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repeated membrane  
emulsification*

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### **Inability to prepare lecithin-stabilized oil-in-water emulsions by repeated membrane emulsification**

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The purpose of this study was to determine if lecithin-stabilized oil-in-water (O/W) emulsions could be created by repeated membrane homogenization (MH) using a *Shirasu porous glass* (SPG) membrane. O/W emulsions (10 or 20 wt% corn oil, 2 wt% lecithin, 100 mM acetic acid, pH 3) were prepared by passing coarsely emulsified feed mixtures five times through the membrane with a mean pore size of 8.0  $\mu\text{m}$  under the transmembrane pressure of 100 or 150 kPa. Laser diffraction instrument and optical microscopy indicated that there were large populations of relatively large oil droplets ( $d > 50 \mu\text{m} = >50 \text{ vol}\%$ ) in all lecithin-stabilized emulsions prepared by MH, although particle diameters tended to decrease as the number of passes increased. The transmembrane flux decreased as the number of passes increased: 30  $\text{m}^3\text{m}^{-2}\text{h}^{-1}$  after first pass to 1  $\text{m}^3\text{m}^{-2}\text{h}^{-1}$  after 5 passes. This result suggests that lecithin, even if its net charge is negative ( $\text{p}K_{\text{a}} \sim \text{pH } 1.5$ ), is not a good emulsifier in MH using SPG membrane because of positive groups on the lecithin molecules that could interact with anionic silanol groups on the SPG surface, which in turn block pores and cause membrane fouling.