

( )

*Staphylococcus aureus*

(1) (1) (1)

<i>Streptococcus thermophilus</i> )		<i>Staph. aureus</i>	
<i>Staph. aureus</i>		( <i>Lactobacillus bulgaricus</i>	
<i>Staph. aureus</i>	. 4	37	
	<i>Lb. bulgaricus</i>		<i>Str. thermophilus</i>
		<i>Staph. aureus</i> :	

## Study of the inhibition effect of yoghurt starter on *Staph. aureus* bacteria

S. Slik<sup>(1)</sup>; S. Abou Ghorra<sup>(1)</sup>  
and A. Abou Younes<sup>(1)</sup>

### ABSTRACT

This investigation was done in the laboratories of the Faculty of Agriculture – Damascus University in the Department of Food Sciences. The aim of this research use to study the inhibition effect of the growth and activity of *Lactic acid bacteria* used as starter and on the growth of *Staph. aureus* bacteria. Pure strains of *Staph. aureus* and *Lactic acid bacteria* was used the effect of *Lactic acid bacteria* (*Streptococcus thermophilus* and *Lactobacillus bulgaricus*) on the number of *Staph. aureus* was studied at 37 °C and 4°C. The *Lactic acid bacteria* were inoculated in milk for the manufacturing of yoghurt. The number of *Staph. aureus* was fixed then was decreased gradually according to time. And the decreasing number of this bacteria was clear when *S. thermophilus* and *Lb. bulgaricus* were used as a mixture starter, then when was used as a single starter, *Lb. bulgaricus* and *S. thermophilus*.

**Key Words:** *Staph. aureus* , yoghurt, starter, inhibition

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<sup>(1)</sup> Dep. food sciences, Facu., Agric., P.O.Box 30621, Univ., Damascus, Syria.

(Ash, 1997) (Abdelnoor *et al.*, 1983) *Staph. aureus*  
*Staph. aureus*  
*Staph. aureus* .(Ribeiro *et al.*, 1999)  
pH  
(Nes *et al.*, 1996)  
*Staph. aureus*  
. 4 37  
*Staph. aureus*  
*Staphylococcus* Micrococcaceae  
*Staph. aureus* (Ash, 1997)  
(Jablonski and Bohach,1997) 1 – 0.8  
(Ash,1997)  
(Jablonski and Bohach,1997) *Staph.aureus*  
48.5 – 7  
2-1 (Schmitt *et al.*, 1990) 37  
pH 9.3 4.2 pH .(Ash,1997)  
%15 NaCl (Bergdoll, 1989) 7  
(Hajmeer and Marsden, 2002)

:*Staph. aureus*

.*Staph. aureus*

(Pitt *et al.*, 2000)

.(Vignolo *et al.*,1995)

2004 Savadogo

*Pediococcus* spp. *Lb. acidophilus* *Lb. fermentum* (Burkina Faso)  
*Lc. lactis* *S. thermophilus* *Ln.mesenteroides* ssp *mesenteroides*  
 6 Screening 2004 Oyetayo

*Staph. aureus* NCIB 8588  
 Harris

(Laveau and Bouix,1993) 1989  
*Staph. aureus* *Lb. acidophilus* ADH  
 Laveau and ) 1989 Raccach  
 (Bouix,1993  
*Staph. aureus*  
 1995 Lacroix . 24 4.7  
*Lc. lactis*  
*S. aureus*  
 2002 Alexandre .diacetin B  
 minas  
 2006 Erbilir Erdogrul . *Staph. aureus*  
*Staph. aureus* *Lb.bulgaricus*  
 pH

*Lb. bulgaricus* 1999 Zúñiga  
*Staph. aureus* *Str. thermophilus*  
 8 42 / 610  
*Staph.* 4 4  
 8 *Staph. aureus* . *aureus*  
*Staph. aureus*  
 10  
 Ashenafi Tadesse 2004 .  
 Borde *Staph. aureus*  
 4.28 pH / 210 12  
 .3.5 pH 24

. - 1  
*.Str.thermophilus* M17 - 2  
 Rogosa -3  
*.Lb.bulgaricus*  
 Baird Parker - 4  
*.Staph. aureus*  
***Staph. Aureus***  
 15 121  
 %11  
*Staph. aureus*  
 /  $^{4}10^{-3}10$   
*Lactobacillus delbruckii subsp bulgaricus*  
 - CHR HANSEN *Streptococcus thermophilus*  
 ( ) 1:1  
*Str. thermophilus*  
 - CHR HANSEN  
 - CHR HANSEN *Lb. bulgaricus*  
 %2  
 /  $^{3}10$  *Staph. aureus*  
 .2.8 3.2 4.5 5.2 6.6 pH %10  
 /  $^{4}10^{-3}10$  *Staph. aureus*  
 72 - 48 - 24 - 12 - 6 - 0  
 . 4 37  
 SPSS

*Staph. aureus*

(1) : 37 *Staph. aureus* -1  
) *Staph. aureus*

(*Stre. thermophilus* *Lb. bulgaricus*)

pH *Staph. Aureus* (1)

37

	متوسط الأعداد <i>Stre. thermophilus</i>	<i>Lb. bulgaricus</i>		( )
	$4 \times 10^{-1} - 3 \times 10^1$	$4 \times 10^1 - 3 \times 10^1$	$4 \times 10^1 - 3 \times 10^1$	0
pH	6.5	6.5	6.6	
	$4 \times 10^1 - 3 \times 10^1$	$3 \times 10^1 - 2 \times 10^1$	$4 \times 10^1 - 3 \times 10^1$	6
pH	5.4	5.9	5.4	
	$3 \times 10^1 - 2 \times 10^1$	$2 \times 10^1 - 1 \times 10^1$	$3 \times 10^1 - 2 \times 10^1$	12
pH	5.1	5	4.8	
	$2 \times 10^1 - 1 \times 10^1$	-	-	24
pH	4.8	4.5	4.5	
	$1 \times 10^1$	-	-	48
pH	4.5	4	3.5	
	-	-	-	72
pH	3.9	3.2	3	

6 *Staph. aureus* (1)

pH 24

.1989 Bergdoll 4.5

( 72)

*Lactobacillus* /  $3 \times 10^1 - 2 \times 10^1$  *Streptococcus thermophilus*  
*bulgaricus*

12 *Staph. aureus* (1)

24

37 *Lb. bulgaricus*

/  $2 \times 10^1 - 1 \times 10^1$  *Lb. bulgaricus*

6 *Staph. aureus* (1)  
 3.9 pH 72  
*Staph. aureus* pH  
 .(Tadesse and Ashenafi, 2004) (Bergdoll, 1989)  
*Staph. aureus* (2)  
 (*Str. thermophilus* *Lb.bulgaricus* )  
*Staph. aureus* 4  
 /  $4 \times 10^4 - 3 \times 10^3 \times 1$   
 4 4 42

4 pH *Staph. aureus* (2)

	متوسط الأعداد <i>Stre.thermophilus</i>	<i>Lb.bulgaricus</i>		( )
	$4 \times 10^4 - 3 \times 10^3 \times 1$	$4 \times 10^4 - 3 \times 10^3 \times 1$	$4 \times 10^4 - 3 \times 10^3 \times 1$	0
pH	6.4	6.5	6.5	
	$4 \times 10^4 - 3 \times 10^3 \times 1$	$4 \times 10^4 - 3 \times 10^3 \times 1$	$4 \times 10^4 - 3 \times 10^3 \times 1$	6
pH	5.5	6.4	5.5	
	$4 \times 10^4 - 3 \times 10^3 \times 1$	$4 \times 10^4 - 3 \times 10^3 \times 1$	$4 \times 10^4 - 3 \times 10^3 \times 1$	12
pH	5.3	6	5.5	
	$3 \times 10^3 - 2 \times 10^2 \times 1$	$3 \times 10^3 - 2 \times 10^2 \times 1$	$3 \times 10^3 - 2 \times 10^2 \times 1$	24
pH	4.5	6	5.5	
	$2 \times 10^2 - 1 \times 10^1 \times 1$	$2 \times 10^2 - 1 \times 10^1 \times 1$	$2 \times 10^2 - 1 \times 10^1 \times 1$	48
pH	4.5	5	5	
	$1 \times 10^1 \times 1$	-	10	72
pH	4.1	4.5	4.5	
	-	-	-	98
pH	4	4.5	4.5	

*Staph. aureus* (2)

72 12  
 pH 4.5 pH 98  
*Staph.aureus*  
 (Bergdoll, 1989) 4.7 pH  
 $1 \times 10^1$  *Lb. bulgaricus* (Schmitt *et al.*, 1990) 7  
*Str.thermophilus* /  $2 \times 10^2 \times 1$

... ( )

12 *Staph. aureus* (2)  
*Lb. bulgaricus* 72  
*Staph. aureus* /  $3 \times 10^1 - 2 \times 10^1$   
 (4) 48  
 Erbilir Erdogrul  
 (2) .1996 Nes 2006  
 .4 pH 98 *Staph. aureus*  
 : *Staph. aureus* -2  
 pH *Staph. aureus* (3)  
 .3.2 pH 5.2 6.6

37 (3)

2.8	3.2	4.5	5.2	6.6	pH
-	-	$3 \times 10^1 - 2 \times 10^1$	$4 \times 10^1 - 3 \times 10^1$	$4 \times 10^1 - 3 \times 10^1$	<i>Staph. aureus</i>

37 *Staph. aureus* (4)  
*Staph. aureus*

pH  
*Staph. aureus*

( ) 37 *Staph. aureus* (4)

	2	( )
	$4 \times 10^1 - 3 \times 10^1$	0
pH	6.6	
	$4 \times 10^1 - 3 \times 10^1$	6
pH	6.4	
	$5 \times 10^1 - 4 \times 10^1$	12
pH	6.2	
	$5 \times 10^1 - 4 \times 10^1$	24
pH	6.2	
	$9 \times 10$	48
pH	6.2	
	$9 \times 10$	72
pH	6.2	

*Staph. aureus* (5)

*Staph. aureus*

72



*Staph. aureus* 7 ( 4)  
 .(Schmitt *et al.*, 1990)

( ) 4 *Staph. aureus* (5)

	2	( )
	$^4 10 \times 1 - ^3 10 \times 1$	0
pH	6.6	
	$^3 10 \times 1 - ^2 10 \times 1$	6
pH	6.4	
	$^3 10 \times 1 - ^2 10 \times 1$	12
pH	6.2	
	$^4 10 \times 1 - ^3 10 \times 1$	24
pH	6.2	
	$^4 10 \times 1 - ^3 10 \times 1$	48
pH	6.2	
	-	72
pH	6.2	

: -3

SPSS

A

*Lb. bulgaricus* 1:1 )

4)

B

(

*Stre.thermophilus*

24 12 6 0)

C

( 37 -

. *Staph. aureus*

( 72 48

(6)

LSD 5%		F				
		6.003E29	49287.500	98575.000	2	A
		6.565E30	539068.056	539068.056	1	B
		2.916E31	2393985.833	1.197E7	5	C
2.40	**	1.823E30	149726.389	299452.778	2	B *A
1.5	**	1.136E30	93290.833	932908.333	10	C*A
3.19	**	2.314E30	189994.722	949973.611	5	C* B
367.4	**	1.023E30	84003.056	840030.556	10	C* B* A
			8.211E-26	2.956E-24	36	

:C

:B

:A

(6 )

*Lb.* *Staph. aureus*  
*Str. termophilus* *bulgaricus*  
*Staph. aureus*

1989 Raccach .2000 Pitt  
(Laveau and Bouix,1993)  
*Staph. aureus*  
. 24 4.7

37

4  
Schmitt *Staph. aureus* 1990

10 *Staph. aureus* 1999 Zúñiga  
*Str. Thermophilus* *Lb. bulgaricus*  
LSD 4  
.367.4 C\* B\* A

-1

*Staph. aureus* *Staph. aureus* -2

*Staph. aureus* *Lb. bulgaricus* -3  
*Str.thermophilus*

*Staph. aureus* -4  
37

*Staph. aureus* 4 pH -5

pH

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