

Table S1. Change in the total plate count (log CFU/mL) of raw milk after different biopreservative (reuterin (R), nisin (N) and pediocin (P)) treatments at different time intervals at 37 °C

Treatment	t/h			
	0	3	6	9
	N/(log CFU/mL)			
C	(4.6±0.5) ^{aA}	(7.5±0.4) ^{aB}	(8.3±0.5) ^{aB}	(8.9±0.5) ^{aDC}
R1	(4.6±0.5) ^{aA}	(5.0±0.3) ^{ba}	(7.3±0.2) ^{aB}	(8.2±0.2) ^{aC}
N1	(4.6±0.5) ^{aA}	(5.9±0.4) ^{baB}	(7.4±0.3) ^{aC}	(8.5±0.4) ^{aD}
P1	(4.6±0.5) ^{aA}	(6.8±0.4) ^{baB}	(8.1±0.3) ^{aC}	(8.7±0.4) ^{aDC}
R1+N1	(4.6±0.5) ^{aA}	(4.3±0.4) ^{bcA}	(5.9±0.4) ^{bB}	(8.4±0.4) ^{aC}
R1+P1	(4.6±0.5) ^{aA}	(4.9±0.6) ^{baA}	(6.5±0.9) ^{aB}	(8.3±0.3) ^{aC}
R1+N1+P1	(4.6±0.5) ^{aA}	(4.1±0.3) ^{bdA}	(4.9±0.5) ^{aC}	(7.2±0.8) ^{aDC}
R2+N2+P2	(4.6±0.5) ^{aA}	(4.4±0.5) ^{beA}	(4.8±0.3) ^{cA}	(8.0±0.4) ^{AB}
R1+N2+P2	(4.6±0.5) ^{aA}	(5.3±0.5) ^{baA}	(4.9±0.4) ^{dA}	(7.7±0.3) ^{AB}
R2+N1+P1	(4.6±0.5) ^{aA}	(5.0±0.5) ^{bFA}	(5.7±0.4) ^{eBA}	(7.9±0.5) ^{aC}
R1+N1+P2	(4.6±0.5) ^{aA}	(3.6±0.5) ^{bgB}	(4.2±0.5) ^{fAB}	(6.7±0.5) ^{aC}
R2+N2+P1	(4.6±0.5) ^{aA}	(5.2±0.6) ^{baA}	(5.9±0.4) ^{eBA}	(7.3±0.5) ^{aC}
R2+N1+P2	(4.6±0.5) ^{aA}	(5.2±0.3) ^{bhA}	(6.8±0.4) ^{aB}	(8.1±0.5) ^{aC}
R1+N2+P1	(4.6±0.5) ^{aA}	(4.9±0.6) ^{baA}	(6.1±0.3) ^{aB}	(8.2±0.3) ^{aC}

Results are shown as mean value±standard deviation (S.D.) of three samples taken from three replicate experiments (N=9). Mean values within the same row with different superscripted uppercase letters differ significantly ($p<0.01$) among treatments for a given time. Mean values within the same column with different superscripted lowercase letters differ significantly ($p<0.01$) among treatments for a given time. Activity/(AU/mL): R1=150, R2=16, P1=2185 and P2=600; Activity/(IU/mL): N1=100 and N2=20

Table S3. Change in pH of raw milk after different biopreservative (reuterin (R), nisin (N) and pediocin (P)) treatments at different time intervals at 37 °C

Treatment	t/h			
	0	3	6	9
C	(6.7±0.1) ^{aA}	(6.1±0.1) ^{aB}	(5.3±0.1) ^{aC}	(4.1±0.1) ^{aD}
R1	(6.7±0.1) ^{aA}	(6.3±0.2) ^{aB}	(5.6±0.4) ^{aC}	(5.0±0.2) ^{aD}
N1	(6.7±0.1) ^{aA}	(6.2±0.2) ^{aB}	(5.5±0.1) ^{aC}	(4.4±0.2) ^{aD}
P1	(6.7±0.1) ^{aA}	(6.1±0.2) ^{aB}	(5.4±0.4) ^{bc}	(4.3±0.3) ^{bd}
R1+N1	(6.7±0.1) ^{aA}	(6.6±0.1) ^{ba}	(6.0±0.2) ^{cb}	(5.4±0.2) ^{aC}
R1+P1	(6.7±0.1) ^{aA}	(6.4±0.1) ^{aA}	(5.9±0.2) ^{db}	(5.3±0.4) ^{cC}
R1+N1+P1	(6.7±0.1) ^{aA}	(6.5±0.1) ^{aAB}	(6.2±0.1) ^{ab}	(5.1±0.2) ^{aC}
R2+N2+P2	(6.7±0.1) ^{aA}	(6.0±0.3) ^{aB}	(5.5±0.5) ^{eC}	(4.9±0.4) ^{dD}
R1+N2+P2	(6.7±0.1) ^{aA}	(6.5±0.2) ^{aAB}	(6.1±0.1) ^{aB}	(5.3±0.3) ^{eC}
R2+N1+P1	(6.7±0.1) ^{aA}	(6.5±0.1) ^{aA}	(5.7±0.2) ^{fB}	(5.1±0.1) ^{fC}
R1+N1+P2	(6.7±0.1) ^{aA}	(6.5±0.2) ^{aA}	(6.4±0.1) ^{aA}	(5.9±0.2) ^{gB}
R2+N2+P1	(6.7±0.1) ^{aA}	(6.4±0.1) ^{aA}	(5.6±0.3) ^{gB}	(5.1±0.2) ^{hC}
R2+N1+P2	(6.7±0.1) ^{aA}	(6.4±0.1) ^{aA}	(6.0±0.2) ^{hB}	(4.9±0.2) ^{hB}
R1+N2+P1	(6.7±0.1) ^{aA}	(6.4±0.2) ^{aA}	(5.9±0.1) ^{hB}	(5.1±0.2) ^{hB}

Results are shown as mean value±standard deviation (S.D.) of three samples taken from three replicate experiments (N=9). Mean values within the same column with different superscripted lowercase letters differ significantly ($p<0.01$) among treatments for a given time. Mean values within the same row with different superscripts uppercase letter differ significantly ($p<0.01$) among treatments for a given time. Activity/(AU/mL): R1=150, R2=16, P1=2185 and P2=600; Activity/(IU/mL): N1=100 and N2=20

Table S2. Change in coliform count (log CFU/mL) of raw milk after different biopreservative (reuterin (R), nisin (N) and pediocin (P)) treatments at different time intervals at 37 °C

Treatment	t/h			
	0	3	6	9
	N/(log CFU/mL)			
C	(4.1±0.1) ^{aA}	(6.4±0.4) ^{aB}	(7.8±0.4) ^{aC}	(8.2±0.5) ^{aDC}
R1	(4.1±0.1) ^{aA}	(5.2±0.5) ^{ba}	(6.1±0.2) ^{baA}	(8.0±0.4) ^{aAB}
N1	(4.1±0.1) ^{aA}	(4.9±0.7) ^{baA}	(6.2±0.4) ^{aB}	(7.5±0.6) ^{aC}
P1	(4.1±0.1) ^{aA}	(5.9±0.5) ^{bcB}	(6.9±0.8) ^{aAB}	(8.2±0.4) ^{aCBA}
R1+N1	(4.1±0.1) ^{aA}	(4.1±0.6) ^{bdAC}	(5.3±0.5) ^{cACD}	(7.1±0.6) ^{aBCD}
R1+P1	(4.1±0.3) ^{aA}	(4.9±0.5) ^{ebAC}	(6.9±0.7) ^{aAD}	(7.1±0.5) ^{aBCD}
R1+N1+P1	(4.1±0.2) ^{aA}	(4.3±0.6) ^{bFA}	(4.9±0.7) ^{dAB}	(6.9±0.7) ^{bAC}
R2+N2+P2	(4.1±0.2) ^{aA}	(4.9±0.9) ^{gbAD}	(5.8±0.5) ^{eBD}	(6.6±0.5) ^{cC}
R1+N2+P2	(4.1±0.1) ^{aA}	(3.8±0.5) ^{bhAC}	(4.8±0.6) ^{fAD}	(6.9±0.5) ^{dBCE}
R2+N1+P1	(4.1±0.1) ^{aA}	(4.9±0.6) ^{biAD}	(5.0±0.4) ^{gB}	(6.6±0.5) ^{eCDB}
R1+N1+P2	(4.1±0.1) ^{aA}	(3.5±0.5) ^{bjAC}	(3.9±0.4) ^{hAD}	(6.3±0.4) ^{fB}
R2+N2+P1	(4.1±0.1) ^{aA}	(4.9±0.6) ^{bkA}	(4.3±0.4) ^{iA}	(6.8±0.9) ^{gA}
R2+N1+P2	(4.1±0.1) ^{aA}	(4.4±0.5) ^{bliA}	(5.5±0.5) ^{jAC}	(7.0±0.4) ^{hBC}
R1+N2+P1	(4.1±0.1) ^{aA}	(3.9±0.6) ^{blmA}	(6.2±0.5) ^{kAC}	(6.8±0.5) ^{hBC}

Results are shown as mean value±standard deviation (S.D.) of three samples taken from three replicate experiments (N=9). Mean values within the same column with different superscripted lowercase letters differ significantly ($p<0.01$) among treatments for a given time. Mean values within the same row with different superscripted uppercase letters differ significantly ($p<0.01$) among treatments for a given time. Activity/(AU/mL): R1=150, R2=16, P1=2185 and P2=600; Activity/(IU/mL): N1=100 and N2=20

Table S4. Change in titratable acidity (TA) of raw milk after different biopreservative (reuterin (R), nisin (N) and pediocin (P)) treatments at different time intervals at 37 °C

Treatment	t/h			
	0	3	6	9
	TA/%			
C	(0.16±0.01) ^{aA}	(0.39±0.04) ^{aB}	(0.45±0.02) ^{aCB}	(0.55±0.046) ^{aDC}
R1	(0.16±0.01) ^{aA}	(0.20±0.02) ^{aB}	(0.30±0.03) ^{aC}	(0.46±0.04) ^{aD}
N1	(0.16±0.01) ^{aA}	(0.25±0.02) ^{aB}	(0.36±0.03) ^{aC}	(0.56±0.04) ^{aD}
P1	(0.16±0.01) ^{aA}	(0.33±0.03) ^{baB}	(0.44±0.04) ^{bcB}	(0.54±0.03) ^{aD}
R1+N1	(0.16±0.01) ^{aA}	(0.21±0.02) ^{cb}	(0.25±0.02) ^{cAB}	(0.42±0.02) ^{aC}
R1+P1	(0.16±0.01) ^{aA}	(0.20±0.03) ^{da}	(0.30±0.03) ^{dB}	(0.44±0.02) ^{aC}
R1+N1+P1	(0.16±0.01) ^{aA}	(0.25±0.03) ^{eb}	(0.32±0.04) ^{eAB}	(0.46±0.02) ^{aC}
R2+N2+P2	(0.16±0.01) ^{aA}	(0.23±0.03) ^{fB}	(0.31±0.03) ^{fC}	(0.50±0.04) ^{aD}
R1+N2+P2	(0.16±0.01) ^{aA}	(0.19±0.01) ^{gB}	(0.27±0.04) ^{gAB}	(0.41±0.05) ^{aC}
R2+N1+P1	(0.16±0.01) ^{aA}	(0.23±0.03) ^{hA}	(0.45±0.04) ^{aB}	(0.50±0.03) ^{aCB}
R1+N1+P2	(0.16±0.01) ^{aA}	(0.18±0.02) ^{iA}	(0.22±0.03) ^{hB}	(0.29±0.02) ^{bc}
R2+N2+P1	(0.16±0.01) ^{aA}	(0.21±0.03) ^{jA}	(0.32±0.11) ^{aAB}	(0.51±0.03) ^{aB}
R2+N1+P2	(0.16±0.01) ^{aA}	(0.21±0.02) ^{kb}	(0.40±0.03) ^{aC}	(0.52±0.02) ^{aD}
R1+N2+P1	(0.16±0.01) ^{aA}	(0.23±0.02) ^{lB}	(0.35±0.02) ^{iC}	(0.49±0.03) ^{aD}

Results are shown as mean value±standard deviation (S.D.) of three samples taken from three replicate experiments (N=9). Mean values within the same column with different superscripted lowercase letters differ significantly ($p<0.01$) among treatments for a given time (Dennett's test). Mean values within the same row with different superscripted uppercase letters differ significantly ($p<0.01$) among treatments for a given time. Activity/(AU/mL): R1=150, R2=16, P1=2185 and P2=600; Activity/(IU/mL): N1=100 and N2=20