

Stability of Biopolymers in Aqueous Solution. GMPC Approach.

A.V Asatryan, Sh.A. Tonoyan, D.L. Hayrapetyan, V.F. Morozov

Within the frameworks of Generalised Model of Polypeptide Chain (GMPC)¹⁻⁴ the concentration behaviour of helix-coil transition temperature of biopolymer in two-component solvent was observed on the simplest models. It is shown that if the solvent and the ligand interact with the biopolymer at different binding sites, and even if both components influence the helical state in the same way, the model allows one to obtain the non-monotone character of the melting temperature behaviour of biopolymer depending on the ligand concentration. It is shown that changes in the regime of helical state stability is not always related with the competition of stabilising and destabilising interactions of blend components but can be the result of the cumulative effect of both components.

1. Morozov, V. F., Badasyan, A. V., Grigoryan, A. V., Sahakyan, M. A., & Mamasakhlisov, Y. S. (2004). Stacking and hydrogen bonding: DNA cooperativity at melting. *Biopolymers*, 75(5), 434-439.
2. Badasyan, A., Tonoyan, S., Giacometti, A., Podgornik, R., Parsegian, V. A., Mamasakhlisov, Y., & Morozov, V. (2012). Osmotic pressure induced coupling between cooperativity and stability of a helix-coil transition. *Physical review letters*, 109(6), 068101.
3. Badasyan, A., Tonoyan, S. A., Giacometti, A., Podgornik, R., Parsegian, V. A., Mamasakhlisov, Y. S., & Morozov, V. F. (2014). Unified description of solvent effects in the helix-coil transition. *Physical Review E*, 89(2), 022723.
4. Asatryan, A. V., Tonoyan, S. A., Mirtavoosi, S., Mamasakhlisov, Y. S., & Morozov, V. F. (2015). 192 The helix-coil transition in two-component solvent in the frames of GMPC. Ligands effects on the characteristics of the transition. *Journal of Biomolecular Structure and Dynamics*, 33(sup1).
5. Schildkraut, Carl, and Shneior Lifson. "Dependence of the melting temperature of DNA on salt concentration." *Biopolymers* 3.2 (1965): 195-208.
6. De Costa, N. Tilani S., and Jennifer M. Heemstra. "Evaluating the effect of ionic strength on duplex stability for PNA having negatively or positively charged side chains." *PloS one* 8.3 (2013): e58670.