How to Optimize Gel-tube Method

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'Gel-Tube' is a method for a protein crystallization using a simplified counter-diffusion technique as we previously reported [1]. A gel in a silicon tube, through which protein and precipitant solution diffuse each other from different direction, is attached to the end of a capillary. Crystallization experiments with a wide range of conditions can be carried out by only one capillary unless crystallization occurs, which suggests that there is a higher possibility for obtaining crystals by a single experiment than conventional method such as vapourdiffusion. Moreover, if combined with 1-dimensional (1-D) simulation program to know concentration change of protein and precipitant solution in a capillary, it is possible to estimate the concentration of protein and precipitant in a certain position of a capillary when crystallization occurred, so that optimization of crystallization condition for further crystallization experiment can be performed. According to the results of the simulation, polyethylene glycol (PEG) might work well in Gel-Tube method as a precipitant because it diffuses so slowly that crystal grows gradually. The effects of the geltube length, sample length in a capillary and type of precipitant will be shown.

[1] Tanaka H., et al., J. Synchrotron Rad, 2004, 11, 45-48.

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