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### The ability of cations to precipitate alginate, polyguluronate and polymannuronate

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The relative ability of cations to precipitate alginate, polyguluronate and polymannuronate was examined. The cations used in this study were  $\text{Ca}^{2+}$ ,  $\text{Cd}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Cr}^{6+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Pb}^{2+}$ ,  $\text{Rb}^{1+}$ ,  $\text{Sr}^{2+}$  and  $\text{Zn}^{2+}$ . These cations were classified into three groups, depending on their ability to precipitate polymers: 1) those cations having a relatively high precipitating ability of alginate, polyguluronate and polymannuronate;  $\text{Ca}^{2+}$ ,  $\text{Cd}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Fe}^{3+}$  and  $\text{Pb}^{2+}$ , 2) those cations having a relatively low precipitating ability of alginate polyguluronate and polymannuronate;  $\text{Rb}^{1+}$ ,  $\text{Mg}^{2+}$  and 3)  $\text{Cr}^{6+}$  having a relatively high precipitating ability of polymannuronate but not alginate and polyguluronate. These results obtained by this study will be used for bioremediation or biosorption of toxic or noble cations by biopolymers.