

### The short-and long-term stability study of protein nanoparticle

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Recently, the protein-nanoparticle(PNP) has been utilized for variable applications. The PNP has some advantages in terms of correspondingly large surface-to-vol ratio, high size uniformity and can be easily self-assenbled in *E.coli*. But comparing of other materials such as metals and polymers, the stability of protein is low. In this work, we tried to enhance the short-term and long-term stability of protein, especially PNP, by using lyophilization. The lyophilized samples were stored at four different temperature: -20 °C, 4 °C, 25 °C, 37 °C. The stability of PNP with stabilizers maintained during 12 weeks in all conditions. We confirmed that rehydrated PNP was a native form by TEM image, and had a same activity by measuring the fluorescent intensity. And we found that the stability of PNP is more stable than monomer.