

Impact of Livestock in Quality of Wastewater for Irrigation

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Abstract

Over the last decades, antibiotics have been used in human and animal therapy and livestock. In Europe, they are not allowed as growth promoters in intensive livestock, but can be used as feed additives in aquaculture and poultry production. Antibiotics are daily excreted as a mixture of unchanged and partially metabolized forms, together with resistant bacteria. The major routes of environmental contamination with antibiotics, resistant bacteria and resistance genes are the network of municipal and farm sewers. Besides chemical pollution by antibiotic, their long term permanence in water systems, pressures the selection at sub-inhibitory concentrations upon microorganisms, favouring antibiotic-resistant bacteria. The wastewaters, with high levels of organic and inorganic matter and microorganisms are especially adapted for growth and spread of antibiotic resistances. Common agricultural practices of water, nutrients and organic matter reuse for crop production, *e.g.*, soil fertilization with manure and slurry from intensive livestock farming and irrigation with effluents from intensive aquaculture systems, are responsible for agroecosystems contamination. Humans can be continually exposed to these contaminants, through the ingestion of food plants grown on that irrigated land. Conversely, agricultural systems, then can further contribute to environmental contamination of soil and water resources. Moreover, in intensive aquaculture the antibiotics are directly added to the water to treat infections, generating high concentrations in local wastewaters, resulting in serious environmental and public health problems. This paper presents a preliminary study sought to access the contribution of some livestock activities (chick rearing, hen, poultry, pigs, dairy cattle and slaughterhouse) to the spread of antibiotic resistances through the treated wastewaters, manure and slurry in the central region of Portugal. Between March and July 2015, sampling of treated wastewaters from selected livestock WWTP is being conducted. Samples are collected in 1L sterile plastic bottles, from which *Enterobacteriaceae* are isolated and phenotypically characterized, by the agar diffusion method for determination of the resistance profiles against 14 antibiotics. AMP^r bacteria are enumerated on VRBG plates ampicillin supplemented. The results will be presented in the paper. This paper will provide an insight about the real contribution of these activities to this public health problem in this Region.

Keywords: antibiotic resistance bacteria, antibiotic, irrigation wastewater reuse, wastewater, water quality, WWTP, livestock