

An *In Vitro* Assessment of Antibacterial and Hypolipidemic Activity of Lactic Acid Bacteria

Ayisha Aman ullah*, Tooba Shamim, Ayesha Siddiqui, Suad Naheed

Department of Biotechnology, Faculty of Science, Jinnah University for Women, Karachi, Pakistan.

*E-mail: ayisha.aman24@gmail.com

ABSTRACT

Probiotics are live microbes that exert wide range health benefits to host. Probiotics are generally regarded as safe (GRAS) and hence utilized as therapeutic agents for the cure of many illnesses. Lactic acid bacteria (LAB) are major probiotics. The goal of current research work was to screen potential lactic acid bacteria (LAB) from various fruit sources and to explore their two most important therapeutic properties i.e. antibacterial action and cholesterol assimilation. Isolated LAB strains showed great antibacterial potential against clinical pathogens. They also displayed remarkable capability to minimize cholesterol level *in vitro*.

Keywords: Antibacterial activity, Bile salts, coronary heart disease, de Mann Rogosa Sharpe, Hypercholesterolemia, Lactic acid bacteria

INTRODUCTION

Lactic acid bacteria (LAB) are categorized as probiotics. World Health Organization (WHO) explains probiotics as “living micro organisms that confer potential health merits when administer in sufficient quantities” (Liu *et al.*, 2022). Probiotics posses broad spectrum biotherapeutic abilities including improved digestion, enhanced immunity, suppression of cancer, anti microbial action and efficacy of cholesterol reduction. Lactic acid bacteria (LAB) are grouped in to genera including *Lactobacillus*, *Enterococcus* and *Bifidobacteria* (Ali *et al.*, 2021). The antibacterial action of lactic acid bacteria against various clinical pathogens has been extensively studied. They antagonize pathogenic bacteria by releasing wide range of antimicrobial agents (Suskovic *et al.*, 2010). Because of rapid emergence of multi drug resistant pathogens, LAB can be consumed as a bio preservatives as an alternatives to antibiotics (Eid *et al.*, 2016).

On the other hand, LAB have been reported for their remarkable efficacy to assimilate serum cholesterol. In industrialized countries, coronary heart disease (CHD) is one of the principle cause of death in humans. Raised cholesterol level in serum has been reported to be the major reason of CHD and other disabilities. Total serum cholesterol reduction in individuals suffering from hypercholesterolemia may lower the risk of CHD. Probiotics have been revealed for hypolipidemic action, but more evidence is necessary to evaluate the clinical correlation of this efficacy (Albano *et al.*, 2012).

OBJECTIVES

1. To screen potential lactic acid bacterial strains from multiple fruit sources.
2. To assess *in vitro* anti bacterial potential of purified probiotics strains against various human pathogenic bacteria.
3. To evaluate *in vitro* cholesterol lowering potential of isolated lactic acid bacteria

METHODOLOGY

Lactic acid bacteria were recovered from *Vitis vinifera* (grapes), *Ficus carica* (figs), and *Cocos nucifera* (coconut water) using de Mann Rogosa Sharpe (MRS medium). All cultures were purified and characterized

based on their microscopic, cultural and biochemical properties. After wards, the isolated bacteria were subjected to *in vitro* antibacterial assay by employing agar well diffusion method and cholesterol assimilation test by using bile salts and cholesterol in reaction mixture. Cholesterol reduction was then calculated in % (Bhargavi and Jamil, 2014).

$$\text{Assimilation of cholesterol (\%)} = \frac{\text{concentration of cholesterol in control} - \text{concentration of cholesterol in sample}}{\text{concentration of cholesterol in control}} * 100$$

RESULTS

Total 21 LAB cultures were isolated. Nine isolates out of twenty one bacterial cultures presented maximum antibacterial efficacy against clinical pathogenic bacteria. This recommends that these bacteria release extracellular and difusible inhibitory substances. For cholesterol lowering efficacy, only 6 strains assimilated cholesterol efficiently (up to 98%) when cultivated in médium containing bile salts.

CONCLUSION

Lactic acid bacteria are most promising biotherapeutic agents. This research is beneficial to explore bioactive compounds of lactic acid bacteria and to formulate probiotic based drugs for the treatment of coronary heart diseases and hypercholesterolemia. However, before the manufacturing and development of LAB based therapeutic agents, vigorous *in vivo* studies on animal models are suggested.

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