



3rd INTERNATIONAL PROBIOTIC CONFERENCE

Title: ANTIMUTAGENIC PROPERTY OF EXOPOLYSACCHARIDE-PRODUCING LACTIC ACID BACTERIA

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Cancer is a serious problem in human medicine. Treatments by synthetic therapeutics, radiation and by surgery are rather expensive and related to several side effects. Mutations in key regulatory genes alter the behaviour of cells and can potentially cause cancer. The high degree of correlation between in vitro mutagenicity and in vivo carcinogenicity explains the role of mutations in cancer formation. Probiotic bacteria for instance: *Lactobacillus acidophilus*, *L. rhamnosus*, *Bifidobacterium* spp. and their products of fermentation are claimed to provide antimutagenic and anticarcinogenic actions. The polysaccharide component of bacterial cell wall or bacterial metabolites of lactic acid bacteria (LAB), are known to mediate a non specific host immune modulation, and control the growth or inhibit cancer cells in vivo. Exopolysaccharide (EPS) producing probiotics significantly attenuated experimental colitis, which may be mediated by exopolysaccharide in a dose-dependent manner. Therefore, EPS producing probiotics may have a promising therapeutic role in inflammatory bowel disease and possibly to control the cancers. Presence of mutagens can cause irrecoverable damage to DNA which could lead to carcinogenic conditions. The mechanism of antimutagenic activities of fermented dairy products or probiotic bacteria has not yet been clearly understood. Binding of mutagens to microbial cells has been suggested to be a possible mechanism of antimutagenicity. In this scenario our investigation was carried out to observe the antimutagenic properties of acid and bile salt tolerant exopolysaccharide-producing LAB against the mutagens; 4-Nitroquinoline-N-oxide (NQNO) and 2-Nitrofluorine (NF). The role of milk fermented by *L. rhamnosus*, acetone extract of ferment and EPS produced by it, were investigated on mutagen binding or deactivation by Ames Test. *L. rhamnosus* YHOC137 and *L. plantarum* NYC30 which are acid and bile tolerant strains showed 25 to 70% absorption of both mutagens by live and heat killed cells. *L. brevis* NVC14 showed less than 20% absorption. The pattern of mutagen absorption or deactivation varied greatly for different species and the type of mutagens. Milk cultured by *L. rhamnosus* YHOC137 showed significantly ($P < 0.05$) reduction of revertants in both mutagens. Fermented milk and acetone extract showed antimutagenicity of 29.18 to 38.91% and 8.67% to 54.46%, respectively, depending upon the tested strains. The high molecular weight neutral heteropolysaccharide had less effect against mutagenicity caused by 4NQNO and was prominent against 2NF.

Conclusion

Consumption of fermented milk has a long history for dietary purpose. Binding of mutagens to microbial cells has been suggested to be a possible mechanism of antimutagenicity. In our investigation absorption of mutagens by both live and killed cells of *L. rhamnosus* YHOC137 and *L. Plantarum* NYC30 was observed. Milk fermented by *L. rhamnosus* YHOC137 at suitable condition for EPS production and acetone extract of fermented milk showed antimutagenicity against 4NQNO and 2NF. To identify the factor responsible for antimutagenicity, EPS from *L. rhamnosus* YHOC137 was tested which showed moderate antimutagenicity against 2NF. This has suspected the unknown factor for antimutagenic action might be EPS. Further studies on antimutagenicity of EPS produced by *L. rhamnosus* YHOC137 in dose dependant manner against various dietary mutagens or chemical mutagens should be done to explore the complete idea on deactivation or binding of mutagens by EPS and must be completed by field studies before claiming such positive effects for the potential probiotic cultures.

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