

Security in  
food,  
renewable  
resources,  
and  
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(UNAND)



# Certificate

No.38/PL25/PT.01.06/2019

This is to certify that

**Rini**

has contributed on The 3<sup>rd</sup> International Conference on Security in Food, Renewable resources, and Natural Medicines 2019 (SFRN 2019)" as

**Oral Presenter**

Reg.No. O-054/UA/PLT/IC-SFRN 2019

Held on 25- 26 September 2019, at Gedung Serba Guna— ( GSG ) Politeknik Pertanian  
Negeri Payakumbuh  
West Sumatra, Indonesia



Director of Payakumbuh State  
Polytechnic of Agriculture

( Ir. Elvin Hasman, MP )


Conference Chair  
SFRN 2019

( Fithra Herdian, STP,MP )

Keynote & Invited Speaker from,



**“The Effect of Comparison “Kolang-kaling” (*Arenga pinata* Merr.) and Tamarillo Fruit (*Solanum betaceum* Cav.) on the Characteristic of Slices Jam**



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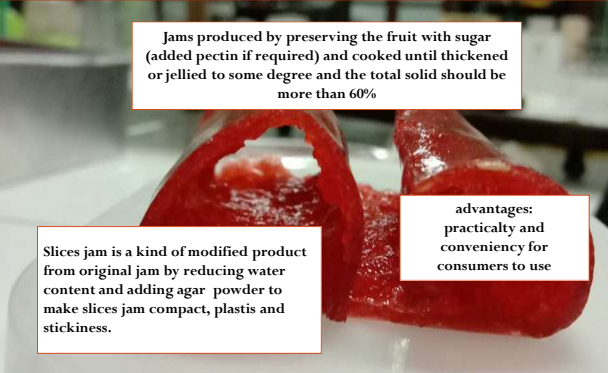
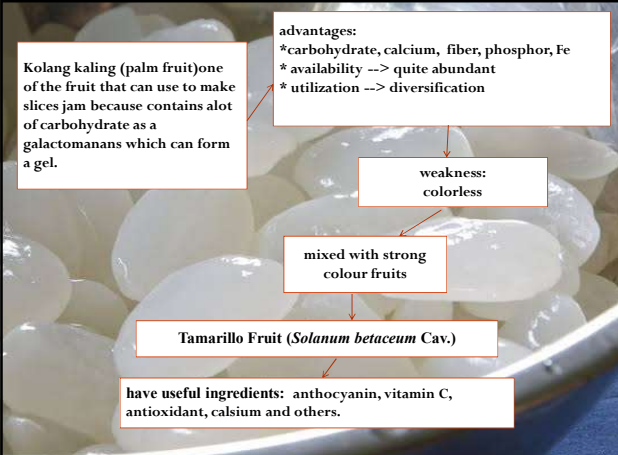
Paper prepare for “The 3rd International Conferences on Security in food ,  
 Renewable Resources and Natural Medicine 2019”  
 STATE AGRICULTURE POLITEKNIK PAYAKUMBUH  
 25 – 26 September 2019

### Introduction

Jams produced by preserving the fruit with sugar (added pectin if required) and cooked until thickened or jellied to some degree and the total solid should be more than 60%

advantages: practicalty and conveniency for consumers to use

Slices jam is a kind of modified product from original jam by reducing water content and adding agar powder to make slices jam compact, plastis and stickiness.

Kolang kaling (palm fruit)one of the fruit that can use to make slices jam because contains alot of carbohydrate as a galactomanans which can form a gel.

advantages:  
 \*carbohydrate, calcium, fiber, phosphor, Fe  
 \* availability --> quite abundant  
 \* utilization --> diversification

weakness:  
 colorless

mixed with strong colour fruits

Tamarillo Fruit (*Solanum betaceum* Cav.)


have useful ingredients: anthocyanin, vitamin C, antioxidant, calsium and others.

### research purpose

1. To determine the effect of comparison kolang-kaling” (*Arenga pinata* Merr.) and tamarillo fruit (*Solanum betaceum* Cav.) on Characteristic of Slices Jam
2. To know the best characteristic slices jam from mixing between kolang-kaling (palm fruit) and tamarillo fruit

### benefit of the research

To increase the added value of kolang kaling and tamarillo fruit  
 To increase food diversification product as a slices jams



### Material and Methode

**time and places of the research**

- ✓ time : Mei– Juli 2019
- ✓ places :
  1. Laboratorium of Technology and agriculture product engineering process
  2. Laboratorium of Biochemical of agricultural products and food nutrition faculty of Agricultural Technology, Andalas University

### Material and Methode

**materials and tools**

- ✓ Materials : kolang-kaling, tamarillo, sugar, citric acid, agar powder, aquadest, asetic acid, HCl, AgNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, KMnO<sub>4</sub>, 0,01 N, NaOH, K<sub>2</sub>SO<sub>4</sub> 10%, alkohol 95%, CaCl<sub>2</sub> 1 N, metanol, DPPH and others
- ✓ Tools : blender, stove, pH meter, erlenmeyer, filter Whattman, lakmus, refractometer, spectrophotometer UV-VIS and others

**research metode**

This study used a completely randomized design (CRD) with 5 treatments and 3 repetitions. Data were analyzed by analysis of variance (ANOVA), followed by Duncan's New Multiple Ranged Test (DNMRT) at the 5% significance level.

### Research Methode

Treatments:

- A = kolang-kaling 80% : tamarillo 20%
- B = kolang-kaling 75% : tamarillo 25%
- C = kolang-kaling 70% : tamarillo 30%
- D = kolang-kaling 65% : tamarillo 35%
- E = kolang-kaling 60% : tamarillo 40%

The formulation of slices jam from kolang kaling and tamarillo fruit

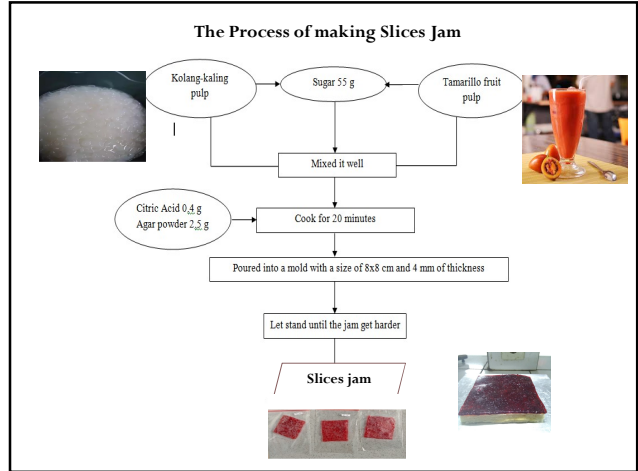
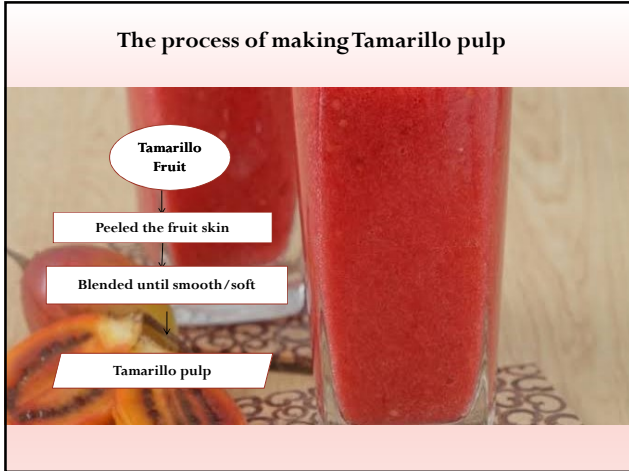
Components (g)	Treatments				
	A	B	C	D	E
Kolang-kaling	80	75	70	65	60
Tamarillo fruit	20	25	30	35	40
Sugar	55	55	55	55	55
Citric acid	0,4	0,4	0,4	0,4	0,4
Agar powder	2,5	2,5	2,5	2,5	2,5

### Research Implementation

The process of making Kolang-kaling pulp

```

    graph TD
      A(Kolang-kaling) --> B[Washed with clean water]
      B --> C[Mashed it with blender until smooth]
      C --> D(Kolang-kaling pulp)
      E[Water ; kolang-kaling 1:3] --- C
    
```



### The observation


<p><b>Chemical Properties Test</b></p> <ul style="list-style-type: none"> <li>• Moisture content</li> <li>• Ash content</li> <li>• pH</li> <li>• Total soluble solid</li> <li>• Total sugar</li> <li>• Crude fiber</li> <li>• Anthocyanin content</li> <li>• Antioxidant</li> </ul> <p><b>Physical Properties Test</b></p> <ul style="list-style-type: none"> <li>• Fold test</li> </ul> <p><b>Organoleptic acceptance</b></p>
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### Result and Discussion

#### Analysis of Raw materials

Analysis	Kolang-kaling ± SD	Tamarillo Fruit ± SD
Moisture content (%)	95,42% ± 3,53	83,21% ± 2,51
Ash content (%)	0,24% ± 0,42	1,36% ± 0,36
Crude fiber (%)	1,92% ± 2,12	4,83% ± 2,35
pH	5,53 ± 0,21	3,51 ± 0,27


**sensory analysis**



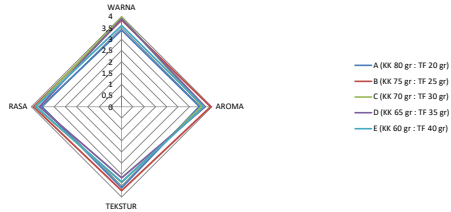
**colour, aroma, taste and texture**

The Treatment	Colour ± SD	Aroma ± SD	Taste ± SD	Texture ± SD
A (KK 80 g : TF 20 g)	3,40 ± 0,55	3,44 ± 0,82	3,56 ± 0,76	3,60 ± 0,86
B (KK 75 g : TF 25 g)	3,94 ± 0,57	3,60 ± 0,76	3,90 ± 0,88	3,72 ± 0,97
C (KK 70 g : TF 30 g)	3,96 ± 0,43	3,56 ± 0,71	3,82 ± 0,57	3,36 ± 0,86
D (KK 65 g : TF 35 g)	3,90 ± 0,45	3,70 ± 0,70	3,64 ± 0,90	3,16 ± 0,85
E (KK 60 g : TF 40 g)	3,60 ± 0,65	3,64 ± 0,70	3,80 ± 0,86	3,34 ± 0,81

5 point hedonic scale  
 1- dislike extremely  
 2- dislike slightly  
 3- neither like nor dislike  
 4- like slightly  
 5- like extremely



**Organoleptic Radar**



Based on the Organoleptic Radar, the best treatment by panelist was B with the comparison kolang-kaling and tamarillo fruit 75 : 25 with score value for colour 3,94 (like), aroma 3,60 (like), texture 3,72 (like), taste 3,90 (like).


**Physical Properties Test**

**Fold test**

The treatment	Fold test ± SD
A (KK 80 g : TF 20 g)	3,66 ± 0,57 a
B (KK 75 g : TF 25 g)	3,33 ± 0,57 a b
C (KK 70 g : TF 30 g)	3,00 ± 0 b c
D (KK 65 g : TF 35 g)	2,00 ± 0 c d
E (KK 60 g : TF 40 g)	2,00 ± 0 d

KK = 20,50

The more Kolang-kaling was used, the folding ability was pretty good and the texture of slices jam also more compact and elastic, and if more tamarillo fruit was used, the slices jam not compact enough and the decreased the elasticity.



**Chemical Properties Test**

**1. Moisture content**

The treatment	Moisture content % ± SD
A (KK 80 g : TF 20 g)	31,40 ± 0,26 a
B (KK 75 g : TF 25 g)	29,43 ± 0,61 b
C (KK 70 g : TF 30 g)	28,43 ± 1,76 c
D (KK 65 g : TF 35 g)	24,60 ± 1,91 d
E (KK 60 g : TF 40 g)	22,00 ± 0,91 e

KK = 5,89

The moisture content was related with the ratio of kolang-kaling added. The more addition of kolang-kaling, the moisture content in the slices jam also increased

## Chemical Properties Test

### 2. Ash content

The treatment	Ash content % ± SD
A (KK 80 g : TF 20 g)	0,19 ± 0,005 a
B (KK 75 g : TF 25 g)	0,21 ± 0,005 b
C (KK 70 g : TF 30 g)	0,23 ± 0,005 c
D (KK 65 g : TF 35 g)	0,29 ± 0,010 d
E (KK 60 g : TF 40 g)	0,37 ± 0,010 c
KK = 0,41	

The more addition of tamarillo fruit, the ash content on slices jam also increased. It caused by the ash content on tamarillo fruit was bigger than ash content on kolang-kaling

## Chemical Properties Test

### 3. pH

The treatment	pH value ± SD
A (KK 80 g : TF 20 g)	3,61 ± 0,010 a
B (KK 75 g : TF 25 g)	3,54 ± 0,005 b
C (KK 70 g : TF 30 g)	3,45 ± 0,005 c
D (KK 65 g : TF 35 g)	3,35 ± 0,005 d
E (KK 60 g : TF 40 g)	3,08 ± 0,005 e
KK = 0,09	

The more addition of tamarillo, the pH value will be more acidic. pH value on kolang-kaling was 5,53 and pH value on tamarillo was 3,51

## Chemical Properties Test

### 4. Crude fiber

The treatment	Crude fiber % ± SD
A (KK 80 g : TF 20 g)	4,36 ± 0,05 a
B (KK 75 g : TF 25 g)	5,63 ± 0,15 b
C (KK 70 g : TF 30 g)	7,44 ± 0,01 c
D (KK 65 g : TF 35 g)	8,36 ± 0,15 d
E (KK 60 g : TF 40 g)	9,42 ± 0,02 e
KK = 0,97	

Based on analysis of raw materials, the crude fiber on tamarillo was higher than crude fiber on kolang-kaling. The crude fiber on kolang-kaling was 1,92% and the crude fiber on tamarillo was 4,83%. Because of this, the more addition of tamarillo, the crude fiber was increased

## Chemical Properties Test

### 5. Total soluble solid

The treatment	Total soluble solid "Brix" ± SD
A (KK 80 g : TB 20 g)	48,16 ± 0,57 a
B (KK 75 g : TB 25 g)	50,50 ± 0,28 a
C (KK 70 g : TB 30 g)	50,83 ± 0,28 b
D (KK 65 g : TB 35 g)	55,53 ± 0,50 b
E (KK 60 g : TB 40 g)	58,83 ± 0,28 c
KK = 1,49	

Total soluble solid come from addition of tamarillo fruit. The more addition of tamarillo, total soluble solid also increased. Sugar content on tamarillo can increase the total soluble solid on slices jam.



## Chemical Properties Test

### 6. Total sugar

The treatment	Total sugar % ± SD
A (KK 80 g : TF 20 g)	31,10 ± 0,05 a
B (KK 75 g : TF 25 g)	35,18 ± 0,04 b
C (KK 70 g : TF 30 g)	36,43 ± 0,29 c
D (KK 65 g : TF 35 g)	40,04 ± 0,51 d
E (KK 60 g : TF 40 g)	43,12 ± 0,63 e
KK = 1,96	

Total sugar on slices jam come from the addition of sugar.

## Chemical Properties Test

### 7. Anthocyanin

The treatment	Anthocyanin (mg/L) ± SD
A (KK 80 g : TF 20 g)	2,18 ± 0,05 a
B (KK 75 g : TF 25 g)	2,39 ± 0,04 b
C (KK 70 g : TF 30 g)	3,15 ± 0,03 c
D (KK 65 g : TF 35 g)	3,34 ± 0,02 d
E (KK 60 g : TF 40 g)	3,81 ± 0,04 e
KK = 0,62	

the more addition of tamarillo, anthocyanin content also increased.

## Chemical Properties Test

### 8. Antioxidant

The treatment	Antioxidant (ppm)
KK 75 g : TF 25 g	83,12

Antioxidant comes from kolang-kaling and tamarillo. Kolang-kaling have galactomanan that have function as antioxidant, and tamarillo fruit have an anthocyanin that can be antioxidant too.

## Conclusion and suggestion

### Conclusion

Based on this research, the conclusions are:

✓ The analysis result have a significant effect on ( $\alpha=5\%$ ) on physical test, chemical test (moisture content, ash content, pH, crude fiber, total sugar, total soluble solid, anthocyanin and antioxidant).

✓ Based on this research, the best treatment was on comparison by kolang-kaling and tamarillo fruit on 75 % : 25 %. This result based on organoleptik acceptance by panelist with colour 3,84 (like), flavour 3,60 (like). Texture 3,72 (like) and taste 3,88 (like).

## Documentation



Tamarillo fruit



Kolang-kaling



The process of making



Pencetakan Selai



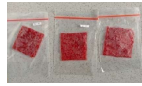
Fold test



Slices jam



Slices jam



Thank You!  
terimakasih