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## *Lactobacillus plantarum* and EGCG in a synbox: An effective intervention for alcohol induced endotoxin mediated liver disease

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Alcohol abuse can cause substantial liver insufficiencies leading to significant mortality worldwide, regardless of the available therapeutic options. Recently, we have evaluated the use of alternative agents like Epigallocatechin gallate (EGCG) and *L. plantarum*, to control ALD. The prebiotic property of EGCG for enhancing the growth of *L. plantarum* was evaluated. Based on this property a coupled formulation consisting of both EGCG and *L. plantarum* was developed by encapsulating these agents in Ca-alginate beads to achieve enhanced biological effects. The formulation was extensively characterized and evaluated for its enhanced in vivo efficiency. Effect of EGCG to enhance the growth of *L. plantarum* was significantly better than inulin. Combination beads lowered serum transaminases and blood alcohol levels. Alcohol fed rats elicited raised plasma endotoxin levels, attributable to the disrupted intestinal permeability, confirmed by lactulose-mannitol test using HPTLC. Transcription studies for TLR-4 receptor mediated signaling molecules (MyD88, CD14, MD2) revealed modulation in the expression of these molecules, resulting in the down-regulation of NF-κB in rats treated with combination beads. Expression of pro-inflammatory cytokines i.e., TNF-α and IL-12β/40 subunit, COX-2 in addition to the levels of antioxidants, oxidants and micronuclei formation also assumed normal levels. Histo-architecture depicted normal liver and intestine in rats treated with co-encapsulated beads whereas severely distorted histology was observed for respective tissues in alcoholic rats. Thus, the formulation of *L. plantarum* with EGCG in a synbox can be a promising therapeutic option ensuring enhanced bioperformance against ALD. To the best of our knowledge, these findings are being reported for the first time.

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## Study of bacteriophages as indicators of the microbiological quality of water

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The current methods to detect enteric viruses in the water source system are very complicated and not efficient economically. In the U.S. EPA, the detection of bacteriophage is a good alternative among the trace methods of using microorganisms to detect feces pollution. Amongst the diverse bacteriophages, DNA somatic coliphage and RNA male-specific phage that infect *E. coli* and other coliforms possess similar size and structural characteristics to enteric viruses. Therefore, bacteriophages are attractive candidates as indicators of enteric viruses in the surface waters and serve as simple water quality assessment tools to diagnose human health risks. In this study, we evaluated the potential of bacteriophages as an indicator of the microbiological quality of water. Water samples were collected at two representative study sites: Mulgum of Nakdong River and the Hoidong reservoir which supplies water to Busan City. DNA somatic phages were detected in 75% samples of Mulgum and 70% samples of Hoidong, while RNA male specific phages ranged from 22-0 PFU/10 L in Mulgum and 25 PFU/10 L in Hoidong. Enteroviruses were detected in 6 cases of Mulgum region and in 5 cases in Hoidong. *Noroviruses* were not detected in any of the samples. Both somatic phages and male specific phage were detected in the *Enterovirus* positive samples. In conclusion, detection of an index organism like bacteriophage before pathogenic bacteria analysis could be a major tool to predict the presence of enteric viruses.

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