The complexation chemistry of 2ketogluconate. (S02-nelson095004-Oral)

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Abstract:

2-Ketogluconate, a microbial oxidation product, is reportedly a significant organic species in the rhizosphere. Several studies have qualitatively shown this compound to have strong complexation capacities and the ability to inhibit some mineral precipitation. However, quantitative information, such as the log K values for the formation of metal-2-ketogluconate complexes, is mostly absent from the literature. The objectives of this work are to determine the log K values for the protonation of 2-ketogluconate and the formation of 2-ketogluconate complexes with Ca and Cu. The log K values were determined by potentiometric methods at ionic strengths of 1.0 and 0.1, at 25 deg. C, and in the absence of CO2. The computer model GEOCHEM-PC was used to determine aqueous speciation of ions other than 2-ketogluconate and the computer model FITEQL32 was used to adjust conditional log K values for the complexes under consideration. Log K values were determined for the following reactions: H + KG - HKG, Log K =2.7 and Ca2+ + KG- = CaKG+, Log K = 1.5. The Cu titration data were modeled by two complexes: Cu2+ + KG- = CuKG+, Log K =3.6 and Cu2++2KG = Cu(KG)2, Log K = 6.5.

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