

Optimized Alginate Encapsulation

Aim of the experiment

It is used to optimize the original Alginate Encapsulation Protocol.

Materials

- Alginic acid sodium salt (Art.-No. 9180.1, ROTH)
- Alginic acid sodium salt from brown algae (low viscosity, A1112, Sigma Aldrich)
- Calcium chloride hexahydrate (Sigma Aldrich)
- 10 mM MgSO_4 in H_2O (Storage solution)
- Magnetic Stirrer
- Manufactured Droplet Dispenser
- Dispensing Tip with Luer Lock (ID 0.51mm)
- Compressed air/nitrogen + Tubing
- Syringe (size variable)
- Syringe Pump System

Procedure

Substrate Preparation

1. Dissolve 1.8% CaCl_2 in storage solution for droplet crosslinking.
2. Prepare 5 – 10 ml Alginate solution.
3. Dissolve 1.8% viscous alginate + 0.2% low viscosity alginate in the buffer by stirring @ 100°C until it is homogenized.
4. OPTIONAL: Label alginate by addition of 0.1% DAPI .

Experimental Setup

1. Let alginate cool to room temperature, draw it into syringe.
2. Plug 0.51mm ID dispensing tip into the Luer lock in the droplet dispenser.
3. Plug syringe on top of the dispenser and into the syringe pump vertically.
4. Connect the tubing to the compressed air/ nitrogen and its pendant at the droplet dispenser @ 2 bar.
5. Place the magnet stirrer underneath the dispensing part and place the crosslinking solution above it.

6. Stirr moderately.
7. Align device outlet centered to the beaker.
8. Select syringe diameter at syringe pump of 12.45 mm (for 5ml syringe).
9. Pump alginate with 500 $\mu\text{l}/\text{min}$ to the CaCl_2 – bath.

Postprocessing of the droplets

1. Let the droplets crosslink for 1 hour.
2. Repeat 3 times:
 - Sediment the droplets in the solution.
 - Carefully remove the supernatant.
 - Resuspend with storage solutiont and agitate.
3. Store the droplets at 4°C.