



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



HANAA ALY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس التوثيق الإلكتروني والميكروفيلم

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**UTILIZATION OF BIO AND RADIO TECHNOLOGY
PROCESSES IN BACTERIOCIN PRODUCTION
BY LACTIC ACID BACTERIA**

By

AMIR MOHEB KAMEL YANNY

B.Sc. (Agric. Microbiology), Fac. of Agric., Ain Shams Univ., Egypt 2005

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ABSTRACT

Amir Moheb Kamel Yanny: Utilization of Bio and Radio Technology Processes in Bacteriocin Production by Lactic Acid Bacteria. Unpublished M.Sc.Thesis, Department of Agricultural Microbiology, Faculty of Agriculture, Ain Shams University, 2021.

Bacteriocinogenic agents have become much interest in recent years because, their potential bioactivity against some food borne pathogens that make them suitable as natural food preservatives. Therefore, this research study focused on isolation of lactic acid bacteria from several of Egyptian products, screening for capability of producing bacteriocin as antimicrobial agent against different bacterial pathogens. Then, selection of the optimal conditions and gamma effect on bacteriocin production.

Firstly, seventy one isolates from ten different Egyptian products were confirmed as lactic acid bacteria based on their characterization as, gram positive under microscopic observation, Catalase negative and acid production from glucose fermentation. Eight strains and seventy one isolates of lactic acid bacteria (LAB) were screened for the production of bioactive peptides against several indicator bacterial pathogens such as *Staphylococcus aureus*, *Listeria monocytogenes*, *Salmonella typhimurium* and others. Twenty eight isolates and all strains of LAB were displayed antimicrobial activity, antimicrobial test were carried out by bacteriocin partially purified precipitated with ammonium sulphate from isolates and LAB strains via disc diffusion method in nutrient agar seeded with target pathogens and incubated for 24 hours at 37°C. After incubation the inhibition zone surrounding disc paper was measured.

The most efficient of LAB standard Strains was *Lactobacillus rhamnosus*, while (R5) isolated from industrial yoghurt and (S6) isolated

from sour milk were the most efficient of LAB isolates. Gram-positive indicator pathogens were found to be higher sensitive to inhibitory bioactivity produced by the lactic bacteria as compared to gram-negative indicator pathogens, *Staphylococcus aureus* exhibited the highest sensitivity to it. Diameters of inhibition zone refer to degree of sensitivity between indicator strains and bacteriocin activity.

The optimal physical factors for higher production of the inhibitory bioactivity from *Lb. rhamnosus*, R5 and S6 were as following; 37°C for incubation temperature, initial pH was found to be 6.2, 5.5 and 7 respectively, 48h for incubation period, and aeration for *Lb. rhamnosus* and S6 was found to be microaerophilic, while agitation at 200 rpm for R5. On other hand, inoculum size had not effected on bacteriocin production. The optimal media composition were; glucose at 2% concentration, nitrogen sources were (PBY) Peptone 10g/l + Beef extract 8g/l + Yeast extract 4g/l, tween 80 was 0.1% for S6 and absence for others, 0.5% of sodium acetate, 0.2% of dipotassium phosphate, while tri-ammonium citrate was 0.4, 0.2 and 0.4% respectively. Highest production of gamma radiation doses were zero, 1.5 and 0.5 kGy respectively.

Keywords: lactic acid bacteria, MRS medium, antibacterial agent, bacteriocin, paper diffusion method, optimal condition and gamma radiation.

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