

Lab Activity Sheet

Procedure

1. Mix 100 ml water and 1.5 g raw wheat germ in a small beaker.
2. Place beaker in hot water bath and stir gently until the wheat germ is softened and dissolved as much as possible.
3. Add 5 ml of Palmolive liquid detergent. Maintain the temperature as close to 55°C as possible.
4. Leave in bath for 5 minutes. Stir occasionally. (**Caution:** Do not allow the temperature to exceed 60°C. This may denature the normally double stranded DNA into single strands.)

The detergent causes the cell membranes to break down by emulsifying the lipids and disrupting the polar interactions that hold the cell membrane together. The detergent then forms complexes with the lipids and cell proteins, causing them to precipitate out of the solution.

5. Dissolve 3 g of meat tenderizer in the wheat germ solution. (Some will remain undissolved.) Immediately add 10 ml sodium bicarbonate solution.

Meat tenderizer contains papain, a proteolytic enzyme (or protease) that degrades proteins. Here in combination with the 55°C incubation, it will degrade any proteins complexed to the DNA.

The sodium bicarbonate (ionic compound) shields the negative phosphate ends of the DNA, which allows these ends to come closer so they can eventually precipitate out of the solution. This keeps the DNA from combining with other substance.

6. Place the solution on ice for 15 minutes. This aids in the precipitation of cellular contents.
7. Transfer some of the lysate to test tube. Pour slowly so that the undissolved solid material stays behind in the beaker. An inch or two of lysate should be in the test tube.
8. Slowly pour 10 ml of 95% ice-cold ethyl alcohol down the side of the test tube, creating a layer on top of the lysate. Hold the test tube on a slant as the alcohol slowly flows down its side. The alcohol must form a distinct layer on top of the lysate – do not shake or stir.

DNA is not soluble in ice-cold ethyl alcohol. All components of the mixture will stay in solution, while the DNA will precipitate out.

9. You should be able to see the DNA precipitate out of the solution. It will appear white and wispy.

