TECHNOTE 100

Centrifugation Parameters for Particle Washing

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Introduction

Micromod's nano- and microparticles are most frequently supplied in aqueous suspension without any surfactants. Our protein-coated particles come in PBS buffer and sodium azide as antimicrobial agent.
If the particles have to be transferred into another medium or simply washed before the application, centrifugation is a standard method. The centrifugation parameters vary in dependence on the particle diameter and matrix material. After centrifugation the particles can be suspended in the new medium by shaking, vortexing or sonication.
We do not recommend to centrifuge our composite particles, consisting of materials with different densities. Such particles are our magnetic polysaccharide particles nanomag® and BNF-Starch, that can be washed by magnetic separation (see Technote 101).
Furthermore the sedimentation of particles < 100 nm requires high-speed ultracentrifugation and intensive sonication to suspend the particles in the new medium. Therefore we do not recommend the ultracentrifugation of protein-coated nanoparticles < 100 nm. Particles with diameters ≤ 100 can be washed or transferred into another medium by size exclusion chromatography (see Technote 102) or dialysis (see Technote 103).

Centrifugation parameters

1. Polystyrene and polymethylacrylate particles (micromer®), IDA-Latex, PLA particles and albumin particles (white, fluorescent or coloured particles)

Particle Size	Centrifugal Acceleration	Time	Resuspension of Pellet
50 nm	45,000 x g	30 min	30 min sonication / vortex
100 nm	45,000 x g	30 min	30 min sonication / vortex
200 nm	45,000 x g	30 min	30 min sonication / vortex
500 nm	45,000 x g	20 min	10 min sonication / vortex
800 nm	10,000 x g	20 min	10 min sonication / vortex
1 µm	3,500 x g	15 min	10 min sonication / vortex
2 – 4 µm	1,600 x g	15 min	vortex
5 - 8 µm	1,200 x g	10 min	vortex
> 8 µm	25 x g	10 min	vortex

2. Silica particles (sicastar®)

Particle Size	Centrifugal acceleration	Time	Resuspension of Pellet
30 nm	45,000 x g	60 min	60 min sonication / vortex
50 nm	30,000 x g	30 min	60 min sonication / vortex
70 nm	25,000 x g	20 min	60 min sonication / vortex
100 nm	20,000 x g	15 min	50 min sonication / vortex
200 nm	13,000 x g	10 min	40 min sonication / vortex
300 nm	7,500 x g	10 min	30 min sonication / vortex
400 nm	1,500 x g	10 min	20 min sonication / vortex
500 nm	850 x g	10 min	10 min sonication / vortex
600 nm	600 x g	10 min	10 min sonication / vortex
800 nm	200 x g	10 min	10 min sonication / vortex
1 µm	50 x g	10 min	10 min sonication / vortex
1.5 µm	35 x g	10 min	10 min sonication / vortex
3 µm	25 x g	10 min	vortex
4 µm	25 x g	10 min	vortex
5 µm	25 x g	10 min	vortex
10 µm	15 x g	10 min	vortex
12 µm	15 x g	10 min	vortex
15 µm	10 x g	10 min	vortex
20 µm	10 x g	10 min	vortex