

## Biopolymers to prevent cancer (preparation details for teachers and technicians)

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### SAFETY

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| <b>Manugel GHB<br/>alginate (55% G)</b>   | Not a hazardous substance according to Regulation (EC) No. 1272/2008   |
| <b>ProtaSea AFH<br/>alginate (30 % G)</b> | Not a hazardous substance according to Regulation (EC) No. 1272/2008   |
| <b>Manucol LD<br/>alginate (40% G)</b>    | Not a hazardous substance according to Regulation (EC) No. 1272/2008   |
| <b>CaCl<sub>2</sub></b>                   | H319 Can cause eye irritation<br>P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.   |
| <b>FeCl<sub>3</sub></b>                   | H290 May be corrosive to metals<br>H302 Harmful if swallowed<br>H315 Causes skin irritation<br>H318 Causes serious eye damage<br>P280 Wear protective gloves/eye protection<br>P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |

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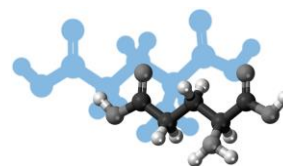
### TO BUY

**‘High M’ and ‘High G’ alginates:** Sodium alginate is easy to buy on the internet, e.g. from ‘Sous Chef’. This will usually be high G alginate, and can be used to demonstrate the binding of generic alginates with calcium and iron. If you do this, try it out beforehand. In order to compare ‘high G’ and ‘high M’ alginates, you can try to contact FMC Biopolymer directly to order Manugel GHB for ‘High G’ and Manucol LD for ‘High M’. (The ProtaSea is no longer stocked by FMC). Supplies can also be sent out from Dr Zoe Schnepf ([Z.Schnepf@bham.ac.uk](mailto:Z.Schnepf@bham.ac.uk)) or Dr Nicola Rogers Simpson ([N.J.Rogers.1@bham.ac.uk](mailto:N.J.Rogers.1@bham.ac.uk)) at ChemBam, for trial experiments.

**Dying the alginates:** In order to see what happens to the alginates, and also to distinguish which is which easily (!) it helps to stain each alginate solution with food colouring – any food colouring can be used.

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## TO PREPARE IN ADVANCE

### 2% w/v Alginate solutions

Stir 200 mL of deionised water rapidly, and very gradually add 4 g of alginate powder to the vortex with stirring, in ~ 10 aliquots. Keep stirring to get a smooth viscous liquid, and add food dye to give it colour. Label each alginate 'High G' and 'High M', and dye them different colours.

200 mL of each is plenty for a whole class, although it might be easier to split each into 2 x 100 mL bottles for the class.

### 0.1% w/v $\text{CaCl}_2$ (aq) solution

Dissolve 1 g calcium chloride in 1 L deionised water, and stir until dissolved. (The class needs 50 mL per experiment group).

### 0.1% w/v $\text{FeCl}_3$ (aq) solution

**Dissolve 1 g iron(III) chloride in 1 L deionised water, and stir until dissolved.**

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## STUDENTS WILL NEED

- 6 small plastic/glass beakers
- 2 plastic pipettes
- 2% w/v solution of 'High G' alginate (one per class can be passed around)
- 2% w/v solution of 'High M' alginate (one per class can be passed around)
- 0.1% w/v  $\text{CaCl}_2$  solution (50 mL per group)
- 0.1 % w/v  $\text{FeCl}_3$  solution (50 mL per group)
- Deionised water