

Survival of Encapsulated and Free Cells of Probiotics in the Gastrointestinal Tract, Using Tim-1 Model

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Most of probiotics are members of the genera *Lactobacillus* and *Bifidobacterium*, which are inherently sensitive to gastric acid and bile. There is no generic probiotic, and effects are strain specific. A validated *in vitro* model of the GI tract (nick-named TIM) is able to predict survival of various strains in human clinical trials, and the model has been validated for survival of probiotics using volunteers that were intubated with a catheter until the end of the small intestine. Encapsulation by using alginate was aimed to optimize the survival of strains. Encapsulate and free cells of *L. plantarum* IS-10506 as well as *E. faecium* IS-27526 were assessed for the survival in GI tract by using TIM-1. The results show that the survival of encapsulate *L. plantarum* IS-10506 was much higher than the free cells. While there was no difference between encapsulated and free cells of strain *E. faecium* IS-27526. The survival of encapsulated and free cells of *L. plantarum* IS-10506 were 84.5% and 18.5%, respectively. *L. plantarum* survives 4.6 times better in encapsulated form than its free cells, when consumption of the viable counts are the same, and the survival rate of encapsulated was increasing after 2 hours of consumption, compared to the free cells. Taken together, encapsulation technique protects viability of cells to reach the GI tract.

Keywords: Probiotics, encapsulation, free cells, survival, TIM-1

Biography:

Ingrid S Surono, M.Sc., Ph.D., graduated from Food Technology Department, Faculty of Agricultural Technology, Bogor Agricultural University in 1980. She earned MSc in Dairy Microbiology and Food Processing from Asian Institute of Technology (AIT), Bangkok-Thailand, in 1984. PhD was obtained from The United Graduate School, Gifu University-Japan, in 1996. She dedicated herself to probiotic research since 1992, and her research interests are in child nutrition, functional foods and food safety. In 2009, she attended Workshop on Management of Microbial Hazard in Food organized by

European Chair in Food Safety Microbiology, hosted by the Laboratory of Food Microbiology Graduate School VLAG, Wageningen University, The Netherlands. There are 30 international published papers in peer reviewed journals mainly on probiotics, and she is also a reviewer of British Journal of Nutrition, Beneficial Microbes, Appetite, Springer plus, and some national journals. She is co-promoter of 12 PhD students from Post Graduate Programs at Faculty of Medicine Airlangga University, Faculty of Medicine University of Indonesia, Faculty of Human Ecology Bogor Agricultural University, and Faculty of Public Health of Airlangga University and of Andalas University. She supervised 11 MSc Students from Faculty of Medicine/ Seameo Recfon University of Indonesia, Faculty of Human Ecology, Bogor Agricultural University, and Faculty of Mathematics and Sciences, Airlangga University, and supervised more than 40 under graduate students. She has published 7 books, and wrote 2 chapters in text book published by CRC and Springer, and wrote 3 chapters in Encyclopedia of Dairy Sciences. She actively involved as a member of expert team at National Agency of Drug and Food Control Republic of Indonesia (NADFC) especially in Food Safety and member of task force on Probiotics and Prebiotics Guidelines. She is an author of Probiotic, Microbiome and Functional Foods, published in 2016 in Indonesian. She was a visiting Professor at Functional Foods Forum, University of Turku-Finland, during 2004-2006. In 2011, Science and Technology Award have been granted to her from Toray Foundation. In 2012, she was nominated as ten best researcher of Ristek Kalbe Science Award 2012. Two awards of Third best winner of Oral Presenter at the XXXII International Congress on Microbial Ecology in Health & Disease in Athens, Greece, and at FASEB Summer Research Conference, Carefree, Arizona, USA, in 2010 and 2011, respectively have been recorded. A patent on Probiotic has been granted in 2010. She also serves as Advisory Council of Swedish South Asian Network on Fermented Foods (2009 - present time). She is President of Indonesian Scientific Society for Probiotics and Prebiotics (ISSPP), and one of Scientific Members at Danone Institute Indonesia since 2013-present time, and appointed as Head of Food Technology Department, Faculty of Engineering, Bina Nusantara University, Alam Sutera Campus, Tangerang, Indonesia (2013-present time).