

9. Isolation of DNA from Given Sample

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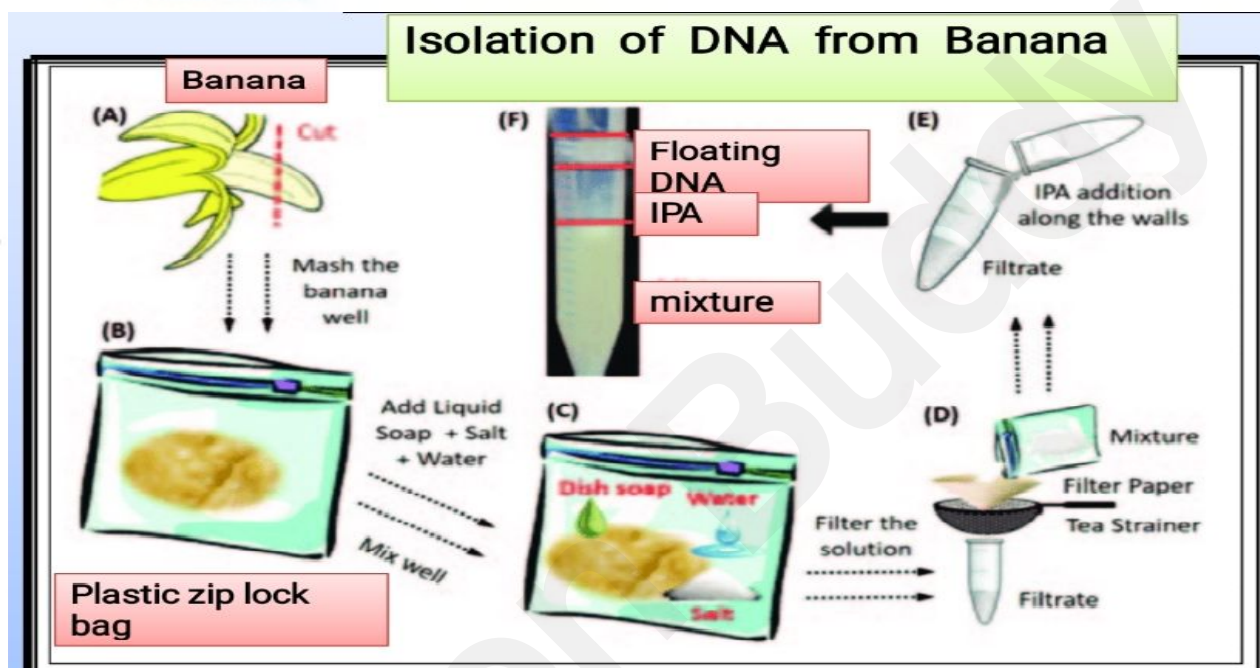
Aim :- To extract and Isolate DNA from a fruit sample.

Requirements :- Fleshly berry fruits like banana, *Zizyphus*, grapes, etc. can be used. Fleshly fruits of banana, liquid soap, distilled water, salt (NaCl), 1000 ml ice cold isopropyl alcohol i.e. IPA [Chill the alcohol (IPA) by placing the test tube in a beaker containing ice cubes and some water], measuring spoons, glass stirring rod, test tubes, glass beakers, plastic cups, strainer or coffee filter, funnel, etc.

Principle :-

All plants DNA extraction protocols, comprise of the basic steps of disruption of cell wall, cell membrane and nuclear membrane to release the DNA into solution followed by precipitation of DNA and ensuring removal of the contaminating biomolecules.

Figure :-



Procedure :-

1. The cells in a fruit sample are separated by physical means such as grinding, to form mash or blend.
2. Put $\frac{1}{2}$ cup of distilled water and one banana blend in it. Then pour the mixture into the beaker.
3. Mix 01 teaspoon of liquid soap with $\frac{1}{4}$ teaspoon of salt in a plastic zip lock bag or cup. Add 02 tablespoons of distilled water and stir gently until the soap and salt are dissolved.
4. Add 02 tablespoons of banana mash mixture to the cup containing salt and soap solution. Stir the mixture for 10-15 minutes by using glass rod.
5. After 15-20 minutes filter the fruit mixture through a fine sieve or coffee filter.
6. Take a test tube of chilled alcohol (IPA). Add filtrate to it with the help of dropper, very slowly.
7. Place the test-tube undisturbed for 5-6 minutes.
8. A layer of alcohol floating on the top of the fruit mixture is now clearly visible.
9. The white material becomes visible as a precipitate that marks the isolated DNA.

10. It can be spooled out with the help of hook or bent paperclip or glass rod. Slowly draw the pDNA up out of the solution.

Observation :-

DNA precipitates out into the alcohol layer.

DNA has the appearance of white stringy mucus.

Questions

1. Where is DNA found in the cell?

Nucleus

2. What is the role of detergent in isolation of DNA?

It breaks down the phospholipid layer. It dissolves the fatty molecules that hold the cell membranes together, and releases the DNA into the solution.

3. Why salt is added to isolate DNA ?

By adding salt, we help neutralize the DNA charge and make the molecule less hydrophilic, meaning it becomes less soluble in water. It helps to remove proteins that are bound to the DNA and to keep the proteins dissolved in the water.

4. Why is chilled condition required during the experiment?

DNases or restriction enzymes that destroy DNA are present in the cell's cytoplasm. In chilled condition, enzymes are temperature sensitive and cooling the solution slows down the process of degradation.

Multiple Choice Questions

1. Which of the function is not performed by DNA?

a. Synthesis of protein
b. Transmission of hereditary character
c. Synthesis of carbohydrates
d. Replication

2. Purines of DNA / RNA are

a. Uracil and guanine
b. Uracil and cytosine
c. Adenine and guanine
d. Cytosine and Guanine

3. Mark the correct statement :

a. Histones are acidic proteins
b. Histones stimulate genetic activity
c. Histones are basic proteins
d. Nucleosomes are formed in *E.coli*, during packaging

4. Which of the following nucleotide sequences has 4 pyrimidine bases?

a. GCUAGACAA
b. UAGCGGUAA
c. GATCAATGC
d. GCAAGAUCAA

5. A nucleoside is

a. A pentose sugar ribose or deoxyribose + a nitrogen base
b. A nucleotide + phosphate
c. A pentose sugar + a phosphate
d. A pentose sugar ribulose + a N_2 base

Remark and Signature of Teacher ...