

## عنوان مقاله:

Identification and investigation of the kinship relationships of Cas proteins in *Lactiplantibacillus plantarum* species

## محل انتشار:

اولین همایش منطقه ای دستاوردهای نوین و پژوهشهای دانش بنیان در میکروبیولوژی و بیوتکنولوژی (سال: 1401)

تعداد صفحات اصل مقاله: 1

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## خلاصه مقاله:

**Background and Objective:** *Lactiplantibacillus plantarum* belongs to the family of lactic acid bacteria. Lactic acid bacteria are microorganisms that produce lactic acid during their metabolic processes and play an important role in agriculture, food, and medical sectors, and because of their high ecological and metabolic compatibility, they are used in dairy industries as crops. They are primarily used in the production of fermented foods, which can improve the taste, texture, and organoleptic properties of food and dairy products. However, for the lactic acid bacteria industry, the infection caused by phages is a serious problem. It is very difficult to completely eliminate bacteriophages due to their resistance to pasteurization because they spread quickly and destroy the entire production chain and cause great economic losses. Bacteria have different methods to interact with bacteriophages, of which the CRISPR system is one of them. Therefore, the aim of the present study is to investigate and identify the kinship relationships of Cas proteins related to the defense system in *Lactiplantibacillus plantarum* species.

**Methods:** The CRISPR system includes Clustered Regularly Interspaced Short Palindromic Repeats and CRISPR-associated Protein called protein (Cas) and forms an adaptive defense system in bacteria and archaea. In this study, after extracting the genome sequence of *Lactiplantibacillus plantarum* from the NCBI database and performing Blastn, the Cas1 proteins related to the CRISPR systems of the species were investigated. Then, the multiple aligning the sequences using software Mega 7.0 was performed and the genetic distance as well as the kinship relationships were presented as an evolutionary tree.

**Results:** The results showed that among 675 isolates of *Lactiplantibacillus plantarum*, only 143 isolates contained Cas proteins. Among these, 125 isolates contained Cas proteins related to subtype II-A and 18 isolates contained Cas proteins related to subtype I-E. Cas9, Cas1, Cas2, and Csn2 proteins were identified in subtype II-A and Cas1, Cas3, Cas4e, Cas5, Cas6, Cas6, Cse2, and DEDDh proteins in subtype I-E. the phylogenetic results based on Cas1 proteins, the isolates containing Cas type II-A proteins were divided into two sub-clusters. Meanwhile, isolates IRG1, MHO2.9, and RI-146 were placed in an independent cluster compared to other isolates studied. Also, the investigation of the kinship relationships of isolates containing Cas proteins related to type I-E also showed that these isolates are also ... divided into two separate clusters so that isolates RI-191 and RI-165 are

## کلمات کلیدی:

Bacteriophage, CRISPR system, *Lactiplantibacillus plantarum*

