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## The Utilization of Extract Durian (*Durio zibethinus* L.) Seed Gum as an Emulsifier in Vegan Mayonnaise

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### Abstract

Durian is the most popular seasonal fruit in Indonesia. Only 1/3 of durian is edible, whereas the seeds are thrown away. This waste is potential of value-added such as seed gum. Mayonnaise is o/w emulsion based product use egg yolk as an emulsifier, but in this research, durian seed gum (2,5%, 3%, 3,5%, 4%, and 4,5%) has been used to replace on egg yolk in making vegan mayonnaise. The best formulation of vegan mayonnaise from 4% durian seed gum was compared to commercial and the control as well. This result is as good as mayonnaise with egg yolk, and the commercial mayonnaise.

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Keywords: durian seed gum, protein, oil in water emulsion, vegan mayonnaise.

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### INTRODUCTION

Durian is a seasonal fruit that most popular in Southeast Asia, particularly Malaysia, Indonesia, Thailand, and Philippines [16]. Central Bureau of Statistics of the Republic of Indonesia states that the average durian production increased from 17,405 tons in 1999 to 741,831 tons in 2003, and by the end of 2011 to 883,969 tons. Only a third of the durian fruit are edible, while the seed (20-25%) and the skin is usually discarded. Utilization of durian seed is still limited. According to research [2], durian seed can be used as a thickener because of the content of hydrocolloid (water-soluble gum).

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Previous studies revealed that the natural polymer of gum durian seed had emulsifying activity oil in water (o/w). Natural gum was a polysaccharide consisting of monosaccharides linked through glycoside bonds [18]. Natural gum polymers are usually complex, generated a lot of plants, such as carrageenan, pectin, CMC, starch, guar gum, and sodium carboxyl. Methyl cellulose was used as a gelling agent, thickener, stabilizer, emulsifier [16]. Liquid extraction was one of the most common techniques used for the extraction of gum [2]. Hydrocolloid can be used as a natural emulsifier and thickener in products such as jam, jelly, and mayonnaise. Mayonnaise, an emulsion of oil in water, is generally using egg yolks as the emulsifying agents [7]. However, the constraints are the risk of contamination with *Salmonella* sp. on raw chicken eggs, the price and quality of chicken eggs, as well as the high content of cholesterol in egg yolk [19]. For some vegetarians can not consume egg-based foods, lead the research on protein utilization as an alternative emulsifying agents developed in recent years [20]. Gum durian seeds can be used as an alternative emulsifying oil in water (o/w) on a more stable mayonnaise expected quality, during storage and produce characteristics similar to mayonnaise in general. This research durian used gum durian seed as egg yolk replacer to make vegan mayonnaise

## **MATERIALS AND METHODS**

These were materials for this research: gum durian seed was extracted from Indonesia local durian, 96% food grade ethanol, soybean oil include mayonnaise, vinegar ( 25% acetic acid) and vegan mayonnaise commercial for comparison.

Methods of experimental were divided into two stages, preliminary and the main research. Preliminary research were conducted to produce extract gum from durian seed. Extraction of *gum* durian seed can be seen as Fig. 1.

The main research was to determine the best formulation on making mayonnaise using durian seed gum as an emulsifier, then compared it with commercial mayonnaise and mayonnaise vegetarian as a control. Experimental design factor for main research were ratio of water /oil ( $A_0$ ) is 30% : 70% and *gum concentration*.: 2,5% ( $B_0$ ), 3% ( $B_1$ ), 3,5% ( $B_2$ ), 4% ( $B_3$ ), and 4,5% ( $B_4$ )

Mayonnaise was made in 5 (five) formulations with different concentrations of emulsifiers (gum durian seed) were used. Formulations for making mayonnaise can be seen in Table 2.

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