

Antioxidant Effect of Coconut Milk on Oxidative Damage in Commensal Lactobacilli in the Gastrointestinal Tract

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Coconut milk (CM) is the aqueous extract of coconut endosperm which is rich in polyphenols. Coconut milk is commonly used in culinary applications in South Asia. In this study, protective effect of phenolic antioxidants (PA) extracted from CM was tested in lactobacilli which are the prominent probiotic forms in the human gut. These commensals help to maintain the immune and metabolic homeostasis. The intestinal environment can be altered by many factors that generate reactive oxygen species (ROS) resulting in oxidative stress. Enteric bacteria have been reported to mediate redox homeostasis through the regulation of ROS production. However, oxidative damage to the gut microbiota has been suggested to contribute to several diseases including intestinal and neurodegenerative disorders. Here, the activity of phenolic antioxidants extracted from CM on oxidative damage in *Lactobacillus acedophilus*, *L. plantarum*, *L. lactis*, *L. casei* and *L. fermentum* under aerobic conditions were evaluated based on the amount of products of macromolecular damage. The total polyphenol content of aqueous extract of CM was 8.21 ± 0.13 mg/L as determined by the Folin Ciocalteu method. Bacterial cultures at optical density of 0.5 at 620 nm were incubated at 37°C under aerobic conditions to induce the oxidative damage. The cells were cultured overnight with a concentration series of PA (0, 0.4, 0.5, 0.6, 0.7, 0.8 and 0.9 mg/mL) to assess the protective effect on oxidative damage. The concentration of PA was kept below the concentration that affect cell viability as determined by 2,3,5-triphenyltetrazolium chloride assay at 620 nm. Lipid peroxide levels ($\mu\text{g/mL}$) and protein carbonyl levels (nmol/mL) were detected with thiobarbituric acid and 2,4-DNPH respectively. Growth under aerobic conditions affected the cell viability and induced significant ($P < 0.05$) damage to proteins and lipids in the lactobacilli under investigation. Treatment with increasing concentrations of PA from CM showed a corresponding increase in the cell viability and a corresponding decrease in the amount of lipid peroxides and protein carbonyls under aerobic conditions. Therefore, PA from CM protect gut microbiota from oxidative damages in lipid and proteins without affecting their viability.

Keywords: Coconut milk; Antioxidants; Lactobacilli; Oxidative stress

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