



BILE SALT HYDROLASE ACTIVITY OF *Lactobacillus acidophilus* LA-5 BY NINHYDRIN METHOD

Luis Alberto Reyes Nava, Raquel González Vázquez, Yadira Rivera Espinoza; Departamento de Graduados e Investigación en Alimentos, Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional, Carpio y Plan de Ayala, C.P. 11340, México City, México; alberto_lafe@hotmail.com.

BSH, Lactobacillus, bile salt

Introduction. Bile salt hydrolase (BSH) is an enzyme that catalyzes the hydrolysis of glycine- and taurine-conjugated bile acids into amino acid residues and free bile acids (2). BSH activity has been detected in many bacterial species of the gastrointestinal tract, including species of the genera *Lactobacillus*. Lactobacilli are normal inhabitants of the human intestine, and have been often used as probiotic agents due to the wide range of consumer benefits associated with their consumption. Certain strains of lactobacilli that possess BSH activity also have the capacity to decrease serum cholesterol levels in *in vivo* studies (3).

The objective of this study was to assess the ability of *Lactobacillus acidophilus* LA-5 to deconjugate the glycine- and taurine-conjugated bile salts by the ninhydrin method.

Methods. *L. acidophilus* LA-5 was obtained from Christian Hansen Collection. Deconjugation of bile salt by *L. acidophilus* LA-5 was tested through the plate assay (1). Bile salt-MRS agar (Difco) plates were prepared at 0.5% of glycocholate (GC), glycodeoxycholate (GDC), taurocholate (TC) or taurodeoxycholate (TDC). Bile salt hydrolase activity was analyzed by measuring the amount of amino acids released from conjugated bile salts (GC, GDC, TC or TDC) by *Lactobacillus* strain, using the ninhydrin method (4).

Results. *L. acidophilus* LA-5 grown on bile salt-MRS agar plate containing GC formed fine precipitate halos around the colonies, while opaque granular and colonies were formed with precipitate halos on bile salt-MRS agar plate containing GDC or TDC (2) while colonies without precipitate halos were observed on bile salt-MRS agar plate containing TC (Fig. 1).



Fig.1. Deconjugation of bile salts by *L. acidophilus* LA-5 on bile salt-MRS agar plates. a): GC, b): GDC, c): TC, d): TDC.

Result of the evaluation of *L. acidophilus* LA-5 for BSH activity is shown in Fig. 2.

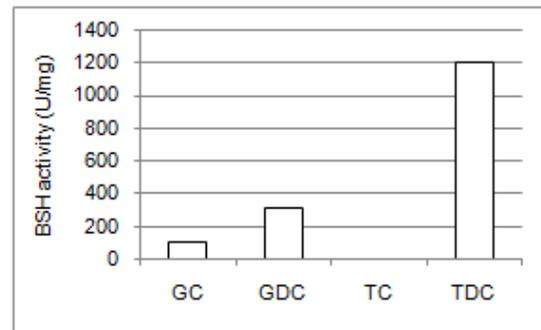


Fig. 2. Bile salt hydrolase activity of *Lactobacillus acidophilus* LA-5.

L. acidophilus LA-5 showed BSH activity over three of the four bile salts tested (GC, GDC y TDC). This strain showed no BSH activity over TC. On the other hand this strain exhibited a preference for TDC over glycine-conjugated bile salts. However *L. acidophilus* LA-5 hydrolyzed the two glycine-conjugated bile salts and considering the fact that the majority of human bile salts are glycine conjugated forms, BSH enzyme from *Lactobacillus* strain might be important in the deconjugation of bile salt in the human intestine (2).

Conclusions. As a conclusion, this lactobacilli with BSH activity is promising as probiotic since it has the potential to reduce cholesterol levels, although further studies are required.

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References.

1. Dashkevicz M and Feighner S. (1989). *Appl. Environ. Microbiol.*55:11-16.
2. Kim G, Yi S and Lee B. (2004). *J. Dairy Sci.*87:258-256.
3. Nguyen T, Kang J and Lee M. (2007). *Int. J. Food Microbiol.*113:358-361.
4. Tanaka H, Hashiba H, Kok J and Mierau I. (2000). *Appl. Environ. Microbiol.*66:2502-2512.