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Research Paper

Growth Characterization of oxalate degrading probiotics Lactobacillus

Biology

KEYWORDS :Probiotic, Lactobacillus, Potassium oxalate, curd

Mahalingam, P.U Department of Biology, Gandhigram Rural institute –deemed University, Gandhigram

ABSTRACT

In this study, an attempt was made to screen and characterize oxalate degrading probiotics Lactobacillus. Probiotic organism was isolated from curd sample and are screened and characterized for its growth in different concentration of Potassium oxalate with various pH and Temperature conditions. The results revealed that probiotic Lactobacillus spp showed better growth performance (0.95OD) in medium of 25mM concentration of Potassium oxalate with pH – 7 and at 37°

Introduction

Oxalate is formed in the liver by aminoacid catabolism (Holmes and Assimos, 1998). Oxalic acid is a toxic strong dicarboxylic acid, that if injested in very high levels could lead to renal failure (Hatch and Freel, 1995). Microorganisms that have been reported to play a role in degradation of oxalate within the gut include Oxalobacter formigenes, Eubacterium lentum, Enterococcus faecalis, and Lactobacillus acidophilus (Hokama et al, 2000; Weese et al, 2004). However dietary supplementation with probiotics has emerged as a potential strategy for increasing the degradation of dietary oxalate (Campieri et al, 2001; Weese et al, 2004). Lactic acid bacteria are important habitants of the human gastrointestinal tract and have been traditionally used as probiotics due to their reported health promoting benefits (Ouwehand et al, 2002; Gilliland, 1990). There fore the study was focused to screen and characterize probitic Lactobacillus on oxalate degradation.

Materials and Methods

Lactobacillus was isolated from curd sample by using a selective MRS medium (Murphy et al. (2009) and screened based on acid tolerance, temperature resistance, growth in various concentrations of Potassium oxalate medium. Each glass vials were prepared with five different concentration of potassium oxalate media(Potassium oxalate – 5mM/ 10mM / 15mM / 20mM / 25mM; Dextrose – 0.1g; Distilled water – 1000ml). Make them into 3 sets of pH such as (pH – 4, 7 & 9). Each vial was inoculated with 2% of broth culture of Lactobacillus. Incubate, the inoculated sets of glass vials at three different temperatures (such as 4°C, 37°C, 45°C) for 48 hours. The growth performance of Lactobacillus spp in various environmental conditions was observed and recorded.

Results and Discussion

Kidney stones are crystal aggregations formed in the kidneys from dietary minerals in the urine. It is also present in a wide range of food and drinks, including tea, coffee, chocolate, fruits and vegetables (Holmes and Kennedy, 2000). In this study, an attempt was made to screen and characterize probiotic organisms from curd sample. The results of Bile salt resistance of Lactobacillus were observed and recorded (Table 1). Lactobacillus showed the better resistant capacity (0.18 OD) to the Bile salt at concentrations of 0.1% and 0.2%. Similarly, Murphy et al. (2009) were already characterized the probiotics. The results of growth performance of Lactobacillus in various concentrations of Potassium Oxalate, and various pH and temperature conditions were observed and recorded. The probiotic Lactobacillus spp showed better growth performance (0.95 OD) in medium of 25mM concentration of Potassium oxalate with pH – 7 and at 37

Table 1: Bile salt resistance test results for Lactobacillus at 2 days.

Conc. Of Bile salt / Organisms	Optical Density at 600nm
	Lactobacillus
0.1%	0.18
0.2%	0.18
0.3%	0.17
0.4%	0.17
0.5%	0.17

Table 2: Growth performance of Lactobacillus in different concentration of Oxalate, and Various pH conditions at 4.

pH	Concentration Of $COOK_2$	Optical Density (at 600nm)
4	5mM	0.20
	10mM	0.42
	15mM	0.43
	20mM	0.45
	25mM	0.40
7	5mM	0.38
	10mM	0.50
	15mM	0.61
	20mM	0.80
	25mM	0.60
9	5mM	0.02
	10mM	0.03
	15mM	0.05
	20mM	0.22
	25mM	0.05

Table 3: Growth performance of Lactobacillus in different concentration of Oxalate, and Various pH conditions at 37°c.

pH	Concentration Of $COOK_2$	Optical Density (at 600nm)
4	5mM	0.15
	10mM	0.26
	15mM	0.42
	20mM	0.95
	25mM	0.55
7	5mM	0.20
	10mM	0.44
	15mM	0.65
	20mM	0.73
	25mM	0.95
9	5mM	0.30
	10mM	0.55
	15mM	0.60
	20mM	0.65
	25mM	0.90

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Table 4: Growth performance of Lactobacillus in different concentration of Oxalate, and various pH conditions at 45.

pH	Concentration Of $COOK_2$	Optical Density (at 600nm)
4	5mM	0.02
	10mM	0.08
	15mM	0.10
	20mM	029
	25mM	0.25
7	5mM	0.02
	10mM	0.25
	15mM	0.25
	20mM	0.60
	25mM	0.68
9	5mM	0.32
	10mM	0.47
	15mM	0.70
	20mM	0.85
	25mM	0.90

Conclusion:

An attempt was made in this study isolated oxalate degrading probiotic Lactobacillus from curd sample. The results of study revealed that probiotic Lactobacillus spp showed better growth performance (0.95OD) in medium of 25mM concentration of Potassium oxalate with pH – 7 and at 37 These probiotics organism would be effectively used for increasing the degradation of dietary oxalate in future.

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