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Influenze of probiotic bacteria on Immune system

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Abstract

The intestinal microflora is important for the maturation of the immune system, the development of normal intestinal morphology and in order to maintain a chronic and immunologically balanced inflammatory response. The micro intestinal mucosa helps in the prevention of the attachment of pathogenic microorganisms and the entry of allergens. Probiotics improves the immune status of the individuals, which was detected by checking the levels of IgG and IgM for *E. coli* infection for a period of one month. Control animals showed a increase in the level of Immunoglobulins both IgG and IgM, indicated the level of infection where as test animals did not show any increase in the level of Immunoglobulins.

Keywords: Immune system, Inflammatory response, Immunoglobulins, Allergens, Probiotic

INTRODUCTION

In the recent years, Probiotics have been defined more precisely as "mono or mixed cultures of live microorganisms which, when applied to animals or humans beneficially affect the host by improving the proportion of the indigenous microflora (Havenaar *et al.,* 1992). Probiotic microbes (LAB) may influence the systemic immune systems in various ways (Perdigon *et al.,* 1995). First of all they enhance the defensive property of intestinal mucosa whose function is like a barrier against the antigens. For example, Crohn's disease associated with impairment of the barrier function, can be cured by including probiotic supplement in patient's diet (Isolauri *et al.,* 1999). Probiotics were shown to modulate the host's immune responses to foreign antigens with a potential to dampen hypersensitivity reactions (Isolauri *et al.*, 1999). Western civilization is witnessing a progressive increase in immune – mediated, gut-related health problems, such as allergies and autoimmune and inflammatory disease. It may be due to the modern life style in hygiene and nutrition. These have been a decline in the incidence of microbial stimulation of host immune system as a result of improved hygiene, vaccination and antimicrobial medication. The development of probiotic functional foods provides a microbial stimulus to the host immune system by means of beneficial live microorganism (Isolauri, 2001). Similarly, probiotic fresh cheese (PFC) is a suitable vehicle for the oral administration of *Streptococcus thermophilus*, *Lactococcus lactis*, *Bifidobacterium bifidum*, *Lactobacillus acidophilus* and *Lactobacillus paracasei*, which exerts, immunomodulating effect in the gut (Medici *et al*., 2004).

MATERIALS AND METHODS

Probiotics improves the immune status of the individual, which was detected by checking the levels of immunoglobulins. Four weeks old mice were taken, one of the mice was fed with feed consisting of S2, the second mice was fed with S3 and the third with feed having a mixture of S2 & S3 cultures, the fourth mice was given a feed with out probiotic. The immunological status of these test animals for *E.coli* infection was analyzed in terms of IgG and IgM levels at weekly intervals for a period of one month.

(i) IgM (immuno turbidimetric assay)

10µl of sample was added to the 700 µl of reagent 1 (Saline 9g/L, Sodium azide 0.95 g/L) and incubated for 5 minutes. Then 100µl of reagent 2 (Polyclonal goat antihuman IgM, phosphate buffer pH 7.43, Sodiumazide 0.95 g/L) was added and again incubated for 5 minutes and the absorbance was read at 340nm.

(ii) IgG (immuno turbidometric assay)

10µl of sample was added to the 500µl of reagent 1 (Saline 9g/L, Sodium azide 0.95 g/L) and incubated for 5 minutes. Then 50µl of reagent 2 (Polyclonal goat antihuman IgG phosphate buffer pH 7.43, Sodium azide 0.95 g/L) was added and again incubated for 5 minutes and the absorbance was read at 340nm.

RESULTS

Probiotics improves the immune status of the individuals, which was detected by checking the levels of IgG and IgM for *E. coli* infection for a period of one month (Fig.28 and 29). Control animals showed a increase in the level of Immunoglobulins both IgG and IgM, indicated the level of infection where as test

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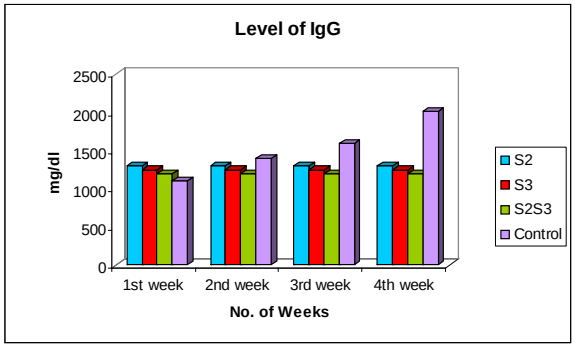
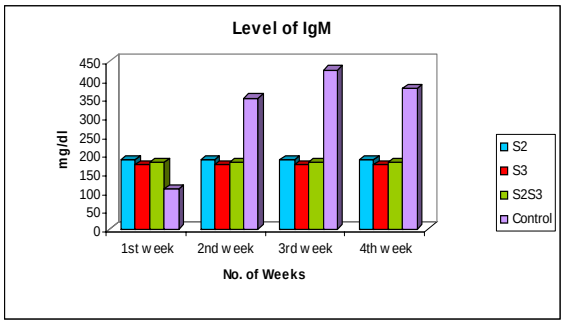
animals did not show any increase in the level of Immunoglobulins.

Immune status





DISCUSSION

Before infection, the IgG and IgM levels were found to be in the normal range, in all the animals (Fig.28 and 29). After infection, the mice which had normal feed, developed infection, which was shown by increase in the levels of the IgM in the second week. Subsequently the levels of IgG also started to increase during the 3 rd week. In the 4th week the levels of IgG and IgM were found to be high (Fig.28 and 29). However, the mice fed with S2, S3 and S2 S3 also had normal levels of IgG and IgM. This may be attributed to the presence of probiotic bacteria in the feed which might not have allowed the *E. coli* to colonize in the intestine. This view also gains support from the removal of higher number of fecal coliforms (Table 20). Isolauri *et al.* (2001) stated that the earliest and most substantial driving forces for the development of the defense mechanisms in the gut are derived from dietary and microbial antigens. Heyman (2000) reported that the beneficial effects of LAB are more in the presence of live bacteria, but inactivated bacteria may also has preventive or curative capacities in diarrheal diseases. It also offers a non-specific immune defense against particulate antigens and perhaps to soluble food antigens. Thus the present study lends support to the previous reports suggesting an improvement in the immune defense.

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