

Interfacial partition of plasmid DNA in aqueous two-phase systems

ABSTRACT

In this paper, the partition of plasmid DNA (pDNA) in polyethylene glycol (PEG) 300 and di-potassium hydrogen phosphate aqueous two-phase systems (ATPS) under gravity separation was investigated. The influence of temperature (20 and 30 °C) and mode of phase separation (40-60% (w/w) lysate concentrations) on the pDNA partition behaviour was studied. At 20 °C, 70.7% of pDNA partitioned to the top phase while the recoveries in the interface and bottom phase were comparatively small. At 30 °C, the partition had switched from a top phase preference to an interface preference where 73.9% of pDNA was recovered. The distribution of pDNA between the top phase and interface is effectively time-dependent during gravitational phase separation. Systems with lysate concentrations between 40 and 50% (w/w) separated with a continuous bottom phase and a dispersed PEG-rich top phase. For ATPS with 55 and 60% (w/w) lysate, the top phase was continuous and the bottom phase was dispersed.

Keyword: Interfacial partition; Plasmid DNA; Aqueous two-phase systems; Top phase; Bottom phase