

**Title** Microbiological quality of fresh lettuce from organic and conventional production  
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### Abstract

Previously there was no available information on the levels of indicator bacteria and the prevalence of pathogens in fresh lettuce grown in organic and conventional farms in Spain. A total of 72 lettuce samples (18 farms for 4 repetitions each) for each type of the agriculture were examined in order to assess the bacteriological quality of the lettuces, in particular the prevalence of selected pathogens. The lettuce samples were analyzed for the presence of aerobic mesophilic, psychrotrophic microorganisms, yeasts and moulds, *Enterobacteriaceae*, mesophilic lactic acid bacteria, *Pseudomonas* spp. and presumptive *Escherichia coli*, *Salmonella* spp. and *Listeria monocytogenes*. The mean aerobic mesophilic counts (AM) were  $6.35 \pm 0.69 \log_{10} \text{cfu g}^{-1}$  and  $5.67 \pm 0.80 \log_{10} \text{cfu g}^{-1}$  from organic and conventional lettuce, respectively. The mean counts of psychrotrophic microorganisms were  $5.82 \pm 1.01 \log_{10} \text{cfu g}^{-1}$  and  $5.41 \pm 0.92 \log_{10} \text{cfu g}^{-1}$  from organic and conventional lettuce, respectively. Yeasts and moulds (YM) mean counts were  $4.74 \pm 0.83 \log_{10} \text{cfu g}^{-1}$  and  $4.21 \pm 0.96 \log_{10} \text{cfu g}^{-1}$  from organic and conventional lettuce, respectively. Lactic acid bacteria (LAB) were present in low numbers and the mean counts were  $2.41 \pm 1.10 \log_{10} \text{cfu g}^{-1}$  and  $1.99 \pm 0.91 \log_{10} \text{cfu g}^{-1}$  from organic and conventional lettuce, respectively. *Pseudomonas* spp. mean counts were  $5.49 \pm 1.37 \log_{10} \text{cfu g}^{-1}$  and  $4.98 \pm 1.26 \log_{10} \text{cfu g}^{-1}$  in organic and conventional lettuce, respectively. The mean counts for *Enterobacteriaceae* were  $5.16 \pm 1.01 \log_{10} \text{cfu g}^{-1}$  and  $3.80 \pm 1.53 \log_{10} \text{cfu g}^{-1}$  in organic and conventional lettuce, respectively. *E. coli* was detected in 22.2% (16 samples) of organic lettuce and in 12.5% (9 samples) of conventional lettuce. None of the lettuce samples was positive for *E. coli* O157:H7, *L. monocytogenes* and *Salmonella* spp. From the samples analyzed by principal component analysis (PCA) a pattern with two different groups (conventional and organic) can be observed, being the highest difference between both kinds of samples the *Enterobacteriaceae* count.