

# Lactococcus /actis Lactic Acid Bacteria from Intestine Beef Cattle as a Candidate Probiotics

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## *Lactococcus lactis* Lactic Acid Bacteria from Intestine Beef Cattle as a Candidate Probiotics

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### Abstract

Probiotics is one feeds additive that can be used to increase production of animal husbandry and to reduce the use of antibiotic growth promoter (AGP). This research aims to identify isolates of lactic acid bacteria from intestine beef cattle that can be used as a candidate probiotics. Survival test on acidity was performed with some modification survival test on bile salts, antagonistic test on enteric pathogen was performed with agar diffusion method with modification in the pouring of pathogenic bacteria. The research showed that *Lactococcus lactis* showed viability in pH 2 as much as  $6.9 \times 10^7$  CFU/ml and isolate viability on bile salts  $3.9 \times 10^7$  CFU/ml. Antagonist test on *Staphylococcus aureus* showed inhibition diameter as much as 3.0 mm and in antagonist test on *Escherichia coli* as much as 3.5 mm. Based on the result of the research showed that *Lactococcus lactis* derived from intestine beef cattle has tolerant on acidity, bile salt and antagonistic on enteric pathogen *E.coli* dan *S.aureus* so it has potency as candidate probiotic.

**Key words :** *Lactococcus lactis*, lactic acid bacteria, beef cattle intestine.

### Introduction

The benefits of probiotics in farm industry include the ability to eliminate bacteria pathogen through production organic acids, bacteriosin and the other antimicrobial. Lactic acid bacteria also has a role stimulate immunity against pathogen agent or prevent infection[1]. The isolates that useful as probiotics having certain conditionals, among others of its resistance to bile salt and an acid so isolates microbes is able to reach the digestive tract part of the intestines in the condition still a live. Isolate as probiotics must have the ability to adherence and colonization on the part of the mucosal intestine. Lactic acid bacteria (LAB) is a group gram positive bacteria, non spores, rod shaped or coccus. As the major metabolic end products during fermentation of carbohydrates namely produces lactic acid. This research aims to identify isolates of lactic acid bacteria from intestine beef cattle that can be used as a candidate probiotics.

## Materials and Methods

MRSB/de Man Rogosa and Sharp Broth (Oxoid), nutrient agar (NA, Oxoid) and nutrient broth (NB, Oxoid), NaCl 0,85% steril, HCl, oxgall (Oxoid), petridish, micropipet, ose, autoclave, incubator, laminair air flow, blue tip, ependorf, bunsen, erlenmeyer, beaker glass.

Survival test on acidity was performed with modification on centrifugation condition and pH media, Survival Test on Bile Salts, Antagonistic test on enteric pathogen (*S.aureus* and *E.coli*) was performed with agar diffusion method with modification in the pouring of pathogenic bacteria.

## Result and Discussion

Isolates lactic acid bacteria obtained from the intestine of beef cattle at slaughterhouse Surabaya, have the following characteristics: coccoid shaped cells, Gram positive and negative motility. Lactic acid bacteria are the group microorganisms able to convert carbohydrates to lactic acid. The bacteria is also suppressed bacteria pathogen include *Streptococcus pneumoniae* or *Streptococcus pyogenes*. *Lactococcus lactis* (*L.lactis*) is nonpathogenic bacteria, Gram positive bacteria known to have a correlation close to the genus *Streptococcus*. In nature, *L.lactis* there are in plants or surface of the animal body and the digestive tract animals. The bacteria is in dormant conditions on the surface of plants and will grow in the digestive tract after the plant consumed by ruminant. The use of *L.lactis* is very important in industry, it is based on energy metabolism, where especially for the production of large quantities lactic acid (homolactic fermentation) and produce fermentation product besides lactic acid (mixed acids fermentation). Besides this *L.lactis* also has a role to stress resistance, autolysis, and mucosal immunostimulation [2]. *Lactococcus lactis* is facultative heterofermentatif lactic acid bacteria, barrier strong against bacteria pathogen including *E. coli*, through the reduction of pH of lactic acid and acetic acid production[3].

Table 1. Survival Test on *Lactococcus lactis* on acidity, bile salts and antagonistic test on enteric pathogen.

	Viability of <i>L.lactis</i>
survival test on acidity pH 2	$6.9 \times 10^7$ CFU/ml
Bile salt tolerance (0.3%)	$3.9 \times 10^7$ CFU/ml
<i>Escherichia coli</i> Antagonistic	3.5 mm
<i>Staphylococcus aureus</i> Antagonistic	3 mm

*Lactococcus lactis* is a Gram-positive bacterium widely used in the dairy industry [4]. *Lactococcus lactis* is predominantly associated with dairy fermentations, originated from a plant niche. *L.lactis* strains was isolated from various nondairy niches (grass, vegetables, and bovine rumen) [5]. This is in line with the result from isolation and identification lactic acid bacteria derived of beef intestine from slaughterhouse Surabaya. This research is similar identified *Lactococcus lactis*.

## Conclusion

Based on the result of the research showed that *Lactococcus lactis* derived from indigenous intestine beef cattle has tolerant characteristic on acidity, bile acid and antagonistic on enteric pathogen *Escherichia coli* dan *Staphylococcus aureus* so it has potency as probiotic candidate.

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## Reference

- Bouchard, D., Even, S. and Le Loir, Y., 2015. Lactic Acid Bacteria in Animal Production and Health. *Biotechnology of Lactic Acid Bacteria: Novel Applications*, p.10.
- Velly, H., Renault, P., Abraham, A. L., Loux, V., Delacroix-Buchet, A., Fonseca, F., & Bouix, M. (2014). Genome sequence of the lactic acid bacterium *Lactococcus lactis* subsp. *lactis* TOMSC161, isolated from a nonsterilized curd pressed cheese. *Genome announcements*, 2(6), e01121-14.
- Annuk, H., J. Shchepetova, T. Kullisaar, E. Songisepp, M. Zilmer, and M. Mikelsaar. 2003. Characterization of intestinal lactobacilli as putative probiotic candidates. *J. Appl. Microbiol.* 94:403–412.
- Kot, W., Neve, H., Vogensen, F. K., Heller, K. J., Sørensen, S. J., & Hansen, L. H. (2014). Complete genome sequences of four novel *Lactococcus lactis* phages distantly related to the rare 1706 phage species. *Genome announcements*, 2(4), e00265-14.
- Salminen S, A.Ouwehand, Y Beno and YK Lee. 1999. Probiotic: How should they be defined? *Trends in Food Science and Technology*
- Cavanagh, D., Casey, A., Altermann, E., Cotter, P. D., Fitzgerald, G. F., & McAuliffe, O. 2015. Evaluation of *Lactococcus lactis* Isolates from Nondairy Sources with Potential Dairy Applications Reveals Extensive Phenotype-Genotype Disparity and Implications for a Revised Species. *Applied and Environmental Microbiology*, 81(12), 3961-3972.



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