

## Preparation of a biopolymer including the effect of a plasticiser

### Introduction

In this practical you will make a plastic from potato starch and investigate the effect that adding a plasticiser has on the properties of the polymer that you make.

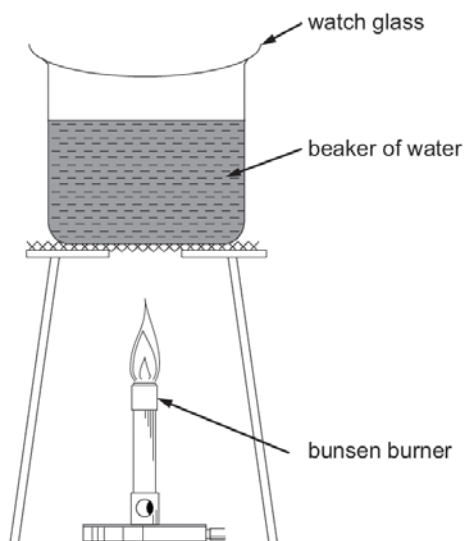
### Apparatus

400 cm<sup>3</sup> beaker  
 250 cm<sup>3</sup> beaker  
 large watch glass  
 Bunsen burner  
 heat resistant mat  
 tripod  
 gauze  
 stirring rod  
 Petri dish or white tile  
 universal indicator paper  
 dropping pipette  
 25 cm<sup>3</sup> measuring cylinder  
 dilute hydrochloric acid (0.1 mol/dm<sup>3</sup>)  
 dilute sodium hydroxide (0.1 mol/dm<sup>3</sup>)  
 distilled water (about 500 cm<sup>3</sup>)

#### Access to:

potato starch  
 food colouring  
 Propane-1,2,3-triol (glycerol), (2 cm<sup>3</sup>)

## Diagram of Apparatus



## Method

1. Put 22 cm<sup>3</sup> of water into the beaker and add 4 g of potato starch, 3 cm<sup>3</sup> of hydrochloric acid and 2 cm<sup>3</sup> of propane-1,2,3-triol.
2. Put the watch glass on top of the beaker and heat the mixture using the Bunsen burner. Bring it carefully to the boil and then boil it gently for 15 minutes. Do not boil it dry.
3. Dip the stirring rod into the mixture and dot it onto the indicator paper to measure the pH. Add enough sodium hydroxide solution drop by drop to neutralise the mixture, testing after each addition with indicator paper. You will probably need to add about 3 cm<sup>3</sup>.
4. Add a drop of food colouring and mix thoroughly.
5. Pour the mixture onto a petri dish or white tile and push it around with the glass rod so that there is an even covering.
6. Repeat steps 1-6 but leave out the propane-1,2,3-triol.
7. Label the mixtures and leave them to dry out. It takes about one day on a radiator or sunny windowsill, or two days at room temperature. Alternatively, use a drying cabinet. It takes about 90 minutes at 100 °C.

## Analysis

1. Compare the two films.