Harmful bacteria in water are of concern, especially if they are resistant to antibiotics. A new Portuguese study reports on levels of a group of bacteria, staphylococci, in three different types of water in the treatment cycle and analyses their resistance to antibiotics.

‘Coagulase-negative staphylococci’ (CNS) are common and usually harmless. However, some CNS can cause skin infections when introduced medically or if present in wounds. The urban water cycle is an important means of transport of microorganisms like CNS and recently the risk of infection by CNS has increased. Although the European Drinking Water Directive sets quality standards for drinking water, it does not recommend screening for staphylococci.

This study assessed the diversity of CNS and their resistance to antibiotics in water from three different sources:
- A drinking water treatment plant where raw water is treated
- A water distribution network that receives treated water
- A wastewater treatment plant where effluent is treated

Staphylococci were isolated from a total of 242 water samples. Although the majority (175) were from the water distribution network, the water from the wastewater treatment plant showed the greatest diversity of species with 12 different species of CNS present. The large number of CNS in the water distribution network may represent an undesired colonisation. Pinpointing the origins of this colonisation is not within the scope of this study, but the authors have two suggestions. It may be that the CNS may not be completely eliminated during water treatment or there may be undetectable micro-fissures (tiny cracks) in the network that allow CNS to intrude.

The research identified different species of CNS in each type of water. The majority found in the water distribution network were from the species *S. pasteuri* that is widely distributed in food and in the environment. Despite the variation in species across the different water types, CNS with resistance to antibiotics were detected in all types of water. The highest numbers of bacteria resistant to two or more antibiotics were observed in untreated water from the drinking water treatment plant: 52.6 per cent of the CNS from this plant were resistant to at least two types of antibiotics. 25 per cent of CNS in treated water, from the distribution network, were resistant to two or more antibiotics. The most common resistance was to the antibiotic erythromycin, widely used by patients allergic to penicillin.

Antibiotic resistant CNS in water for human consumption is a risk for which little or no assessment is available. In addition, the behaviour of CNS may change depending on other environmental stress factors. For example, the over-use of antibiotics might encourage an increase in CNS. Further research is needed on the persistence of bacteria through the different stages of the water cycle and on the effect of possible environmental factors on CNS.


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