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# Role of Lactic Acid Bacteria Isolated from Goat Milk in Cancer Prevention

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## Abstract

Lactic acid bacteria, act as probiotics, isolated from goat milk has various medicinal properties. The studies have found out that the LAB of goat milk plays an important role in prevention of colon and colorectal cancer. It has been observed that along with biologically active peptides, bacterial species of LAB like *L. plantarum* and *L. paracasei* has inhibited the proliferation of HeLa cell lines. The mechanism of action of preventing role of these bacteria is still under study.

**Keywords**: Lactic acid bacteria; Goat milk; Cancer prevention

## Introduction

Lactic Acid bacteria are well known for their medicinal properties therefore it is considered as major source of probiotics [1]. Now a day's probiotics are becoming an essential part of the human diet. These bacteria can be isolated from different sources like milk, milk products, meat, fish and prawn etc. and it can also be found in human gut and intestine [2-5]. LAB strains isolated from goat milk may exhibit the more medicinal characteristics compare to other bacterial source. It is well known that the Goat milk is preferred over the cow or buffalos milk because of its highest nutritional value [6]. Due to limited sources and expensiveness of the milk production, it has been rarely used in homes. Besides goat milk is strongly recommended to those who have allergy to cow milk and also recommended to pregnant women and infant to fulfil their nutritional requirements for growth [7]. The minerals, vitamins, enzymes, proteins, electrolytes, fatty acids, trace elements and Lactic acid bacteria (probiotic) present on goat milk are help the human body to fight against the various diseases like diarrhoea, gastrointestinal disturbances, vomiting, constipation and respiratory disorders [8]. Especially in infants goat milk helps to improve the digestive system and increase the immunity of the body [9]. It has been also studied that goat milk has a remarkable role in prevention of various types of cancers specially colon cancer and colorectal cancer [10].

## LAB of Goat Milk and its Cancer Preventing Role

The lots of studies have been done so far to evaluate the role of different components of the goat milk in cancer prevention [8]. It has been suggested that protein of milk that can be act as precursor of various biologically active peptides have anticancer properties. The biologically active peptides of milk proteins even get commercialized due to their various physiological and pharmaceutical roles against the different disease including cancer [12]. In spite of these milk proteins, the Lactic Acid Bacteria present in goat milk can have potential role in fighting against the cancer [13,14]. These Lactic acid Bacteria can also act as probiotics and taken as a food supplement on regular basis (15). According to Setyawardani et al., goat milk have approximately 61% of lactic acid bacteria has heterofermentative characteristics and 39% of them have homofermentative characteristics [16]. A lot of studies have worked on identification and characterization of the lactic acid bacteria isolated from goat milk. The results of these studies have isolated the different species of bacteria that *includes Lactobacillus acidophilus, L. reutei, L. plantarum, L. casei, L. paracasei, L. bulgaricus, L. lactis, Bafidobacterium bifidum, B. longum, B. lactis* and *streptococcus thermophiles*. These are gram positive bacteria having negative catalase activity and most of them grow anaerobically (17,18]. These bacteria have studied against the prevention of colon cancer and coloractal cancer [19,20]. It has been studied that LAB present in goat milk reduces the risk of occurrence of cancer, toxicity of the carcinogens and suppression of tumors [9]. A single study has been done on the Hela cell lines to prove the anti- cancerous properties of bacteria isolated from goat milk. This study have taken fermented goat milk with the homolysate of two bacterial species viz *L. plantarum* and *L. paracasei* and showed the inhibited growth of HeLa cell lines [21]. Besides, a few studies have been done to show the anticancer activity of other LAB isolates of the goat milk. The increase in the immunity of the body against the cancerous cells by LAB bacteria is still under the study. On the contrary, it has also been controversial that how these bacteria can act as anticancer agents. A study by Shida K. on *Lactobacillus casei* strain *Shirota* has showed the mechanism of action of bacteria in the process of cancer prevention. It has been suggested that *L. casei* has ability to augment the NK cells activity which stimulate the production of IL-12 from macrophages or monocytes [22]. However, the mechanism of action of other bacteria in cancer prevention is hot topic of the research [23]. Lastly, According to M. Villa-Garcia we can isolate these bacteria from goat milk and microencapsulate them to further use as probiotics against the cancer [24].

## Discussion

Plethora of studies has been done to identify the preventing role of Lactic Acid Bacteria of goat milk in cancer. A study has shown that these bacteria have remarkable capability to prevent the colon and colorectal cancer [11]. Because of presence of LAB, goat milk known to have anti cancer property. In contrast, the other sources of LAB can possess anti cancer activity but it has been shown that goat milk has more medicinal properties as compare to other sources of LAB like fish, meat, cow milk etc. [7]. Nandhini, B. and M. Palaniswamy have observed the inhibitory

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effects of LAB strains isolated from goat milk on HeLa cell lines [21]. This showed that the strains of LAB of goat milk may have unique mechanism of action in inhibition of proliferation of cancer. The result of another study on *L. casei* has proved that the bacterial strain involved in stimulating the production of IL-12 from macrophages or monocytes which increase the immunity against the cancerous cells [22]. The only mechanism that has been studied on LAB strains of goat milk.

In crux, the lactic acid bacteria are widely used as probiotics to get essential nutrition. Along with its nutritional value, these bacteria have property of cancer prevention which can be studied further on the basis of mechanism of action. The study on these bacterial strains of goat milk can bolster to the research on cancer prevention.

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