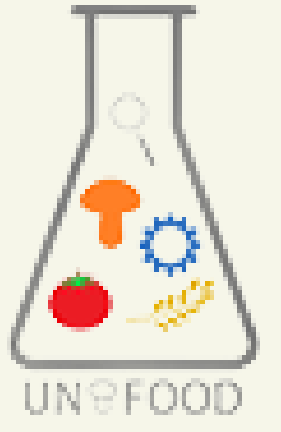


USE OF PROBIOTIC LACTIC ACID BACTERIA (LAB) IN THE CONTROL OF FOODBORNE PATHOGENS



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INTRODUCTION

Food safety and quality and their associated risks pose a major concern worldwide regarding not only the relative economical losses but also the potential danger to consumer's health. Foodborne illness is a serious public health concern. According to World Health Organization (WHO) 600 million, almost 1 in 10 people in the world, fall ill after eating contaminated food and 420 000 die every year. Unsafe food poses global health threats, endangering everyone. Infants, young children, pregnant women, the elderly and those with an underlying illness are particularly vulnerable. Several commonly used approaches to control foodborne pathogens include antibiotics, natural antimicrobials, bacteriophages, bacteriocins, ionizing radiations, and heat. Lactic acid bacteria (LAB) are a diverse group of microorganisms consisting of Gram-positive, aerotolerant, acid-tolerant, usually nonsporulating and nonrespiring rod or cocci microorganisms, and play an important role in the process of fermentation of food by inhibiting spoilage/pathogenic bacteria and by producing excellent flavor, aroma, and texture of fermented foods. Probiotics are live microorganisms that are intended to have health benefits when consumed or applied to the body. They can be found in yogurt and other fermented foods, dietary supplements, and beauty products.

OBJECTIVE

The aim of this work was to evaluate the use of probiotic lactic acid bacteria in the control of some food pathogens. The study was conducted with six strains of lactic acid bacteria isolated from Macedonian cheese against three food pathogens, *Listeria monocytogenes*, *Escherichia coli* and *Salmonella typhimurium*, using diffusion method.

METHODOLOGY

Phenotypic characterization was based on cell shape and Gram stain. The determination of the inhibitory effect of isolates on test bacteria was carried out according to the agar-disc diffusion method. All bacteria were cultured on nutrient broth medium and incubated at 37 °C for 24 hours. Nutrient agar medium (15 ml) was poured into each sterile Petri dish. Suspensions (100 µL) of target strain cultured for 24 hours were spread on the plates. Each sample (80 µL) was filled onto the discs of agar plates directly. The inoculated plates were incubated for 24 hours at 37 °C, and the diameter of the inhibition zone was measured with ruler as mm. The measurements were done basically from the edge at the zone to the edge of the wall.

RESULTS

Morphological studies indicated that the isolates are Gram-positive, rod-shaped bacteria. Four out of six isolates from the homemade cheese showed antibacterial activity against *Salmonella typhimurium* and two out of six isolates showed antibacterial activity against *Escherichia coli*. None of the isolates showed antibacterial activity against *Listeria monocytogenes*.

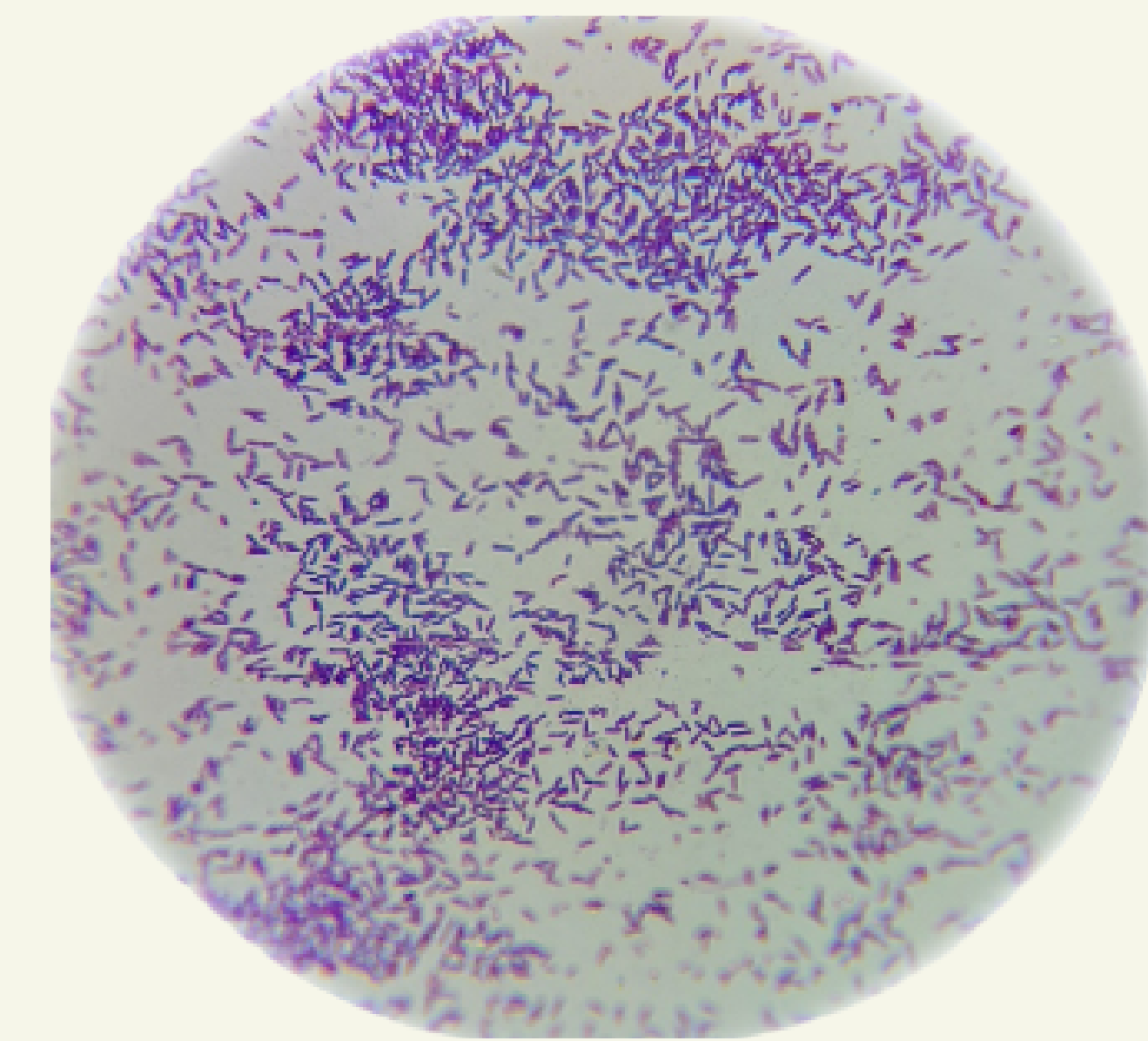


Figure 1. Microscopic image of LAB isolated from homemade cheese (Gram stain)

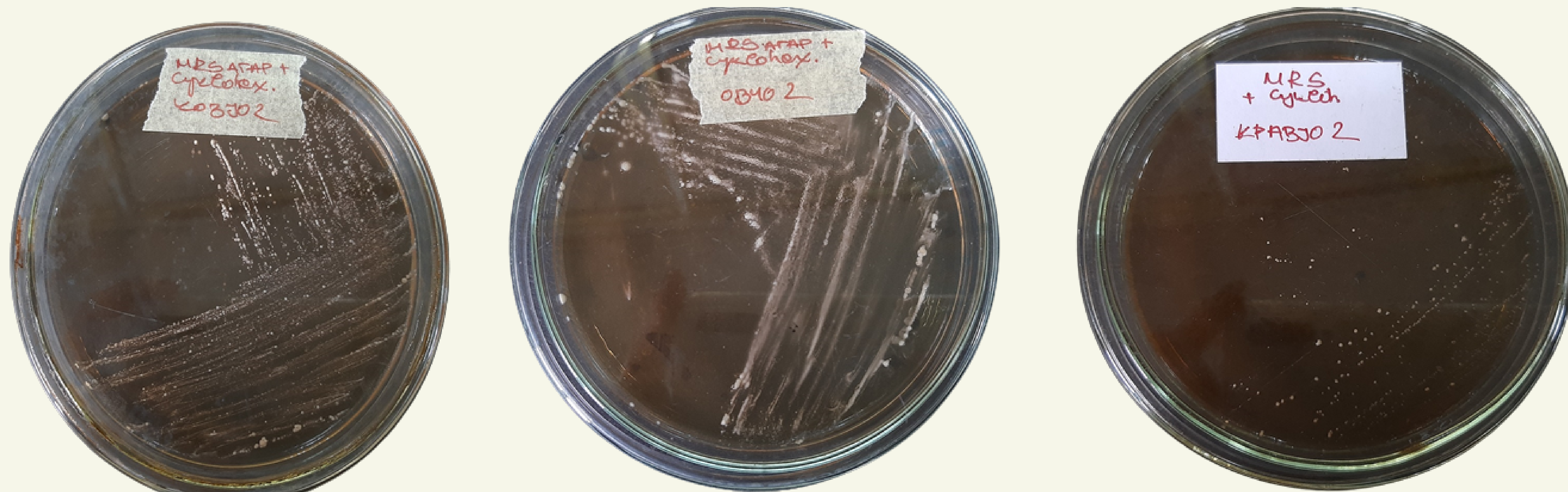


Figure 2. Macroscopic characteristics of LAB isolated from homemade cheese (MRS agar)

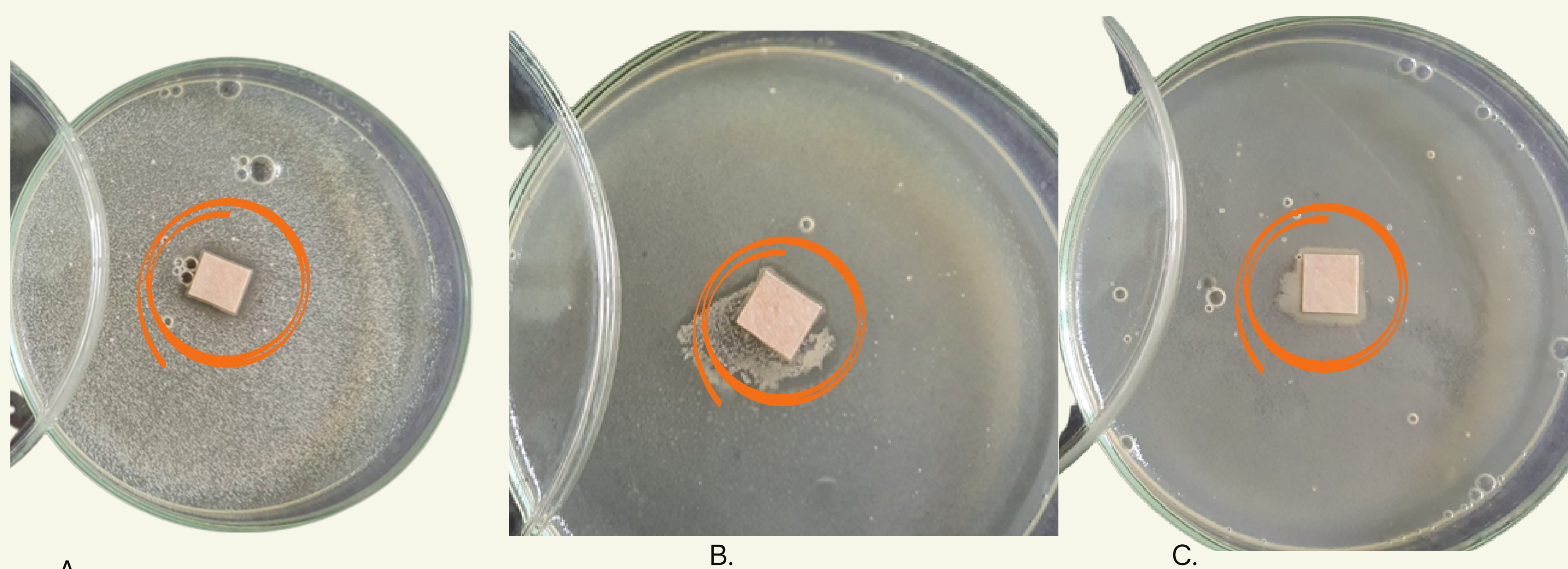


Figure 3. Agar disc diffusion method for determining the antibacterial activity of LABs isolated from homemade cheese against: A. *Salmonella typhimurium*, B. *Escherichia coli*, C. *Listeria monocytogenes*

CONCLUSION

Results showed that most of the isolates demonstrated antibacterial activity against tested bacteria, and should be consider as a potential strategy for the prevention and control of foodborne pathogens and foodborne infections. Our results show that probiotic lactic acid bacteria strains from foods can be excellent candidates in the control of foodborne pathogens.