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YST014 - POTENTIAL OF BORNEO INDIGENOUS SEED (*KOP NUT*) AS A NEW SOURCE OF FOOD PRODUCT

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ABSTRACT

New food sources are vital due to global challenges such as population growth, climate change, and scarcity of food resources. An indigenous plant seed known as *kop nut* among the local of Dayak's community in Sarawak Borneo has a commercial prospect for a new food product. This plant is belong to *Euphorbiaceae* family, which are common with it plant seed toxin. Natural toxins are usually present in plants, but the potential toxins can be eliminated by employing a proper and suitable treatment. Here, the aim is to eradicate the seed toxicity and to establish a new food source. Heat treatment of wet or dry heat was applied to the seed. Later, the possible toxin present in the treated *kop nut* was examined using brine shrimps lethality assay (BSLA), a tiny *Crustacean* of an *Artemia*. This is crucial for ascertaining that the seed is non-toxic, safe and suitable for consumption. Subsequently, a preliminary of possible prospect market of this seed among local consumer through sensory evaluation on the preference regarding taste, aroma and its suitability as nut-bean product was obtained. Result demonstrated the toxin was eliminated and no toxic effects until the maximum experimental concentration of 1g/ml when seed was treated at 100°C for 30 minutes. Sensory test demonstrated the consumer (n=30) preference on the high scale (7-9) for taste was 93.33%, aroma was 70% and suitability as a nut-bean product was 80%, thus supporting the potential of this seed for commercial nut. This shall be the first scientific evidence after validating the traditional knowledge in treating the seed plant, then sensorial attributes for possible market potential as a nut-bean product. *Kop nut* may not only served as a new source of food product in food industry, but may also served to others like pharmaceutical and cosmetic industries.

Keywords – borneo indigenous plant, kop nut, toxic, new source food

INTRODUCTION

Investigation of underutilized species or exploration of innovative food product are garnering global attention. Factors such as climate changes, food security, and dietary diversity contribute to the pursuit of alternative functional food ingredients, reflecting the need for broader food options. *Kop nut* is a seed from plant belong to *Euphorbiaceae* family. It is also known as *buantik*, *broti*, or *merantik* among the *Bidayuh* and *Iban* community (Sakai et al., 2020). Although *Euphorbiaceae* are widely-known plant for its therapeutic potential and among the species that are diversely studied are *Ostodes*, *Aleurites*, *Jatropha* and *Ricinus*, nevertheless the plant is also familiar for its seed toxin.

Nonetheless, a suitable heat treatment can remove possible toxins (Bilang et al., 2018) from the seed since local community traditionally cooked the seeds after harvested. It was said that the practise was to remove the bitterness from the seed (Eunice, personnel communication, 2021) and yet there has been no established or uniform method for cooking it, whether through boiling or frying. Thus, in this study the effects of heat treatment towards the toxicity of the seed and the sensorial attributes as potential nut-bean was investigated. This was an example of study which connecting the information from the ethnic knowledge into the scientific context of evidence. Based on the communication and practices within the local community, this research can serve as a foundation for more extensive studies and underscore the commercialization capacity of this seed not just in food sector but also in various other industries. Consequently, revealing the economic opportunities for this underutilized seed plant.

OBJECTIVE

- To evaluate the present of seed toxicity using brine shrimps letality assay (BSLA).
- To produce a safe consumption seed using suitable process of heat treatment.
- To conduct an initial assessment market potential for this seed among local consumers through sensory evaluation, preferences regarding taste, aroma, and its appropriateness as a nut-bean.

DESCRIPTION OF THE PROJECT

Fruits was collected near the hill area of Gunung Payang, located at Padawan, Serian Division, Sarawak, Malaysia. The coordinate GPS was at 1.48799,110.33164. Matured fruits was selected, washed until clean and was treated using dry treatment (oven; 100°C for 30 minutes) and wet treatment (boiling 100°C for 30 minutes) with the black seed coat was still attached. Seed was then extracted and the raw seed was identified as RS while the boiled seed and the oven dried seed was identified as BS and OS respectively. The present of toxin in seed was determined using brine shrimps lethality assay (BSLA) with varied concentration and the maximum concentration was set at 1 g/ml. The concentration consisted of 3 replicates with 10 live nauplii each. The results from the analysis was summarized in Table 1.

Table 1: Maximum concentration of sample used and the percentage of live nauplius after 24-hours

Treatment (Maximum concentration of treated seed 1 g/ml)	live nauplii			% of live nauplii after 24 hours
	Replicate I (n=10)	Replicate II (n=10)	Replicate III (n=10)	
^a C (blank)	10	10	10	100
^b RS-UT (raw seed-untreated kop nut)	0	0	0	0
^c OS (oven)	2	3	3	26.67
^a BS (boiled)	10	10	10	100

Notes: C=control assay. Different alphabet indicates significant differences ($p < 0.05$) of alive nauplius from one treatment to other.

Subsequently, a sensory evaluation was performed to the BS sample (after roasting) to assess its potential for the market focusing on consumer preference towards the taste, aroma and its suitability as a nut-bean. The data was summarised in Figure 2. The scale range was as below.

Table 2: Scale range for three sensory test parameter

Parameter	Scale range	Category	Explanation
Taste	1-3	dislike	poor; no nutty-creamy taste, texture soft
	4-6	neutral	moderate; mild nutty-creamy taste, texture soft crunchy
	7-9	good	good; nutty-creamy taste, texture crunchy
Aroma	1-3	dislike	poor; no buttery aroma
	4-6	neutral	moderate; mild buttery aroma
	7-9	good	good; rich buttery aroma
Suitability as a nut-bean	1-3	dislike	poor; no quality and suitable as nut-bean
	4-6	neutral	moderate; suitable and can be improved as nut-bean
	7-9	good	good; have quality and suitable for nut-bean

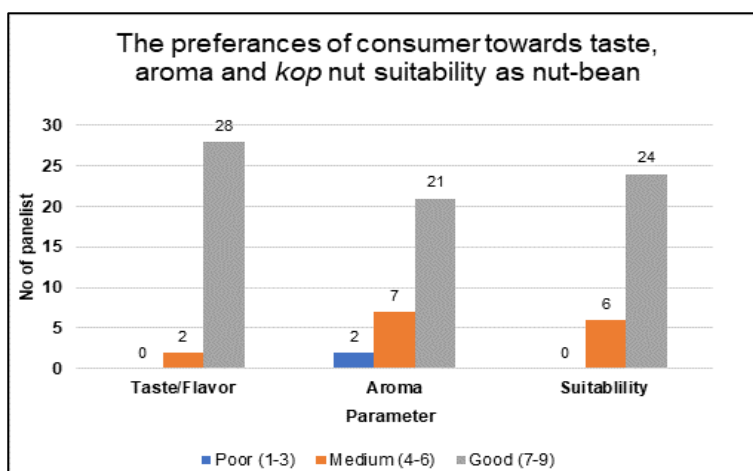


Figure 1: *Kop* nut post-treatment sensorial attributes (n=30)

NOVELTY

This is the first scientific study showcasing the *kop* seed as an innovative food product, specifically as nut-beans, after the process has effectively removed the toxicity of the seed through the heat treatment. A random preference supported that this seed has comparable potential with taste, aroma, and suitability reminiscent of nutty, creamy, and buttery qualities similar to those found in commercial tree nuts like macadamia, cashew, almond, pistachio, and walnut, making it a viable alternative to nut-beans in chocolate or confections. This seed also holds more potential for various food industries in the future.

CONCLUSION

The present of toxic was detected in the untreated seed with mortality of nauplius demonstrated in the cost-effective assay of BSLA. However, it was able to be eliminated using a simple approach of wet heat treatment at 100°C for 30 minutes, which is represented by the alive nauplius. Additionally, this underutilized seed offers a commercialization potential not only in food industries, but also across other potential sectors such as pharmaceutical, cosmetic, and biodiesel industries.

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