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## RELEVANCE OF IRON CONTENT FOR ESCHERICHIA COLI GROWTH IN DRINKING WATER

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### Background:

The chemical and microbiological quality of drinking-water should be considered within overall public health priorities. The chemical contaminants of drinking-water may have different sources, including agricultural activities (e.g. nitrate), geological origin, and as a result of corrosion reactions in the distribution systems (e.g. heavy metals) [1]. In public water system of drinking water, the presence of iron (Fe) could be related to increased bacterial activity including *Escherichia coli* growth [2,3], an indicator of faecal contamination and the potential presence of pathogenic bacteria, protozoa or viruses [1]. On the other hand, phylogenetically different species of bacteria can promote the oxidation of ferrous iron [Fe(II)] coupled to nitrate (NO<sub>3</sub><sup>-</sup>) reduction, often referred to as nitrate-dependent iron oxidation [4].

### Aim:

This research evaluated the relation between the iron (µg/L) and nitrate (mg/L) concentration and the *E. coli* colony-forming units (CFUs) persistence in drinking water distribution systems.

### Methods:

The samples of drinking water (n=464) were analyzed according the standardized protocols [5]. The proportion of samples with high number of *E.coli* CFUs (>80) were estimated according to the concentration of iron (<50 or ≥50 µg/L) and nitrates (<1 or ≥1 mg/L). By including only positive samples for *E.coli* (n=22), we estimated the Spearman's correlation coefficients (r<sub>s</sub>) and the respective p-value (p < 0.05) between iron concentration, nitrate concentration and number of *E. coli* CFU.

### Results:

There were higher proportion of >80 *E.coli* CFUs among samples with high iron concentration (p=0.049) while no significant differences were observed by nitrate concentration (p=0.059). When analyses were restricted to positive samples for *E.coli* (CFUs > 0) we observed a significant correlation between iron concentration and *E. coli* CFUs; r<sub>s</sub>=0.497 (p=0.019), while no correlation was observed between nitrate concentration and *E. coli* CFUs; r<sub>s</sub>=0.335 (p=0.126).

### Conclusion:

The results emphasizes the iron role in the *E. coli* persistence in drinking water of public network, rising some concerns in the field of public health.

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