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# **ICTAFF 2018**

**International Conference  
on Tropical Agrifood, Feed, and Fuel**  
Sustainability of Food, Feed, and Fuel Tropical Resources for Quality Future

**PROCEEDING**

**Samarinda, 13-14 November 2018  
MESRA Bussines Hotel**

# **PROCEEDING**

## **INTERNATIONAL CONFERENCE ON TROPICAL AGRIFOOD, FEED, AND FUEL (ICTAFF) : SUSTAINABILITY OF FOOD, FEED, AND FUEL TROPICAL RESOURCES FOR QUALITY FUTURE**

**Samarinda, 13-14 November 2018**



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**Department of Agricultural Products Technology  
Agriculture Faculty, Mulawarman University  
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## PROCEEDING

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## PREFACE

The greatest regards should be expressed only to God the Almighty, Allah SWT. We have finished the Proceeding book of International Conference on Tropical Agrifood, Feed, and Fuel (ICTAFF) after the conference which was held on 13-14 November 2018 in Mesra bussines Hotel Samarinda.

The conference takes "Sustainability of Tropical Food, Feed, and Fuel Tropical Resources for Quality Future" as the main theme. This international conference is aimed at resolving problems and bringing together scientists, researchers, professionals, and students from multidisciplinary agriculture-related fields to share the latest findings or ongoing research activities.

There are 6 sub themes emphasized in the ICTAFF 2018, including halal, safe, and healthy food, improving quality food and nutrition, security and sustainability food and agriculture, innovation in feed technology to increase animal production, sustainable and renewable fuels based on tropical resources, and empowering of agribusiness based on community.

We would like to thank all keynote speakers for their contributions to the Conference, they are Asst. Prof. Dr. Somsak Maneepong from Walailak University Thailand, Prof. Xuming Huang from South China Agricultural University, Prof. Irwandi Jaswir from International Islamic University Malaysia (IIUM), Prof. Ali Agus from Gadjah Mada University, Dr. Dadan Rohdiana from Research Institute of Tea and Cinchona Indonesia, and Widi Sunaryo, Ph.D from Mulawarman University Indonesia.

Finally, we would like to thanks all of the proceeding team who have dedicated their constant supports and countless time to bring these scratches into a book. The ICTAFF 2018 proceeding is a credit to a large group of people, and everyone should be proud of the outcome.

Editors

## Welcome Speech

### Welcome Note From ICTAFF 2018 Committee



*Assalamu'alaikum Warahmatullah Wabarakatuh*

I would like to express the greatest regard to the Almighty God, Allah Subhanallahi Wa Ta'ala, for the Successful of International Conference of Food, Feed and Fuel 2018. I also would like to welcome all the audiences to Samarinda Kota Tepian.

Food security is very important to strengthen and support sustainable development in agriculture. Food, not only from plant but also from animal, should be available for all resident of Indonesia. It is urgent to provide quality feed to support food animal development to fulfill people needs of nutrition.

We would like to report that about sixty participants are attending the conference. Researcher and lecturer from some universities and research institutions will disseminate their research in this conference. This number is beyond our expectation when we were arranging the conference.

This conference will present international speakers from Wailailak University, Associate Professor Somsak Maneepong, Prof. Irwandi Jaswir from International Islamic University of Malaysia, Prof Xuming Huang from South China Agricultural University, Prof Ali Agus from Gadjah Mada University, Dr. Dadan Rohdiana from Research Institute of Tea and Cinchona Indonesia, and last but not least, Widi Sunaryo, Ph.D from Mulawarman University.

The morning session is designed to keynote speeches and the afternoon session is for parallel sessions. The parallel sessions will be focused into six topics: Halal, safe and healthy food; Security and sustainability of food and agriculture; Innovation in feed technology to increase animal production; Sustainable and Renewable fuel based on tropical resources; and Empowering of agribusiness based on community.

Faculty of Agriculture as conference organizer would like to thank Agrivita, the Journal of Agricultural Science on an agreement for publication of the selected papers from ICTAFF participants, and special thank Dr. Havaludin for helping our communication to the agreement. I also would like to thank to STIPER Kutai Timur, especially Prof. Juraemi, for cooperation in organizing and special thanks to PT. Kaltim Prima Coal and PT. Pupuk Kaltim for strong support to this conference.

We hope you will enjoy the tropical climate as long as staying in Samarinda. Thank you

*Wassalamu'alaikum Warahmatullah Wabarakatuh*

Committee,

Aswita Emmawati  
Chairman

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## DESIGN OF SOFT JELLY CANDY WITH ADDITION OF EDIBLE BIRD NEST (*Collocalia Sp.*) AS FUNCTIONAL FOOD RICH IN SIALIC ACID

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### ABSTRACT

We have previously demonstrated a design of soft jelly candy using mix of fish and bovine bone gelatine (1:3) to promote the use of halal gelatine and with the addition of rosella calyx extract to construct functional food rich in antioxidants. In this report, we made further development of the product by adding edible birds nest (EBN) to construct the jelly rich in sialic acid (*Sia*). Strawberry essence was applied to reduce gelatinflavour. The *Siaplaysan* important role in brain development, anti-cancer and cell rejuvenation. This experiment was arranged in a completely randomised design with the factor of the addition of EBN 0-24 % w/v in the gelatine sol containing rosella calyx extract. The result showed that addition of EBN between 6-18% w/v gave the best characteristic of hedonic sensory (rather like), with quality hedonic characteristics of red in colour, the taste of mild strawberry, and a mild in chewiness.

*Keywords: fish gelatine, bovine gelatine, brain development, anti-cancer, cell rejuvenation*

### INTRODUCTION

Jelly candy is very popular among children, which then attract people to design functional food based on candy. Recently we have developed Roselle soft jelly candy, which produced from the mixture of fish bone and bovine bone gelatine added by Roselle calyx extract to design functional candy and promote the using of halal gelatine. In this report, we made advance developed on the Roselle soft jelly candy by adding edible birds nest (EBN).

EBN is collected from the nest of *Collocalia* sp., which is produced from their saliva. The EBN is commonly consumed as soup in the Chinese community. It is reported rich in substances showing the activity of antioxidant (Yida, Imam, & Ismail, 2014), and shows bone strength improvement, skin rejuvenation, epidermal growth factor activity and cell proliferation (Chua & Zukefli, 2016), as well as anticancer (Rashed & Wan Nazaimoon, 2010) and autoimmune (Haghani et al., 2016). Sialic acid (*Sia*) is found about 1.5% in EBN (Norhayati, Azman, & Wan Nazaimoon, 2010). *Sia*, a carbohydrate with 9 atom C posses a negative charge, is responsible as the bioactive on the activities (Ma & Liu, 2012). It is inline with the report that *Sia* is found in a significant amount in mother milk, which is the only food available for an infant (Carlson, 1985).

There were reported that addition of carbohydrate in gelatinsol would increase the

hardness of the jelly (Haug, Draget, & Smidsrød, 2004). This research aimed to study the addition of EBN on sensory characteristics of Roselle soft jelly candy. This study will explore the potency of EBN in designing a functional food, as until now the EBN only exported from Indonesia to Asian countries especially to China as raw material (Chairul, 2015). Indonesia as the largest producer of edible birds nest (EBN) in the world should develop the EBN potency as industrial and pharmaceutical material (Zhang, Lai, Liu, Li, & Li, 2013).

### MATERIALS AND METHODS

#### Materials

The edible birds nest (EBN) obtained birdhouse in East Kalimantan, rosella flowers obtained from local farmers around Samarinda city, and giant featherback fish bones collected from the waste of amplang industry in Samarinda city. Sugar, bovine gelatin, high fructose sugar (HFS), guar gum, flavours, and potassium sorbate were obtained from a local market in Samarinda city.

#### Experimental design

A single factor experiment (addition of EBN) arranged in Completely Randomized Design was conducted in this research. The EBN was added at 0, 8, 16 and 24 g into 100 g of material. Each treatment was replicated three

times, and sensory characteristics for aroma, colour, taste and texture were observed.

### Experimental procedure

#### *Preparation of fish bone gelatin and roselle-calyx extract*

Fishbone gelatine was prepared from giant feather back fish (*Chitalopsis*) bone obtained from the industrial waste of Amplang in the city of Samarinda. Degreasing of fat from the bones and extracted the gelatine using acid solution was done as suggested by (Yuliani, Agung, Marwati, & Candra, 2018). Rosellacalyx extract was prepared by extracted of 6 g dried roselle calyx in 400mL of boiling water for 15 minutes then filtered (Yuliani et al., 2018).

#### *Preparation of EBN*

The EBN for soft jelly candy was prepared in three steps. Firstly, the EBN was washed in running water for three times each of 30 sec. Brushing the EBN was applied on the first washed to remove the rest of the eggshell, faeces and feathers (Susilo, Latif, & Ridwan, 2013). Secondly, the washed EBN was soaked in hot water (1:10 w/v) at 80°C for 10 minutes to remove the rest feathers attached on the nests followed by rinsing and reducing the size ( $\pm$  2-3cm<sup>2</sup>). The clean EBN then dried in an oven at 60°C for 6 h. Thirdly, the dry clean EBN were soaked (1:10 w/v) in warm water (55°C) for 90 min. followed by EBN puree preparation. The EBN puree was prepared by crushing the soaked EBN with the addition of flake ice (1:2 w/w) and filtered the mixture to remove the ice (allowed to melt to water at room temperature).

#### *Soft jelly candy preparation*

Soft jelly candy was prepared according to Yuliani et al. (2018). Three grams of HFS and 26.25 g of sugar were poured into 50 mL of Roselle calyx extract and cooked at 80-85°C. After 1 min., 9 g of mixture-gelatine of giant feather back fish and bovine bone gelatine (1: 3) was added to the extract mixture step by step while stirring to prevent clotting. As the sol formed, 3g of guar gum and an amount of EBN puree (0-24 g) was added step by step while stirring until the sol is mixed evenly. The temperature process was maintained at 80-85°C for 3 min then the heating was stopped, and 0.05 g of potassium sorbate and 5 drops of strawberry essence were added as a preservative and flavour while stirred for 2 min. The sol mixture then formed by cooling at 15°C for 2 hours.

## RESULT AND DISCUSSION

The addition of EBN puree until 24 % in Roselle soft jelly candy affected significantly on the hedonic sensory characteristics for colour, aroma, texture, and taste. The all performance of hedonic sensory characteristics are shown in Table 1.

**Table 1.** Effect of edible birds nest (EBN) on hedonic sensory of *Sia Jelly Candy*

EBN content (%)	All performance
0	3,94±0,29 b
6	3,83±0,38 b
12	3,78±0,37 b
18	3,31±0,36 a
24	3,16±0,35 a

*Note: Hedonic sensory scores (avg ± sd) were derived from all attributes (colour, aroma, texture and taste, each 30 data). Data were analysed by Friedman test continued by Tukey test. Data followed by different letter show significantly different (p<0.05). Sensory hedonic score 1-5 for very disliked to like very much.*

Addition of EBN puree more than 12% will reduce the acceptance of the Roselle soft jelly candy containing EBN added as a puree. Protein is the main content of EBN, about 60%, besides it contains until 1.5% sialic acid (*Sia*) (Norhayati et al., 2010). The *Sia* is found in the form of glycoprotein, glycolipid, and oligosaccharide (Corfield & Schauer, 1982). We expect that the carbohydrate content of EBN (You et al., 2014) was responsible for the changes of panellist acceptance on the sensory hedonic characteristics as it was reported that the mixture of some types of carbohydrate, like agar (Somboon, Karrila, Kaewmanee, & Karrila, 2014) and carrageenan (Eveline, Santoso, & Widjaja, 2011; Haug et al., 2004; Pranoto, Lee, & Park, 2007) affects gel characteristics of gelatin.

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