



# PROCEEDING INTERNATIONAL CONFERENCE 6<sup>th</sup> SAADC 2017

Conference on Sustainable Animal Agriculture for Developing Countries

**"WISDOM OF USING LOCAL RESOURCES FOR DEVELOPMENT OF  
SUSTAINABLE ANIMAL PRODUCTION IN DEVELOPING COUNTRIES"**



**The Singhasari Resort, Batu City, Indonesia, October 16-19, 2017**

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## PROCEEDING

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## The effect of kolang-kaling (*Arenga pinnata*) addition on characteristics of beverage Kefir

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### Abstract

kefir is the product fermentation of milk with kefir grain. Changes in certain microbiological and chemical characteristics of kefir added with kolang kaling were studied. Kolang kaling is the fruit of the palm tree (*Arenga pinnata*), with chewy texture and an unique taste and smell. Utilization of kolang kaling on availability yeast, pH and mineral compound of kefir never been reported. The objective of this study to evaluate the effect of kolang kaling addition on pH, total yeast and characteristic mineral of beverage kefir. This study using completely randomized design (CRD) with 5 treatments and 3 replications. The treatment on this study was the percentage of kolang kaling juice. (Control A0 0%, A1 5%, A2 10%, A3 15% and A4 20%). Grain kefir from house hold Indonesia used as starter culture. The results of this study showed that the treatments applied significant effect ( $P < 0.05$ ) on pH, total yeast and Highly significant ( $P < 0.01$ ) on mineral content (Fe, Ca, and Zn) of beverage kefir. The utilization of the percentage of kolang kaling at a concentration 15% and 20% caused a decrease on total yeast and mineral content. From this research concluded that the used 5% 10 % of kolang kaling juice, produced the best of pH, total yeast and mineral content of beverage kefir.

*Keywords:* Kolang-kaling, beverage kefir, chemical, microbial, grain kefir

### Introduction

kefir is fermented food from cow milk, goat milk or sheep milk and inoculated by starter as grain kefir or kefir granule, with contain a complex mixture of both bacteria and yeast. The bacteria and yeast mixture its bound together with milk casein and complex sugars where are polysaccharide known as kefiran and protein matrix (Tamime et al, 2011). The benefits of consuming kefir in the diet are numerous. kefir has frequently been claimed be effective against a variety of complaints and diseases (Hosono et al, 1996).

The benefit of consuming kefir in the diet are numerous, as it is reported to possess the antibacterial and hypocholesterolemic effects (Acconi et al, 1995). The typical characteristics and quality of beverage kefir depend on the amount of kefir grains and incubation times. Quality of kefir also depend on quality of composition material was used, grain kefir type and also condition of material used before inoculation. (Chen et al., 2011). Irigoyen et al. (2005) in their study reported that kefir produced from cow, goat, sheep and buffalo milk had the following chemical characteristics such as pH about 4.0, alcohol from 0.55 to 2.0%, fat content depends on the type of milk used, and this fermented milk have an acid, prickly and slightly yeasty taste.

Beverage kefir by addition of kolang kaling has not been much reported, and used kolang kaling fruit on produce of kefir are not study. Kolang kaling is a fruit which good quality such as, protein, carbohydrate, fat, fiber and mineral such as calcium, iron and have special quality for healthy. The content of nutrients found in kolang kaling include

carbohydrates, protein, fiber, and minerals. Producing beverage of kefir, using cow s milk and kolang kaling is a product diversification. Usage kolang kaling on produce of beverage kefir, it will certainly result in changes both in terms of taste, aroma, texture, color and chemical composition produced, including the viability of microorganisms beverage of kefir. Based on the background above, this study intended to evaluate the quality beverage of kefir produced by the treatment was determined by pH, total yeast and mineral compound analysis. This research is expected as beverage of kefir products can be produced as a healthy beverage from Indonesia.

## Methodology

Fresh cow milk were obtain from Faculty of Animal Husbandry, Gadjah mada University, Yogyakarta. Sucrose and skim milk from supermarket in Yogyakarta, while kolang kaling obtain from traditional market in Yogyakarta. olang kaling was prepared on juice form by added of water at 1 5 ratio. olang kaling was added in efir material. 0, 5,10,15,and 20% respectively. Milk were homogeni ed and pasteuried at 85 C for 15 minute and mixing with sucrose, skim milk and kolang kaling juice. Material cooled down until its temperature was 24 C. Beverage kefir sample were prepared with added 5% of starter (Grain culture ) on milk and incubated at 24 C for 24 hour. After fermentation kefir was restored in refrigerator 24 hour and analysis. pH values of milk kefir were measured by pH meter with probes from Hanna Instruments. Total yeast were performed on PDA from Oxoid with 1% oxytetracycline at 25 C under anaerobic condition for 5 days (Fardia , 1993). Mineral count were measured by AAS (atomic absorption spectroscopy) methode.

## Results and Discussion

### *pH and total yeast beverage kefir*

pH analysis range from 4.23 4.39 at the end of fermentation. pH beverage of kefir control smallest increase than beverage of kefir added 5% kolang kaling. The changes of pH values as well as as titratable acidity. efir that made from cows milk, according to Simova et. al (2002), the pH of kefir between 4.35 4.50 and the lactic acid are between 8.18 8.20. Irigoyen et al. (2005) in their study reported that kefir produced from cow, goat, sheep and buffalo milk had the following chemical characteristics such as pH about 4.0, and this fermented milk have an acid, prickly and slightly yeasty taste. The statistical analysis showed there were significant effect ( $P < 0.05$ ) between treatments at the end of fermentation process beverage of kefir on pH value. where total yeast increase with 5% dan 10 % kolang kaling addition and decrease with 15% and 20% kolang kaling addition. Total of yeasts on kefir after fermentation  $5.0 \times 10^6$   $9.3 \times 10^6$  cfu/ml. The addition 5% of kolang kaling gave the highest amount of total yeast ( $9.3 \times 10^6$  cfu/ml) or log 7.98 cfu/ml sample. Yeast and *Lactobacilli* are mutually dependent and growth in balanced proportions in kefir grains, and symbiosis between yeasts, and *Lactobacilli*. The statistical analysis showed there were significant effect ( $P < 0.05$ ) between treatments

### *Mineral characteristic*

Mineral properties of kefir after fermentation are quite different each other. Total mineral Calcium (Ca), Ferrum (Fe), alium ( ), and inc ( n) on kefir after fermentation depend on kolang kaling persentase. Total Ca, Fe, and n slight increase was obtained by the kolang kaling addition 5 until 10 % but decrease by addition 15 and 20 % kolang kaling. Total Fe decreasing by kolang kaling addition. Decreasing Fe countent on beverage of kefir after kolang



kaling addition because kolang kaling could linkage with kefir grain. Table 1, shown the means of mineral composition of beverage kefir after fermentation at 24 hours.

**Table 1.** Mineral content of beverage kefir with kolang kaling addition after incubation at 24 hrs.

kolang kaling (%)	Mineral (mg/g sampel)				
	Ca	Fe			n
A0 (0%)	704.567 <sup>a</sup> – 1.870	0.941 <sup>b</sup> – 0.018	1980.35 <sup>c</sup> – 0.980		4.828 <sup>d</sup> – 0.041
A1 (5%)	858.32 <sup>b</sup> – 0.097	1.144 <sup>c</sup> – 0.048	2093.00 <sup>e</sup> – 0.018		4.722 <sup>b</sup> – 0.560
A2 (10%)	1261.39 <sup>e</sup> – 1.837	0.901 <sup>b</sup> – 0.003	2239.49 <sup>d</sup> – 0.526		4.776 <sup>c</sup> – 0.044
A3 (15%)	1056.76 <sup>c</sup> – 0.434	0.561 <sup>a</sup> – 0.526	1841.27 <sup>a</sup> – 1.236		5.653 <sup>e</sup> – 0.109
A4 (20%)	1211.07 <sup>d</sup> – 0.225	0.548 <sup>a</sup> – 0.017	1905.57 <sup>b</sup> – 2.567		4.523 <sup>a</sup> – 0.022

Mean of three replication – standar deviation

Means with different superscript showed significant different (P 0.01)

In regards of Ca, Fe, and n content on beverage kefir it was found that higher amount of kolang kaling addition at 5 and 10 % caused increasing Ca and Fe content but decreasing after addition 15 and 20 % kolang kaling. The mineral content Ca, Fe, and n were found different each other. The statistical analysis showed there were highly significant effect (P 0.01) between treatments at the end of fermentation process of beverage kefir on mineral Ca, Fe, and n

## Conclusion

Percentage of kolang kaling could inhibit starter or grain kefir and may influence on the growth of grain kefir. The used of 5 % and 10 % of kolang kaling juice, produced the best of pH, total yeast and mineral content of beverage kefir.

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