

## Efficacy of a combination of nisin and citric acid against listeria monocytogenes 10403S in vitro and in model food systems

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### Abstrak

#### <b>ABSTRAK</b><br>

Nisin has been extensively used as a safe food preservative: therefore, the occurrence of nisin resistance in various bacteria including nisin exposed *Listeria monocytogenes* has increased in recent years. This problem could be overcome by using nisin in combination with other antimicrobial agents resulting in synergistic effects. Citric acid is a safe food additive granted GRAS status by the Food and Drug Administration, USA. In the present investigation, the antibacterial activity of nisin and citric acid alone or in combinations against *L. monocytogenes* 10403S was determined, and their potential as food preservative in food model systems was evaluated. The nisin and citric acid showed minimum inhibitory concentration (MIC) at 250 and 4,000 mg/ml, respectively. Checkerboard microdilution method using both compounds showed synergistic effect at concentration of 62.5mg/ml and 1,000 mg/ml, respectively, with the fractional inhibitory concentration index (FICI) value of 0.5. The potent anti listeria effect of nisin in combination with citric acid on the growth of *L. monocytogenes* in pork ham (food model) was observed during six days of storage at 4°C. This might be exploited to inhibit foodborne bacteria and minimize the nisin resistant problem of *L. monocytogenes* in the food industry.