



## Viability Lactic Acid Bacteria of Yogurt Powder With Carrageenan Addition

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### Abstract

This research aimed to analyze the viability of lactic acid bacteria in carrageenan fortified yogurt powder. This research was done in Laboratory of Food Chemistry and Nutrition Faculty of Animal and Agriculture and Laboratory of Integrated Diponegoro University. Yogurt was made using pasteurized fresh milk and inoculated with *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. The incubation was set to 6 hour and followed drying in vacuum oven. Carrageenan 0.5% (w/v) was mixed prior to the drying. The all treatment was repeated 4 times. The viability of lactic acid bacteria in powdered yogurt was analysed during 10 days. The results of this research showed that carrageenan addition provide no noticeable effect to the viability in powdered yogurt during the ten days storage. The conclusion of this research was carrageenan may be used in powdered yogurt without provide any affect in the viability of lactic acid bacteria.

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### Introduction

Yogurt is a functional food that is now increasingly popular, because it contains probiotic bacteria that can prevent various kinds of digestive tract health disorders and other disorders such as intolerant lactose and can also be used to enrich the microflora (Ginting and Pasaribu, 2005). As development in dairy industry, yogurt is now made in powder form. In well developed countries like Japan and Korea, yogurt was found in powder. Whereas in Indonesia the presence of yogurt in powder form is not yet found, recently. Therefore, there is a need to make yogurt into a powder that can be consumed by Indonesian.

Yogurt contains probiotic bacteria (lactic acid bacteria) and when it was processed into powder may cause a decrease in the viability of lactic acid bacteria. So the action to protect the viability of lactic acid bacteria is needed, for example by the addition oligosaccharides which are useful for prebiotic supplements (Conrad et al., 2000). Then in the study of Wihardi et al. (2015) explained that oligosaccharides from avocados had the potential agent to support the growth of lactic acid bacteria in yogurt. In the process of rehydrating yogurt powder without, surfactant are very important to be present in powder, for example iota carrageenan.

Therefore, this study used carrageenan in the making of yogurt powder and analyze the viability of lactic acid bacteria during storage.

### Materials and Methods

Fresh milk from university farm was used as raw milk and cultures of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* were obtained from the Laboratory of Chemistry and Food Nutrition, Food Technology Department, Faculty of Animal and Agricultural Sciences, iota carrageenan was obtained from Carrageenan Indonesia, Co. Ltd. Incubators (Memmert, Germany) was used to incubate yogurt, 3MTM Petrifilm Aerobic Count Plates was used to calculate the lactic acid bacteria in the CO<sub>2</sub> vacuum container.

Yogurt was made from the two time serial regeneration of lactic acid bacteria at the concentration of inoculation at 2.5% in the pasteurized milk and the incubation time was then conducted for 6 hours at 41°C (Hartati, 2011).

### Yogurt Drying

Drying yogurt was done after the yogurt was added with 0.5% iota carrageenan. For drying, vacuum

oven dryer was used. Yogurt was put into 30X28 cm<sup>2</sup> plate, and the oven was set at 50°C for ±24 hours. Dried yogurt was taken from the tray and put into 15 ml sterilized centrifuge tube for 10 days in room temperature.

#### Lactic Acid Viability Test

Lactic acid bacteria viability testing was carried out using petrifilm using serial dilution of 10% powdered yogurt into 0.85% NaCl. As much as 100 microliters sample was then dripped onto petrifilm surface then followed by pressing the surface of the petrifilm after cover closing. Petrifilm was incubated in the CO<sub>2</sub> vacuum container at 37°C for 48 hours. Colony calculation by calculating the appearance of red spot on the petrifilm surface (Kailasapathy, et al., 2007).

#### Results and Discussion

Powdered yogurt with the addition of 0.5% iota carrageenan was determined initial count of lactic acid bacteria then the determination was also conducted at the ten days of storage in room temperature. As results, there was slight change on the number of lactic acid bacteria after powdered yogurt was stored at room temperature for 10 days. The number of about 4 logs CFU/ml was calculated and this similar result was also could be obtained at the end of this experiment. This means iota carrageenan might not provide negative effect to bacterial growth, thus it is very good to prevent a decrease in the population of lactic acid bacteria.

Additional prebiotic such as oligosaccharides and polysaccharides may also prevent a decrease in lactic acid bacteria (Conrad et al., 2000) due to the environmental stress. Keivani et al. (2014) stated that the polysaccharides matrix may provide the resistance of bacterial cells during the drying process which may break down cell membranes resulting in cell leakage. The results of this study were not much different from the results of previous studies conducted by Shori and Baba (2012) which produced viability of lactic acid bacteria in the amount of 6 log CFU/ml and may produce proper concentration of lactic acid and other organic acids Legowo et al. (2009).

#### Conclusion

Based on the results, it can be concluded that carrageenan might provide positive effect to maintaining the viability of lactic acid in powdered yogurt.

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