Antibiotics Crises: Bacteriocins from Whey of Cow's Milk Fermented by Kefir Grains: A Possible Solution?

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The development of antibiotics has meant a new era for microbial treatment and control. However, because of some natural and social problems, have emerged the "Antibiotics Crises" which, according to World Health Organization report of 2019, may cause 10 million deaths in 2050. Therefore, this project proposed to analyze the possible presence of bacteriocins, bacterial peptides produced at the level of ribosomes, in the whey from the fermentation of cow's milk by kefir grains according to their antibiotic actions and socio-cultural factors linked to the crises, to create alternatives to inactive antibiotics and also combat overuse of these drugs. After the whey extraction, their proteins were collected diluted in saline solution. Three main tests were performed with this protein solution: (1) electrophoresis - which allows the identification of bacteriocins from their molecular weight; (2) the challenges - which consist in the exposure of proteins to pathogenic organisms (Escherichia coli and Staphylococos aureus); (3) Minimum dose test - consists of identifying the lowest amount of active principle (protein substrate) necessary to obtain the antibiotic action against pathogens. For this purpose, three concentrations of the principle were tested: 1%, 3% and 5%. Applying these methods, the results indicated positive antimicrobial action by the protein substrate after 48 hours of exposure of the pathogens to proteins. Moreover, in electrophoresis, the presence of peptides with molecular weight below 10KDa was visualized, a size range that indicates, according to the literature, the presence of bacteriocins in the analyzed material. Finally, in the dose test was found that a minimum concentration of 3% of protein substrate was necessary to verify their antibiotic action.

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