

## Plasticization of Amorphous Cellulose w/ Glycerol + Citric Acid

### Introduction

This protocol will plasticize amorphous cellulose using glycerol and citric acid. The amorphous cellulose can be made by following the protocol titled “*Amorphous Cellulose Preparation*”.

### Reagents

- 🔗 Glycerol
- 🔗 Citric acid
- 🔗 Milli-Q H<sub>2</sub>O
- 🔗 0.3 g amorphous cellulose

### Equipment

- 🔗 125 mL Erlenmeyer flask
- 🔗 Magnetic hot stir plate
- 🔗 Magnetic stir bar
- 🔗 Glass plate

### Procedure

#### Preparation of Plasticizer Mixture

1. Mix a 1:1 molar ratio solution (8.3447 g glycerol : 4 g citric acid) of glycerol and citric acid at 40°C and 600 rpm. To facilitate dissolution of the mixture, add approximately 1.85 g of Milli-Q H<sub>2</sub>O.

#### Plastic Gel Preparation

2. Mix a 6% dry weight molar ratio (0.3 g : 0.5 g) of amorphous cellulose with the aforementioned plasticizer mix to a total dry weight of 0.8 g.
3. Keep this mixture at 40°C until a constant dry weight is achieved, removing excess water.

#### Curing Plastic

4. Form a thin layer of plastic gel on a glass sheet and cure it at 175°C for 1 hour.