

## Effect of whey protein concentrate on the survival of *L. Plantarum*

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Probiotics are defined as microbial dietary supplements that beneficially affect the host by improving the intestinal microbial balance. Recent studies have proven that the use of food containing specific strains of probiotic microorganisms can help to prevent enteric pathogen diseases. Furthermore they help to replace intestinal and vaginal microflora, decrease serum cholesterol and enhance immune system. Therefore it is important that probiotic strains are able to survive and colonize the intestine and the vagina by adhering to the intestinal and/or vaginal epithelium. The two principal genera of microorganisms used for probiotic production are Lactobacilli and Bifidobacteria. Lactobacilli are commonly cultured in MRS broth, but for large-scale commercial applications its cost is prohibitive. Aim of this work was to develop a new inexpensive and safe growth medium for lactobacilli. For this purpose we used whey from Gorgonzola cheese, obtained from a local dairy. Even if whey retains almost 50% of milk components, it has been considered as a waste for a long time. However, as a results of recent processing technologies, several new probiotic products enriched with whey components have appeared. Evidence continues to prove that whey contains a wide range of factors able to improve human health and prevent disease. Lactoferrin, is an iron-binding protein which exerts an antimicrobial activity and promotes desirable microflora. Moreover, lactoferricin, a basic peptide derived form lactoferrin by pepsin digestion, inhibits a diverse range of pathogens bacteria, including some antibiotic-resistant pathogens. Whey protein concentrate (WPC) and whey permeate were obtained from liquid whey through ultrafiltration with a 10 KDa polysulphone membrane. The effective composition of these products was tested and compared with those reported on literature. The effect of liquid cheese whey, WPC and whey permeate on the growth of *L. plantarum* on a simple media without peptones was investigated. The grown tests were performed using the vaginal originated *L. plantarum* P17630 (deposited in BCCM/LMG). Cell concentration was estimated by plate counts on MRS-agar and by measuring optical density of the culture broth. The viability was considerably affected by the concentrations of the added ingredients. Several concentration of the said whey derivatives were tested and compared with MRS commercial broth. Lactose supplementation provided no growth enhancement. Generally, the performance of whey concentrate was higher than liquid whey and whey permeate. The addiction of 10% WPC and 2% yeast extract resulted in the highest rate of grown. The growth of *L. plantarum* in the finally attained medium was higer than MRS broth, suggesting that this could be a prominent medium for large-scale production.

### References

Klaenhammer T. et al. (1999) Selection and design of probiotics. *Int. J. food Microb.* 50: 45-75.

Dragalic et al. (2005) Growth and survival of probiotic bacteria in reconstituted whey. *Lait* 85: 172-179.