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Review Article

LAB AS REMEDY FOR HEALTH PROBLEMS: REVIEW PAPER

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Abstract

Lactic acid bacteria organisms have potential ability to acts as biological control agents to inhibit growth of pathogens and furthermore they have ability to produced anti-fungal and antibacterial compounds that can constrain and preclude pathogens proliferation and infectious diseases, therefore they play significant role in preventing diseases. Its antibacterial and anti-fungal activity and possible use as a diseases treatment has been studied in a few number of medical science. Its application for the control of some pathogens and food spoilage organisms as biological control agents has been approved in a number of countries. Biological control is an alternative approach for the treatment of infections. The mechanisms involved in bio control are hyper parasitism or predation, production of antibiotics, lytic enzymes and induction of host resistance. The ability to produce several antibacterial and antifungal substances confers a bio preservation and Biological control potential to lactic acid bacteria. The bio control potential of lactic acid bacteria is demonstrated in the prevention of different infectious diseases. Thus, living cells or product formulations of lactic acid bacteria may be prepared and used as an alternative bio preservatives and bio control technology.

Keywords: Biological control agents, Pathogens, Diseases.

1. Introduction

Fermentation is known as one of the oldest forms of food preservation in the world. Fermentation can increase the shelf life of meat, fish, fruit and vegetables that are highly perishable due to their high water contents and nutritive values, especially in tropical countries like Indonesia. Preservation of foods occurs through lactic acid, alcoholic, acetic acid and high salt fermentations. Besides preserving foods, fermentation also changes the organoleptic characteristics of foods through developing a wide diversity of flavors, aromas and textures. Moreover, fermentation may improve digestibility and nutritional quality through enrichment of food substrates with vitamins, proteins, essential amino acids and essential fatty acids.

LAB in fermented foods are of interest not only for their role in fermentation but also for their role in promoting positive health impacts. Although historically the fermented products associated with beneficial LAB were milk-based, much research has been directed to exploring LAB from other fermented foods as potential probiotics. The probiotic bacteria used in commercial products are mainly members of the genera Lactobacillus and Bifidobacterium (Heller, 2001). Probiotic bacteria are usually those bacteria that have

adapted to the gastrointestinal environment. However, recent research has shown promising probiotic activity of LAB isolated from fermented foods (Rhee et al., 2011). Some potential benefits may result from growth and action of the bacteria during the manufacture of cultured foods. Some may result from growth and action of certain species of the lactic acid bacteria in the intestinal tract following ingestion of foods containing them. In selecting a culture to produce a specific benefit it is necessary to consider not only the wide variation among species of the lactic acid bacteria but also that among strains within a given species. With the possible exception of improving lactose utilization by persons who are lactose maldigestors, no specific health or nutritional claims can yet be made for the lactic acid bacteria.

Recent studies have demonstrated that bacterial community composition is considerably altered in diseases such as obesity and periodontal disease, with healthy subjects usually exhibiting distinct, diverse and temporally stable bacterial populations at these sites when compared with patients displaying disease symptoms (Nuraidaet al., 2014). As consumers become aware of the impact of what they eat on their health, they tend to search for functional foods. Attention has been paid to prevention of diseases than cure and hence, probiotic containing foods are abundant on the market. Therefore this paper is aimed to address the medical important of lactic acid bacteria in preventing and control infectious disease in human beings.

2. Prevention and treatment of dental caries

As some evidence suggests that species of some species of LAB have beneficial effects in the oral cavity by inhibiting cariogenic bacteria (Meurman, 2005; Galganoet al., 2012, 56, and Jain and Sharma, 2012). The potential application of LAB as a remedy for oral infections is of research interest, and clinical studies carried out thus far suggest that LAB could be critical in preventing and treating dental caries, periodontal disease, and halitosis (Bonifaitet al., 2009). As one study (Naseet al., 2001) revealed that Lactobacillusrhamnosus GG, ATTC (LGG) was demonstrated to be antagonistic to many bacteria, including S. mutans, which is responsible for tooth decay. A survey of novel technologies for the prevention of dental caries has been conducted, and these include the use of probiotics (Barlow, 2010). Dental caries and their biofilms can be treated by using probiotic lactobacilli and bifidobacteria from dairy products, tablets, lozenges, and chewing gum in various dose regimens. Results from randomized clinical trials are promising although further large-scale trials with orally derived anticaries bacteria are essential for the success of bacteriotherapy (Twetman, 2012).

3. Prevention of diabetes

Earlier studies suggest that probiotic bacteria play an important role in management of insulin independent diabetes, with one study particularly indicating that the oral administration of L. casei in mice causes a decrease in plasma glucose levels. Bacterial metabolism of nutrients in the gut is suggested to influence the release of bioactive compounds which interact with host cellular targets to control energy metabolism and immunity, resulting in less fat mass development, diabetes, and low levels of inflammation associated with obesity (BushanChachra, 2010). A human randomized, doubleblind, placebo-controlled trial concluded that probiotic bacteria induce beneficial changes in gut microbiota, reduce the systemic inflammatory state through altering systemic endotoxin levels, thereby reducing the systemic inflammatory response observed in type II diabetes mellitus subjects (Alokailet al., 2013). Studies with mice indicate that antidiabetic activity of probiotic LAB could emanate from continuous reduction of the blood glucose through the suppression of glucose absorption from the intestine, thus indicating that specific strains of LAB are crucial for the management of type II diabetes (Honda et al., 2012). Consumption of yoghurt, rich in probiotic bacteria, may exert antidiabetic and antioxidant

properties in human subjects and human microflora and is likely to have a major role in maintaining the homeostasis of human metabolism, suggesting that probiotics intake is a useful approach for modulation of human microbiota (Naydenov et al., 2012).

4. Lowering serum cholesterol levels

Studies conducted to explore the role of probiotic bacteria in the reduction of serum cholesterol showed promising results where cholesterol precipitated out during in vitro studies with a possibility of the same being excreted under in vivo conditions (Roos and Katan, 2000). Probiotic bacteria able to reduce cholesterol in blood can be obtained from carnivores because they normally eat meat containing high fat and rarely develop cardiovascular conditions. Isolation and characterization of such strains of bacteria has a potential application in controlling cholesterol levels in humans (Ma, 2004). *Bifidobacterium longum* SPM 1207 is able to reduce serum total cholesterol and low-density lipoproteins which are associated with bad cholesterol levels, while slightly increasing serum high-density lipoproteins, which are associated with good cholesterol. This suggests that a combination of LAB from the genus Bifidobacterium and Lactobacillus could result in robust probiotics as the latter genera produce bacteriocins (Kumar et al., 2012; Lee et al., 2005 and Lee et al., 2007). A Lactobacillus oris HMI68 was successfully isolated from a mother's milk and this strain demonstrated cholesterol reducing property and was regarded as a candidate probiotic (Anandharaj and Sivasankari, 2014).

5. Effects on diarrheal diseases

Lactobacillus GG strain has been to be very effective against viral and idiopathic diarrhea as identified by Harish and Vargese in their studies (Harish and Vargese, 2006). Canani et al. (2007) investigated the effects of lactic acid bacteria (*Lactobacillus rhamnosus, Lactobacillus plantrum*, Bifidobacterium, and *Enterococcus faeciumSF68*) on children of 6 to 36 months of age with diarrheal complication and found that these were effective in preventing diarrheal complications. Bactobacillus GG was found to be more effective antidiarrheal agent Streptococcus faecium strain SF68 was effective against diarrhea associated with respiratory tract infection. Due to these beneficial effects of lactic acid bacteria in Diarrheal disease especially in children, use of LAB containing food such as yogurt and fermented milk should be promoted in children.

6. Role of lactic acid bacteria in treating ulcer

Myllyluoma et al., in their study reported the beneficial effects of Lactic acid bacteria in gastric ulcer. If LAB are used in combination of antiulcerative therapy then results are astonishingly fast recovery and improved efficacy of therapy. In LAB use of *Lactococcus rhamnosus* as an adjuvant therapy during H. pylori eradication has been proved (Myllyluoma et al., 2007). *Lactococcus rhamnosus* not only is used as adjunct in anti-ulcerative therapy but also reduced ethanol-induced mucosal lesion. Pre-treatment with *Lactococcus rhamnosus* also significantly increases the basal mucosal prostaglandin E2 (PGE2) level, also attenuates the suppressive actions of ethanol on mucus secreting layer and transmucosal resistance and reduces cellular apoptosis in the gastric mucosa. Hence we can say *Lactococcus rhamnosus* is an antiulcerative in many ways as reported by researchers (Lam et al., 2007).

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