



# Stability of antibiotics in drinking water: An advanced approach towards the impacts of water quality parameters on doxycycline bioavailability

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## Abstract:

**Objective:** This study was considered to explore the possible impacts of drinking water quality from different sources on the bioavailability of doxycycline. **Materials and Methods:** Sixty-four tap and ground drinking water samples collected from poultry farms were scrutinized for their water quality limits (TH, pH, total dissolved solids, electrical conductivity,  $Cl^-$ ,  $Ca^{2+}$ ,  $Na^+$ , and  $Mg^{2+}$ ) and heavy metals concentrations (Zn, Fe, Cu, and Ni). An in vitro study was conducted by adding the therapeutic concentrations of doxycycline to all tested water samples, and allowed to interact for 1 h, 3 h, 5 h, and 8 h followed by re-estimation of doxycycline concentrations after each contact time using thin layer chromatography. **Results:** The therapeutic concentration of doxycycline was decreased in tap water samples by 1.92%, 9.63%, 22.42%, and 30.83% for the aforementioned contact times, respectively, while the corresponding reduction percentages in ground water samples were 2.14%, 17.14%, 28.57%, and 40.09%. However, the control samples had never showed any recorded decrease in their doxycycline concentrations overall contact times. All measured concentrations of doxycycline were significantly lower in tap and ground water than those of control at all times of contact. Both pH,  $Mg^{2+}$  showed significant positive correlations with decreasing values of doxycycline in water. **Conclusion:** Different drinking water sources reduce the concentrations of doxycycline in vitro in a time dependent manner, which can be attributed to their different physico-chemical parameters, i.e., pH and  $Mg^{2+}$  ions. This emphasizes the role of water quality on the stability of antibiotics concentrations administrated via drinking water.

## Keywords:

antibiotics- drinking water- quality parameters - doxycycline- bioavailability

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