ChemBam

DNA barcodes for healthcare

AIM

To extract DNA from the cells of strawberries and/or bananas

YOU WILL NEED

- Bananas / strawberries
- Sodium chloride
- Washing-up liquid
- Distilled water
- Ethanol (cooled over ice)
- Sealable sandwich bags
- Fruit knife
- Small sieve
- Beakers and stirring rods
- Plastic Pasteur pipettes
- Tweezers / wooden skewers

PROCEDURE

To make the extraction mixture:

Weigh out 3 g of NaCl (s) and add to a 150 mL glass beaker. Add 10 mL of washing-up liquid (2 tsp) and make up to 100 mL with distilled water. Gently stir the solution to mix it together, without forming too many bubbles.

To extract the DNA:

Take 1 strawberry and/or a similar sized piece of banana (peeled), cut it up into small pieces and place into a plastic bag, with 50 mL of the extraction mixture. Seal the bag with minimal air in it, mash the fruit inside the bag by squeezing it (without bursting the bag!) for 5-10 min, to form a relatively smooth puree. Filter the puree through a sieve lined with kitchen towel.

Take 20 mL ice-cold ethanol in a beaker, and carefully drop 2 mL of the fruit mixture into this; do not shake it. After a few minutes you should be able to see some insoluble material precipitating out in the ethanol, which you can remove from the solution with tweezers, or by twisting it around a wooden skewer.

QUESTIONS

1. Why is cold ethanol used to precipitate out the DNA?
2. What does the DNA look like?
3. What effect does the detergent have on the way the puree looks? – try to mash the strawberries in 50 mL water / 1.5 g salt. Does it look different?
4. When salt is added, the ions help to create an environment where the DNA clumps together, and is easier to see and extract from the ethanol – why do you think this is?

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