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A STUDY ON THE ANTIBIOTIC SUSCEPTIBILITIES OF SOME PROBOTIC STRAINS USED AS THE DIETARY SUPPLEMENTS

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ABSTRACT

Use of Probiotics as the dietary supplements is quite common nowadays. Probiotics are microbial strains which support human health by putting positive effects and by inhibiting the harmful microbes to act on it. This antimicrobial potential of probiotics can be better evaluated by understanding the antibiotic susceptibility of probotic strain itself. In this study four dietary supplements viz. Yakult, Sporolac, G norm and Enterogermina were used to isolate the strains *Lactobacillus casei L. sporogenus*, *Saccharomyces boulardii* and *Bacillus clausii* respectively. The antibiotic susceptibility of these strains were detected against the antibiotics, Chloramphenicol, Cefoxitin, Azithromycin, Amoxyciilln, Ampicillin/Sulbactam, Meropenem, Ceftazidine and Levofloxacin. All the probotic strains were found to be resistance for the drug Ceftazidime and almost resistance towards Cefoxitin, showed intermediate sensitivity for the drug Amoxyciilln and high sensitivity to Meropenam, Levafloxacin and Chloramphenicol.

INTRODUCTION

Probiotics are commonly consumed as a part of fermented foods with specially added active live cultures, such as yogurt, soy yogurt, yakult or as dietary supplements. The fermentation of dairy foods represents one of the oldest techniques for food preservation (1). probiotics are described as a "live microbial food supplement which beneficially affects the host animal by improving its intestinal microbial balance"(2). Large species of *Lactobacillus, Bifidobacterinum* and *Saccharomyces* are considered as main probiotics but Yeast and Bacilli may also be used. Probiotics produce secondary metabolites i.e. ethanol, acetaldehyde, acetoin, CO_2 and other germicidal compounds which act as growth inhibitory or membrane disrupting factor against pathogens and a mixture of organic acids have a powerful antimicrobial activity at low pH. *Lactobacillus* and *Bifidiobacterium,* inhibit *Helicobacter pylori* growth through the release of bacteriocins and decrease its ability of to adhere to epithelial cells (3). Similar "antimicrobial" mechanism of probiotics administration including reduction of adherence and translocation of luminal bacteria have been reported in rats exposed to chronic psychological stress (4). Also the probiotic micro organisms are found to modulate the mucosal and systemic immune system (5) and respond to rotavirus infection (6). Activated monocytes and dendritic cells in the lamina propria produce tumor necrosis factor α (TNF-α) as well as IL-1 and IL-6 (7). Besides showing antimicrobial effect alone probiotics have found to potentiate the antimicrobial activity of the antibiotics (8,9). Nowadays antibiotic & probiotic combination are commonly used for therapeutic purposes. So it will be a great help to have the antibiogram of the probiotic strain as the probotic strain in combination with the resistance drug will give the better results as compare to the drug for which it is sensitive. This study is intended to show the antibiotic susceptibility patterns of the probiotic strains isolated from the different dietary supplements. Four dietary supplements, Yakult, Sporolac, G norm and Enterogermina were taken to isolated the probiotic strains and their resistance pattern towards the different antibiotics were detected.

MATERIALS AND METHODS

PROBOTIC STRAINS

Probotic strains used in the study were isolated from the dietary supplements Yakult, Sporolac, G norm and Enterogermina .To isolate the *Lactobacillus casei* from yakult, a loopful of yakult suspension was inoculated on MRS agar media and kept at 37ºC in a Mc Intosch jar for 48 hrs. While a pinch of sporlac, powder was suspended in De man,s Rogosa Sharpee (MRS) broth in anaerobic condition at 37^0C for 24 hrs prior to its inoculation on

MRS agar with an anaerobic gas packet for 48 hr at 37^{o}C to isolate the *L. sporogenesis*. *Bacillus clausii* was isolated from enterogermina, by inoculating it on Nutrient agar surface and kept at 37^{o}C for 24 hrs. Pinch of G Norm, capsule powder was dissolved in 2 ml of water and the suspension was inoculated on the nutrient agar medium and kept at 37^{o}C for 24 hr to isolate the *Sacchraomyces boulardii*. Pure colonies were obtained by repeated sub culturing in all the cases. Pure colonies of all the strains were stored at 4^{o}C in the butt slant tubes of nutrient agar. All the probiotic strains were confirmed by Gram's staining, cell and colony morphology.

PROBOTIC SUSPENSION

To prepare the probotic suspensions for inoculation, the pure colonies of each probotic culture was inoculated in distilled water and the turbidity of the medium was adjusted as Mac farland standard #0.5, now this suspension was used detect the resistance of probotic strains against the various drugs.

ANTIBIOTIC SUSCEPTIBILITIES

Antibiotic susceptibilities of the all four probiotic strains were detected against the readymade antibiotic discs of Chloramphenicol(C) Cefoxitin (CX) Azithromycin (AZM) Amoxyciilln (AMC) Ampicillin/Sulbactam(A/S) and Meropenem (MRP) Ceftazidine (CAZ) and Levofloxacin (LE) (Hi Media, India) by using the disc diffusion method [10] according to the national committee for clinical laboratory standards (NCCLS) guidelines. For this the probotic suspensions were swabbed on the M.R.S. agar surfaces and the antibiotic discs were placed on Muller Hinton Agar (MHA) surface and kept at 370C for 24 hrs. Zones of inhibition were measured by using a standard caliper from the back of Petri plate.

RESULTS AND DISCUSSION

PROBOTIC STRAINS

Both *Lactobacillus casei L. sporogenus,* and produced pale yellow, round and small colonies on MRS agar and appeared as gram positive bacilli. *S.boulardii* produced whitish, smooth colonies on nutrient agar and seen with characteristic oval shaped cells under microscope. *B.clausii* viewed as gram positive bacilli.

ANTIBIOGRAM:

All the probiotic strains were found to be highly sensitive to C, LE, MRP & A/S (Max. zone of inhibition 13, 11, 10,10 mm) but highly resistance to CAZ (0mm) followed by CX (2-4), AMC(4-7mm) and AZM(5-10mm). It can be interpreted that the drugs C, LE, MRP &A/S would show lesser antimicrobial activities as compared to the drugs CX, AMC and AZM

when given in combination with the probotic strains. (Table-1 & Fig.-1). So to get the best potential of the probiotic strain it must be combine with the resistant drug only.

Table-1: Zone of inhibition of isolated probotic strains against the 8 antibiotics

S.N	Antibiotics	Conc/disc(mcg)	Zone of inhibition (mm)			
			L.casei	***L.sporog.***	***S.boulard.***	***B.clausii***
1.	Chloramphenicol (C)	30	11	10	13	11
2.	Cefoxitin (CX)	30	4	3	4	2
3.	Azithromycin (AZM)	15	10	8	6	5
4.	Amoxyciilln (AMC)	20/10	6	7	7	4
5.	Ampicillin/Sulbactam(A/S)	10/10	10	7	6	7
6.	Meropenem (MRP)	10	8	10	8	10
7.	Ceftazidine (CAZ)	30	0	0	0	0
8.	Levofloxacin (LE)	5	7	11	9	6

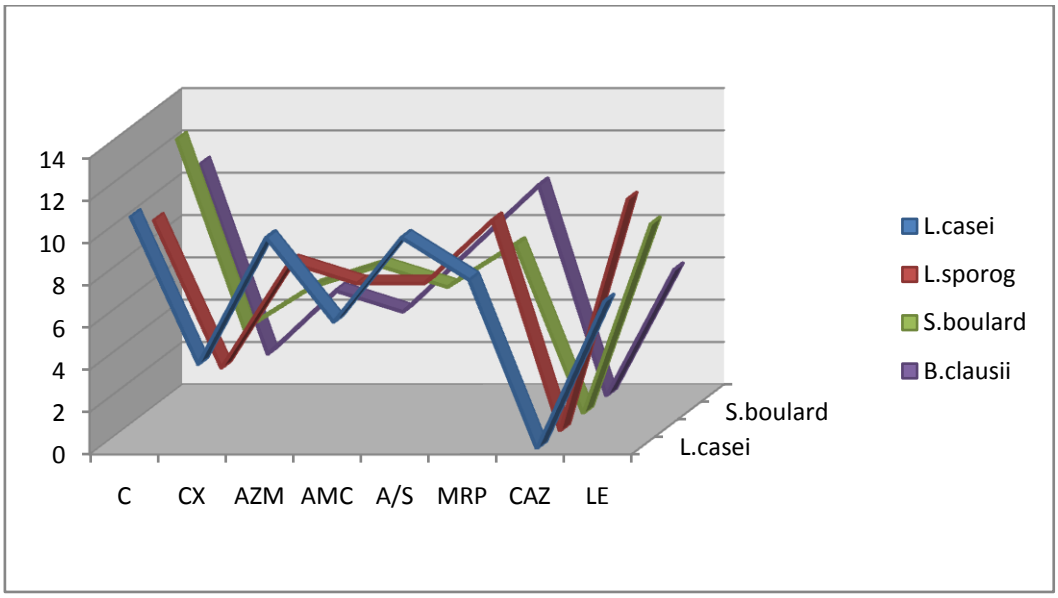

Fig-2: Comparison of zone of inhibition of probiotic strains against the different drugs used in the study.

CONCLUSION

Drug susceptibility pattern of the above probotic strains can be used to predict the potential benefit of the probotic strain in combination with the drug particular. In this study almost all the probotic strains were found to resistant against CAZ hence the best antimicrobial activity in combinations followed by CX, AMC, AZM, A/S, MRP, LE and C. To conclude, it is favorable to use probotic strain with the resistant drug rather than the sensitive one for their better antagonistic effect.

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