDINGS

1. DSF type, DSF level and level of carrageenan significantly ($p < 0.05$) affect the sensory acceptability of the edible film.

(DSF type and carrageenan negatively affects the film's color acceptability. Film pliability and general acceptability is also negatively affected by the level of DSF).

2. Film thickness ranges from 0.12 to 0.15 millimeters.

(High film thickness decreases film pliability indicated by a positive result in folding test. On the other hand, low film thickness increase film pliability).

The transparency range from slightly clear to opaque.

(Result of transparency test indicates that, incorporation of durian inner seed coat in DSF production decreases film transparency).

3. Sensory acceptability for edible film's color, aroma, texture, pliability, taste and general acceptability ranges from 5.13- 7.03, 6.17- 6.57, 5.50- 6.40- 5.30- 6.53, 6.20- 6.50 and 6.17- 6.90, respectively.

Conclusion

Based on the result of the study, it can be concluded that durian seed flour is a potential material for edible film production useful for food application.

Implications

- ✓ Healthy alternative to existing food wrappers in the market.
- ✓ Maximizes the use of locally available and commonly wasted raw materials.
- ✓ Offers new opportunity to local farmers and food processors.
- ✓ Reduce wastes

Acknowledgement

Durian seeds provided by the Local Durian vendors in Valencia City, Bukidnon are greatly appreciated and acknowledged.



THANK YOU!

