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Rare Species Milk as a New Source for Potential LABs

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Abstract

Present exploration depicts rare species milk as the new source in search of novel starter cultures i.e. lactic acid bacteria (LABs). Camel milk itself is very nutritional and rich source of initial feed to infants. The term probiotics is very popular from the last few decades so as the result search of new sources for the hunt of novel probiotic strains increased. Efficient probiotics fulfill the current market demand for the development of new industrial products. This study focuses on the significance of rare species milk i.e. camel milk and the essential probiotic attributes concerned for starters might be used in industrial applications.

Keywords: Camel milk; Probiotics; Micro flora; Lactic acid bacteria;

Introduction

Figure 1: Representing the milk composition of four different camel breeds in India.

In today's life every single (human being) is consuming the functional foods in the form of dairy or non-dairy products. Functional foods comprised of probiotics i.e. live bacteria. Etymologically probiotics are pro (for) and bios (life). According to FAO probiotics are defined as "live microorganisms which when administered in adequate amounts confer a health benefit on the host" [1]. Lactic acid bacteria genus considered to be safe and exhibit the properties to be called as probiotics. In current market scenario as the demand of probiotics is increasing so as the demand of new starter cultures for the product development. Therefore, to find the new sources is very important for the isolation of novel starter cultures. Among the dairy sources many rare species Milk might be used as a source, and one of them is

camel milk. In India vast diversity of mammalian species are present but our society totally depends on cow and buffalo milk for the initial nutrition only because no one can access the milk from other thousands of species. And it is due to the fact of lack of knowledge and awareness regarding the benefits of rare species milk. The worlds camel population is 23.9 million out of which 0.45 million is contributed by India [2]. Different breeds of camel are present in India (Bikaneri, Mewari, Kachhi and Jaisalmeri) [3]. Being a ship of the desert camel does tolerate harsh climatic conditions and even in the scarcity of water they produce more milk with longer lactation period other than any species. Camel milk being rare species milk is very rich in nutrients like proteins, minerals and vitamins. Milk composition values of different breeds are shown in (Figure 1). It specifically contains lot of protective proteins and immunoglobulin's which helps in improving the immune system. It lacks the allergic proteins which are present in cow's milk. This is the solution towards the cow milk allergies, this might act as a substitute as a weaning feed for babies. Even for adults this rare milk is very valuable and beneficial for health because it is good in many disorders like allergies, autism and even in cancer.

With all these good prospects of camel milk its indigenous micro flora is also rich in LABs (lactic acid bacteria) which are termed as a safe species group of bacteria or GRAS (generally recognized as safe) [4,5]. LABs are known for their probiotic potential and they might use as starter cultures for dairy and non-dairy product development. The examples of LABs with probiotic application are *Lactobacillus plantarum, Lactobacillus brevis, Lactococcus lactis, Bifidobacterium* and many more. LABs are gram positive and catalase negative species which are able to produce lactic acid as an end product from fermentation. Further these strains might act as a probiotic feed for weaning babies and come up as the solution of wholesome food for the nutrition in growing stage. It is predominant to comment that probiotic potential of bacteria is very much strain specific. It is very important to recognize and identify the bacterial species so that it might be apt for industrial applications.

Probiotic Attributes and Associated Health Benefits

It is mandate for potential probiotic; bacterial species must exhibit some probiotic attributes within and exert beneficial effects on the host. Major traits to be called as probiotics are determined by *in vitro* tests:

a. Acid and bile salt tolerance is important criteria for strains;

b. Bile salt hydrolase activity;

c. Cell surface hydrophobicity;

d. *In vitro* cell adhesion to mucosal epithelial surfaces;

e. Antimicrobial activity against pathogenic bacteria;

f. Antibiotic resistance [1].

These in vitro parameters are the prerequisites for the probiotic strains and shown in Figure 2. As far as dose of probiotics is concerned, the lowest concentration 10^6 CFU/mL is consumed daily for the visible good probiotic effect. Different probiotic mechanisms are associated with the human health which may include the production of antimicrobial substances like bacteriocins, acidic pH of gut, and competitive adherence to mucosal epithelial surface, providing the gut barrier functions as well as enhancing the immune system [6]. There are clinically proven evidences that actually prove the associated health benefits of the probiotics. According to Russo et al. [7] and Orlando et al. [8] probiotic *Lactobacillus rhamnosus* strain GG (LGG) and *Bifidobacterium adolescentis* SPM0212 showed a significant anti proliferative role and inhibit human gastric cancer cells and three colonic cancer cells lines including HT-29, SW 480, and Caco-2 [7,8]. The probiotic mechanism for decreasing the proliferation of cells and treatment still needs to be understood and more research is required. Probiotics are also helpful in allergies by moderating the allergic response. Allergic reactions occur when an immune system reacts with an allergen. Numbers of bacterial cultures were studied are very limited for their ability in the treatment and prevention of allergies in infants. Studies showed that *L. rhamnosus* GG has been successful in preventing the occurrence of atopic eczema in infants, when delivered to mothers who had already first-degree atopic eczema, allergic rhinitis or asthma [9]. Health benefits of probiotics are not limited there are other; they contribute in reduction of cholesterol levels and eventually leads to reduction in coronary heart diseases, autism and bacterial vaginosis in women's. The mechanism of probiotics behind the reduction of cholesterol level in serum is due to the presence of BSH activity which helps in absorbing the cholesterol from the gut. These properties are strain specific in nature and vary with strain to strain. There is more need of valuable research regarding the clinical evidences of health benefits of probiotics.

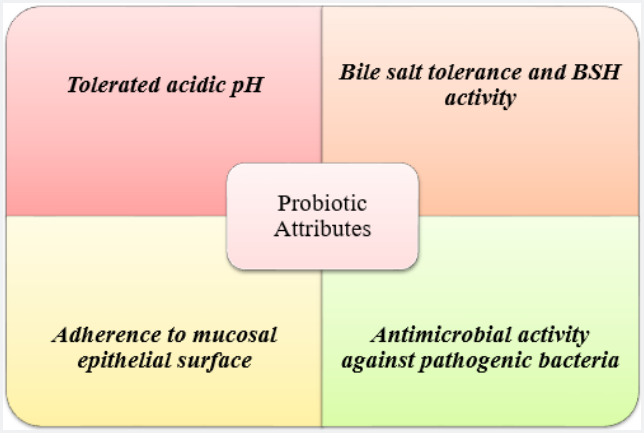

Figure 2: Prominent probiotic attributes.

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Conclusion

It can be concluded from the present study that, rare species milk are the good source for the isolation of novel LABs. Utilization of rare species milk needs to be considered by creating the awareness among the society. As far as their probiotic activity is concerned, remains to be validated in future studies.

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