

Isolation of DNA from Tomato

Materials

(for each pair of students)

50 ml conical tube with cap

15 ml conical tube with cap

Funnel

Paper coffee filter

Resealable sandwich bag

Cut up fresh tomato or whole canned tomato (approximately golf-ball size amount of tomato)

10 mL 91% Isopropanol¹

35 mL DNA Extraction Solution

Ice bucket or cooler for chilling isopropanol

Preparation

Make up DNA Extraction Solution in 1-liter bottle:

44 g sodium citrate²

8.8 g sodium chloride³

143 ml clear dish detergent⁴

Distilled water up to 1 liter

For each pair of students:

Measure 35 ml DNA Extraction Solution into a 50 ml conical tube

Place 1 whole canned tomato or a cut up fresh tomato in a resealable bag.

Measure 10 ml of isopropanol into the 15 ml conical tube. Chill tubes on ice.

Procedure

1. Pour 35 ml of DNA Extraction Solution into the plastic bag containing one tomato. Reseal bag and knead gently for 1-2 minutes. Try to avoid letting the contents of the bag squirt out. The combination of the mechanical force, the detergent, and the salt break open the cell walls and membranes to release the DNA.

2. Place the coffee filter in the funnel, and place the funnel into the empty 50 ml tube.

3. Dump the bag contents into filter and collect 7-10 ml into the tube. Large particles will collect in the funnel, but the DNA and other small cellular components will pass through.

4. Slowly add chilled isopropanol⁴ by pouring down the side of the large tube held at a slant. Do not shake or mix!

5. The DNA cannot dissolve in the isopropanol, so it will precipitate out of the filtrate and form a large white clump, which looks a lot like snot. The isopropanol will form a layer on top of the filtrate, and the DNA clump will form at the boundary between the two layers.

Notes

¹91% isopropanol is found in most grocery & drug stores. It is also possible to use 95% ethanol; see note 5 below.

²Sodium citrate is used as a food additive and is available from a variety of sources on the internet including Sigma-Aldrich. Here it is used to buffer the extraction solution.

³Available from scientific supply houses such as Sigma-Aldrich, or you can use non-iodized table salt from the grocery store.

⁴Make sure the dish soap is clear, otherwise the color can interfere with seeing the pigments from the tomato in the filtrate.

⁵If using isopropanol, an equal volume to the amount of filtrate is required to precipitate the DNA (*i.e.* 10 mL isopropanol for 10 mL filtrate). However, if using ethanol, you will need 2 volumes of ethanol for the amount of filtrate (*i.e.* 20 mL ethanol for 10 mL filtrate).