

DEVELOPMENT OF ANTIBIOTIC RESISTANCES IN THE SOIL FROM THE LIVESTOCK MANURE IN THE LIS VALLEY (PORTUGAL)

M.P. Amador^{1*}, I.M. Duarte²

1 Instituto Politécnico de Coimbra, Escola Superior Agrária (IPC/ESAC), CERNAS, Bencanta, 3045-601 Coimbra, Portugal, paula_amador@esac.pt;

* Corresponding author

ABSTRACT

In the last decades, antibiotics have been widely used in human and veterinary therapy. Although not allowed in Europe as growth promoters, they can be used as feed additives in intensive aquaculture and poultry farming. Following administration they are excreted through the urine and feces in the active forms and their metabolites along with antibiotic resistant bacteria. The main routes of environmental contamination with antibiotics, resistant bacteria and resistance genes are the municipal and agricultural sewage networks. Its long-term permanence at subinhibitory concentrations in water systems leads to the selective pressure that favors the emergence of resistances. Slurry and manure, with high levels of organic matter and microorganisms, are especially suitable for the growth and spread of resistance to antibiotics. Common agricultural practices for the reuse of water, nutrients and organic matter, such as soil fertilization and irrigation with effluents from intensive aquaculture systems, are responsible for the contamination of agricultural soils, bringing this problem to the top of environmental concerns. This work evaluates the contribution of intensive livestock farming to the spread of antibiotic resistance through manure in the central region of Portugal. Manure and soil samples were collected between March 2018 and January 2019. Enterobacteriaceae were counted and isolated from the samples, phenotypically characterized isolates and their resistance profiles determined on 14 antibiotics. The main finding of this study was that the soil treated with biological waste is a pool for the resistant bacteria and their genes. All sites revealed a high frequency of multiple drug resistance isolates (60% to 69%). Thus, the environmental spread of these bacteria can become a matter of concern since untreated manure is often used for crop fertilization in the region. This article provides an insight into the real contribution of livestock to the public health problem in this Region. This study is part of the Operational Group for water management in the Lis Valley.

Keywords: antibiotic resistance, intensive livestock production, multidrug resistant bacteria
