

# Analysis of the Mechanism of Mg<sup>2+</sup> Action on the RNase Activity of *Serratia marcescens* Endonuclease

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## Abstract

© 2016, Springer Science+Business Media New York. The main goal of the investigation was to analyze the mechanism of Mg<sup>2+</sup> action on the digestive activity of *Serratia marcescens* nuclease towards RNA due to the potential application of the nuclease as a reagent for removing nucleic acids from biomedical samples as well as an antiviral factor. Examination of the mechanism revealed that it was similar to the mechanism of the metals actions on the DNase activity. The optimal Mg<sup>2+</sup> amount was linked with the changing secondary structure of RNA—substrates within A-helix. Addition of Mg<sup>2+</sup> was found to affect both the rates of products dissociations from the enzyme-substrate complexes and the enzyme associations with the substrates, that was supported by strong increase in the K<sub>cat</sub> values and change in the K<sub>m</sub> values. Comparing the mechanisms of Mg<sup>2+</sup> action on RNase and DNase activities in *S. marcescens* nuclease, we identified a preference for DNA in the absence of Mg<sup>2+</sup> that was supported with the K<sub>cat</sub> values.

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## Keywords

Preference for DNA substrate, *Serratia marcescens* nuclease, The mechanism of Mg action on the RNase activity 2+

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