

**Effects of Sodium Chloride on the Stability of *Escherichia coli***  
**Factor for Inversion Stimulation**

by

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## ABSTRACT

Effects of sodium chloride (NaCl) on the stability of *Escherichia coli* (*E.coli*) protein factor for inversion stimulation (FIS) were investigated. When the concentration of NaCl was increased from 0.1M to 1.0 M, the stability of wild type FIS was increased by about 2.7 kcal/mol, but the slope of the urea equilibrium denaturation curve remained almost unchanged. It was hypothesized that the salt-effect was related to the highly charged C-terminus. To sort out the structural basis of this stabilizing effect, a double mutant P61A/Y51F FIS that can probe the C-terminus structure during equilibrium denaturation experiments was studied. At 0.1M NaCl, the equilibrium denaturation of the C-terminus has been decoupled from the denaturation of the dimer core, resulting in a three-state transition. At 1.0M NaCl, the stabilizing effect is greater at the first transition than that at the second transition. The first transition, which was previously shown to correspond to conformational changes at the C-terminus and the formation of a dimeric intermediate ( $N_2 \rightleftharpoons I_2$ ), was increased by 1.1 kcal/mol while the second transition ( $I_2 \rightleftharpoons 2U$ ) was almost unaffected. The results suggest that the stability of FIS is compromised by the highly positive charged C-terminus, which is stabilized by NaCl, perhaps by shielding the positive charges and decreasing the charge-charge repulsion between nearby residues.