Antibiotic Susceptibility of Lactic Acid Bacteria Isolated From Cow, Goat, Donkey, Buffalo, Sheep, Camel and Human Milk

Nurten YILMAZ [1*], A. Samet ALA [2], Serap GÖNCÜ [3], 8÷X+Uh / . $ ' ø [4], Adnan % $ 5 8 7 d [5], Özgül $ 1 ø 7 $ ù

[1] %LRWHFKQRORJ\ 5HVHDUFK DQG 6XSSRUWLQJ DQG $SSOLFDWLRQ &HQWHU %DOFDOÕ

[2] 'HSDUWPHQW RI $QLPDO 6FLHQFH)DFXOW\ RI $JULFXOWXUH 8QLYHUVLW\ $GDQD

[3] 'HSDUWPHQW RI $QLPDO 6FLHQFH)DFXOW\ RI $JULFXOWXUH 6HOoXN 8

[4] 'HSDUWPHQW *DVWURHQWHURORJ\ &XNXURYD 8QLYHUVLW\ 7• UNL\H $GDQD

[5] 'HSDUWPHQW RI 6RFLDO 3HGLDWULFV &XNXURYD 8QLYHUVLW\ 0HGLFDO

Abstract . Breast milk is a very important factor in regulating gastrointestinal function, improving the immune system and preventing acute illnesses (e.g. acute otitis media), especially during breastfeeding. Breast milk allows beneficial bacteria such as bifidobacteria and lactobacillus species to colonise the newborn intestin*e instead of potential enteropathogenic bacteria such as streptococci and escherichia coli. The aim of the study was to compare the antibiotic resistance of Lactic acid bacteria members isolated from different milk samples. Six milk samples were collected from each of seven different milk sources (donkey, goat, cow, buffalo, sheep, camel and human). The MRS and M-17 medium were used with the double layer sandwich method for isolation of LAB members selected from typic colonies, gram-positive, catalase-negative used in the study. The isolated 42 LAB species were determined antibiotic susceptibility with 9 standart antibiotic discs such as tetracycline, penicillin, kanamycin, streptomycin, rifampin, gentamicin, chloramphenicol, teicoplanin, ciprofloxacin by agar disc diffusion assay test. The 18 LAB isolate were resistant to penicillin, 16 isolate to kanamycin, 14 isolate to gentamicin. LAB isolates such as H1, H4, H5 from Human milk and LAB isolate such as D1 from donkey milk was considered as MDR isolates because they were resistant to at least four of the tested drugs. Among the milks, sheep, camel, buffalo and goat milks were found to be more sensitive to antibiotics on average in the group.

Key words: Lactic acid bacteria, Antibiotic resistance, Cow milk, Goat milk, Donkey milk, Buffalo milk, Sheep milk, Camel milk, Human milk

1. Introduction

0LON LV WKH ILUVW IRRG RI QHZERUQ PDPPDOV DQG D FRPSOH[FROORLGDO GLVSHUVLRQ FRQWDLQLQJ SURWHLQV ODFWRVH PLQHUDOV DQG RWKHU PLQRU FRPSRQHQWV 0RWKHU¶V EUHDVW PLON LV D YHU\ LPSRUWDQW IDFWRU LQ UHJXODWLQJ JDVWURLQWHVWLQDO IXQFWLRQ LPSURYLQJ WKH LPPXQH V\VWHP DQG SUHYHQWLQJ DFXWH LOOQHVVHV DFXWH RWLWLV PHGLD HVSHFLDOO\ GXULQJ EUHDVWIHHGLQJ 1LQHW\ SHU FHQW RI WKH PLON FRQVXPHG LV FRZ¶V PLON DQG SHU FHQW RI WKH PLON FRQVLVWV RI RWKHU PLON W\SHV)RU WKLV UHDVRQ HVSHFLDOO\ LQ UHFHQW \HDUV WKH VHDUFK IRU WKH FORVHVW PLON WR KXPDQ PLON KDV LQFUHDVHG ,Q DGGLWLRQ WR JURZWK DQG GHYHORSPHQW PLON KDV PDQ\ LPSRUWDQW SURSHUWLHV LQ WKH OLIH F\FOH GXH WR LWV SURWHLQ DQG SHSWLGH VWUXFWXUHG HOHPHQWV VXFK DV LPPXQRJOREXOLQV HQ]\PHV HQ]\PH LQKLELWRUV KRUPRQHV RWKHU KRUPRQHV JURZWK DJHQWV IDWW\ DFLGV YLWDPLQV DQG SK\VLRORJLFDOO\ LPSRUWDQW 6SHFLHV RI VHYHUDO JHQHUD LQFOXGLQJ *Lactococcus*, *Streptococcus*, *Pediococcus*, *Leuconostoc*, *Lactobacillus* DQG QHZO\ UHFRJQL]HG &DUQREDFWHULXP 7KHVH RUJDQLVPV DUH LVRODWHG IURP PLON DQG PHDW SURGXFWV IHUPHQWHG PLON SURGXFWV IHUPHQWDWLRQ ZLWK SURELRWLF EDFWHULD XVHG DV VWDUWHU FXOWXUHV DQG DV SURWHFWLYH FXOWXUHV LQ IRRGV

* Corresponding authors: nurtenyilmaz01@gmail.com

2 Material and Method

3 Result

DQWLELRWLFV ZHUH RXQG WR EH WKH PRVW HIIHFWLYH DJDLQVW SHQLFLOLQ *

Table 1. $QWLELRWLF SURILOH RI /$% LVRODWHV IURP PLONXNP DQG FDPHO, EXIIDORHOSR FJFR GRQNH\

LAB isolate source	Antibiogram/standard antibiotic discs								
Human milk	TE-30	C-30	S-10	CN-10	TEC-30	RD-30	P-10	CIP-30	K-30
H-1	5	5	6	5	6	6	5	6	5
H-2	5	6	6	6	6	6	5	6	5
H-3	6	6	6	5	6	6	6	6	5
H-4	5	5	6	6	6	6	I	6	6
H-5	5	5	5	I	6	5	6	6	5
H-6	5	6	6	6	5	6	5	6	6
Camel milk									
CA-1	6	6	6	6	6	6	5	5	6
CA-2	6	6	6	6	6	6	I	6	5
CA-3	6	5	ND	6	6	5	6	6	5
CA-4	6	6	6	6	6	6	5	6	5
CA-5	6	6	6	6	ND	6	5	5	6
CA-6	6	6	6	6	6	6	5	I	ND
Sheep milk									
S-1	6	6	ND	6	6	6	5	6	6
S-2	6	6	5	6	6	6	5	6	5
S-3	6	6	5	6	6	6	I	6	6
S-4	6	ND	6	6	6	6	5	6	5
S-5	6	6	5	6	6	6	I	6	6
S-6	6	5	6	6	6	6	ND	6	6
Cow									
C-1	6	6	5	6	6	6	5	6	6
C-2	6	6	6	6	6	6	5	6	6
C-3	6	6	6	6	6	6	5	5	ND
C-4	6	6	6	6	6	6	5	6	6
C-5	6	6	I	6	6	6	6	5	6
C-6	6	6	6	6	6	6	5	6	6
Buffalo milk									
B-1	6	5	6	6	6	6	6	6	6
B-2	6	5	6	I	6	6	6	6	6
B-3	6	6	ND	6	6	6	5	6	6
B-4	6	6	ND	6	6	6	6	6	6
B-5	6	6	5	6	5	6	6	I	6
B-6	6	6	5	I	5	6	5	6	6
Goat milk									
G-1	6	5	6	6	6	6	6	6	6
G-2	6	6	ND	6	6	6	6	5	5
G-3	5	5	6	6	6	5	6	6	6
G-4	6	5	6	6	6	I	6	6	I
G-5	6	6	ND	6	6	6	6	5	5
G-6	5	5	6	6	6	5	6	6	6
Donkey milk									
D-1	6	6	5	5	6	6	I	6	5
D-2	6	6	5	6	6	6	6	6	6
D-3	6	6	6	6	6	6	I	6	5
D-4	ND	6	6	6	6	6	5	6	6
D-5	5	6	6	6	5	6	6	6	5
D-6	6	6	5	6	6	6	I	6	5

$QWLELRWLF UHVLVWDQFH GHJUHH ZDV , LQWHUPHGLDWH 6 VXVFHSWLEOH YDOXH UDQJHV ZHUH GHWHUPLQHG DQWLELRWLF DJHQW 7HWUDF\FOLQH RU PRUH &KORUDPSKHQLFRO RU PRUH -5LIDPSLQ 5PRUH *HQWDPLFLQ &1 PRUH 3HQLFLOOLQ 3 - PRUH -DQDP\FLQ OHV-V PRUH 7HLFRSODQLQ V7 PRUH 6WUHSWRP\FLQ 6PRUH &/6,

2I WKH WRWDO /$% LVRODWHV SHQLFLOOLQ ¶ FKORUDPSKHQLFRO DQWLELRWLFV UHVLVWDQW WR VWUHSWRP\FLQ *HQWDPLFLQ 5LIDPSLQ ZHUH IRXQG WR EH UHVLVWDQW LVRODWHV ZHUH IRXQG UHVLVWDQW

Table 2. 5HVLVWDQFH $%$ W SHUFHQWDJH RI IURP DZ PLONV

Milk source	LAB LVR(	0XOWL DQWL UHVLV 1XPEH QXPEH	0'5 LQGH[	0$5 $QWLELRWLFV
Human	H-1	5		7(& &1 3
	H-2	3		7(3 .
	H-3	2		CN,K
	H-4	3		7(& 3 .
	H-5*	6		7(& 6 & 5' .
	H-6	3		7(7(& 3
Camel	CA-1	2	2	3 &,3
	CA-2	1	1	K
	CA-3	3	.3	C,5'.K
	CA-4	2	.2	3 .
	CA-5	2	.2	3 &,3
	CA-6	2	.2	3
Sheep	61	1	.1	3
	62	3	.3	6 3 .
	63	2	.2	6 3 .
	64	2	.2	3 .
	65	2	.2	6 .
	66	1	.1	C
Cow	C-1	2	.2	6 3
	C-2	1	.1	3
	C-3	2	.2	3 &,3
	C-4	1	.1	3
	C-5	3	.3	63
	C-6	1	.1	3
Buffalo	B-1	1	.1	C
	B-2	1	.1	C
	B-3	1	.1	3
	B-4		.	3
	B-5	3	.3	6 7(& &,3
	B-6	3	.3	6 &1 3
Goat	G-1	1	.1	C
	G-2	2	.2	&,3 .
	G-3	3	.3	7(& 5'
	G-4	3	.3	&5'
	G-5	2	.2	5' .
	G-6	3	.3	7(& 7(&
Donkey	D-1	4	.4	6 &1 3 .
	D-2	1	.3	6
	D-3	2	.1	3 .
	D-4	1	.2	3
	D-5	3	.1	7(7(& .
	D-6	2	.3	6 3 .

0XOWLGUXJ UHVLVWDQFH QXPEHU DQWLELRWLFV WR ZKLFK WKH LVRO ZHUH IRXQG UHVLVWDQW WR

Lactobacillus plantarum, Lactobacillus paracasei, Lactobacillus reuteri Lactobacillus acidophilus

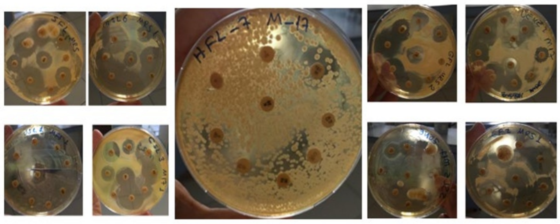

Fig. 1.

Leuconostoc

4 Discussion

Pediococcus

5 Conclusion

VHDUFK RI QHZ /$% DQG /$% PHPEHUV ZLWK SRWHQWLDO XVHG DV IHHG
XVH $QWLELRWLF LQWDNH LV NQRZQ WR FRQWULEXWH WR WKH DQWLELRWLF
SUHVVXUH UHVXOWLQJ LQ D KLJKHU SUHYDOHQFH 7KHUHIRUH WKH
FDXVHV RI DQWLELRWLF UHVLVWDQFH LQ KXPDQV DQG DQLPDOV
VKRXOG EH LQYHVWLJDWHG WKH HIIHFW RI ZKLFK
JLYHQ DQWLELRWLFV WR KXPDQV DQG DQWLELRWLFV VKRXOG EH
DGGHG WR DQLPDO IHHG

References

1. G. %RHKP /LGHV 3 &DVWHOO $UFKLW DO 'LV &KLOG)HWDO 1HRQDWDO (G 86, 178
2. W.J. 'REURJRV] /LQGJUHQ 6 0LFURELRO 70 -64
3. <R-XLQ <X-=KL <DQJ &KHQ = 3R 7LQJ Chen, N.G. I-6RQ %LRVFL 126(6), RHQJ -777
4. D.K. 2¶WRROH)HUPHQWHG)RRGV /HH <XDQ .XQ HGLWRU 0LFURELDO %LRWHFKQRORJ\ 3ULQFLSOHV DQG $SSOLFDWLRQV 3XEOLVKLQJ &RPSDQ\ S
5. H. $EULRXLH /HUPD D.C. &DVDGR 0XxR] 3 0RQWRUR 6FKLFKHU * 6Cho, H. 1HYH)XVFR 0 $ 3UDQ] HW)URQW 0LFURELRO 6,
6. 3 5DWWDQDFKDLNXQVRSRQ 3KXP Ann. Biol. 5HV 1(4), 218-228
7. O. $GHQDLNH 2OXZROH 2 $ERDK C.M.Z. Whong, - 1DW 6FL 6,
8. D. *LOO,EOL 6WDQG 0LFURELRO Lett. 7(1– 2), 75- $ 6+XPPHO -HQW]VFK)RO] &DVWHOO)UDQ] $SSO (QYLURQ 0LFURELRO 73, &/6, &OLQLFDO DQG /DERUDWRU\ 6WDQGDUGV øQVWLWXWH 3HUIRUPDQFH 6WDQGDUGV IRU $QWLPLFURELDO 6XVFHSWLELOLW\ 7HVWLQJ WZHQW\ ILUVW ,QIRUPDWLRQDO 6XSSOHPHQW &/6, GRFXPHQW 0 -6 3HQQV\OYDQLD 86$
11. K. $SX, Y.L. Chong, 0 7 $EGXOODKL 0LF,NI$VLDQ - $QLP 6FL 2(6), 41-9 &/6,
12. 7. ()6$ 3DQHO RQ %LRORJLFDO +D]DUGV %,2+$= 8SGDWH RI WKH OLVW RI 436 UHFRPPHQGHG ELRORJLFDO DJHQWV LQWHQWLRQDOO\ DGGHG WR IRRG RU IHHG DV QRWLILHG WR ()6$ VXLWDELOLW\ RI WD[RQRPLF XQLWV QRWLILHG WR ()6$ XQWLO 0DUFK 18
13. C. 'HYLUJLOLR % DUG 3HUUL *LQHV 1XWU 6, 275–84
14. C. 3OXP P HUPD %DUEHU)URQ NOLQ *XLGHQ 3 O Bennett J HW -DLU\ 6FL 98, 2116–25
15. ()6$ 3DQHO RQ $GGLWLYHV DQG 3URGXFWV RU 6XEVWDQFHV XVHG LQ)HHG)(('$3 *XLGDQFH RQ WKH FKDUDFWHUL]DWLRQ RI
16. 3 6DUPD 'RKUH &KDL 0LFURELRO 3 6,
17. L.L. %DUWRQ 5LGHU5 Coen 3HGLDWU 107, 75–6
18. D.)ORUHV Hill, D. 6XGD 3 &,ZHQ 3HGLDWU ,QIHFW 'LV - 27,
19. 3 +ROPEHUJ +DOOHU 0 +HP 3 0 ()6$ 0HG 52, 744–8
20.) Chen, Z. =KDQJ J Chen J 0HGLFLQH %DOWLPRUH
21. 3 'DWWD *XSWD G.K. Mohi, J. &KDQGHU A.K. -DQPHMD ,Q 'LDJQ 11(2), 57
22. =KRX HW DO 95, 4775–4783 6FL
23. N. 7RRPH\ Bolton, 6)DQQLQJ 0LFURELRO 161, 127-135
24. I. 6WHIDQ .RZDOF]\N 1LD (ZHOLQD]%DUEDUD 0 6WDQLV]HZVND Vet. 6FL 8,
25. L.M. %HDWW\ 7LHYHU $UFK 'LV &KLOG)HWDO 1HRQDWDO (G 96,