

## Research program IZS VE 08/13

**Resistance to biocides, antimicrobials and nanoparticles: study of co-and crossresistance phenomena in two case studies: Salmonella in poultry primary production and Listeria in food processing plants**

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The emergence of microorganisms with a combined resistance to biocides and antimicrobial agents is a challenge to primary production and food-processing industries. Bacteria can be intrinsically resistant to biocides but resistance can also be acquired by adaptation to sub-lethal concentrations. The presence of biocide resistance determinants closely linked to antibiotic resistance determinants could lead to co-selection during disinfection practices along the food chain. Moreover, metal based nanoparticles have been recently studied and used for their antimicrobial properties, but are equally prone to induce resistance, even to other classes of active substances.

Aims of this work are:

- to determine the prevalence and the level of resistance to commonly used biocides of Salmonella and Listeria isolates obtained from poultry farms and food-processing industries, respectively;
- to assess co- and/or cross- resistances with other antimicrobial agents as antibiotics and metal-based compounds;
- to investigate the molecular and physiological mechanisms that are involved in bacteria resistance to biocides;
- to evaluate potential risk factors in the sanitification management that might promote the rising of resistances to biocides and other antimicrobials.