OPINION

For the preservation and fortification of meat, use Lactic Acid Bacteria (LAB), an indigenous and probiotic microbe

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Williams J. For the preservation and fortification of meat, use Lactic Acid Bacteria (LAB), an indigenous and probiotic microbe. Appl Food Sci. J.2022;6(3):31-2.

ABSTRACT

The increased customer concern for food safety, product quality, and the avoidance of artificial food preservatives has led to a breakthrough in biopreservation. Consequently, the adoption of advantageous microbial species, such as bacteria and their secondary metabolites to extend the shelf life and improve the nutritional value of the food goods. Given that they apply to the bulk of food goods, meat preservation and fortification are among the top issues. The traditional chemical preservatives employed to preserve meat and animal products have various negative repercussions on customers. Alternative approaches are therefore required to strategically battle to improve quality and shelf life. LABs, or lactic acid bacteria, are the most secure creature with a significant impact on food and food processing industries.

Key Words: *Food safety; Food fortification; Food microbiology; Shelf-life; Antimicrobial metabolites*

INTRODUCTION

The use of bio preservatives for food safety has been mandated by customers' rising opposition to food containing chemical preservatives and additives. The use of additives helps preserve food's quality and freshness, fortifies or adds nutritional content, and improves food's palatability (taste and look). The most popular choice nowadays for natural preservatives to extend shelf life is beneficial microorganisms and their metabolites. Since meat includes a variety of vital nutrients that promote health and growth, it has long been a significant component of the human diet. Meat and meat products are among the processed foods that pose a significant challenge to the food industry because *Listeria monocytogenes* and other potentially harmful bacteria can contaminate fresh meat and meat products, which cannot be handled solely through physical means like pH lowering, freezing, or salting. Therefore, these issues are caused by typical food-degrading microbes. Using Lactic Acid Bacteria (LAB) and making wise use of their antibacterial capabilities, such as producing bacteriocins and the major metabolite lactic acid, which may lower pH and prevent the growth of a number of food spoilage organisms, is one of the most popular ways to deal with such issues. The respiratory, gastrointestinal, and vaginal systems of people and animals, sewage, and plant materials are just a few of the environments where LAB may develop. It can also grow in fermented meat, vegetables, fruits, drinks, and dairy products. They often inhabit nutrient-dense settings. They compete effectively and aggressively with other microbial species for the nutrients, which significantly increases their survivability. They need fermentable carbohydrates, amino acids, fatty acids, salts, and vitamins for their development. This causes the metabolic activities to be increased, producing the required sort of metabolites that have an inhibitory impact on pathogenic microbes and food-spoilage microorganisms. The homofermentative LAB is mostly employed in the process of meat preservation because it can manufacture lactic acid from many types of fermentative carbohydrate sources found in meats. The LAB group's bacteriocins can be employed as effective meat and meat-based product preservatives. The use of LAB for the preservation and fortification of meat and meat products is the subject of the current

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Received: 3-May-2022, Manuscript No. pulafsj-22-5390; Editor assigned: 7-May-2022, Pre QC No. pulafsj-22-5390 (PQ); Reviewed: 19-May-2022, QC No. pulafsj-22-5390 (Q); Revised: 21-May-2022, Manuscript No. pulafsj-22-5390 (R); Published: 28-May-2022, DOI:10.37532/PULAFSJ .2022.6(3).31-2.

review. The class of ribosomally produced antimicrobial peptides known as bacteriocins. Over time, several scientists contributed their categorization theories for LAB bacteriocins. Bacteriocins made in a laboratory are little, heat-stable, amphiphilic, and membrane-permeabilizing substances. Three classifications can be used to categorise these LAB bacteriocins. An ionic cell the bacteria that produce bacteriocins have teichoic and lipoteichoic acids in their cell walls, which have a significant impact on how these anionic bacteriocins first interact. These bacteriocins also exhibit a wider spectrum of antibacterial action at lower pH levels because their characteristics and cell wall are pH-dependent. Lantibiotics, non-lantibiotics, and bacteriocins are the three main categories of LAB bacteriocins. The structural bacteriocin gene encodes the function of bacteriocin having N-Terminal leader sequence, which assists in identifying the transporter system and prevents activation of bacteriocin when present within the producer cell.

CONCLUSION

There is a lengthy history behind the use of LAB in fermentation. There haven't been many researches done on the use of LAB as bio preservation agents, though, up to this point. Numerous studies have indicated that LAB proved effective for preserving meat and items related to meat. Only a few number of pure bacteriocins have received FDA certification for use as meat preservatives. In order to satisfy customer demand for food safety and security, the antimicrobial metabolites generated by LAB have a very high potential for preventing microbial harm to meat and related goods. They also aid in extending the shelf life of meat products, preventing the growth of harmful organisms, and contributing to its sensory qualities. The metabolites created by the LAB serve as a suitable substitute and have the power to reduce many financial losses that the industry experiences as a result of the deterioration of meat and meat products. The LAB group creates antimicrobial peptides that have the potential to replace routinely used additives and help standardise the quality of meat in accordance with customer demand. In comparison to the typical chemicals that are used for preservation, they also aid in extending the shelf-life of food and food products. Additionally, they assist in giving various meat products sensory qualities and in defending the meat products from various food-borne diseases. Large financial losses can be recovered Due to the complexity of food items, it has been discovered that the use of LAB in actual meat reduces antibacterial activity. When scaling up the same at the industrial level, other issues also appear. The regulatory framework that might complicate the use of new bacteriocins as food additives is now the biggest barrier. Their effectiveness is influenced by the storage conditions, including storage temperature and duration, pH range, and interactions with other food-associated microbial elements. Therefore, further study must be done to determine the mechanism that will improve their utilisation, whether it be in the form of a single dosage or a combined effect and the use of biopreservatives and other preservation methods.