

Alternate Investigation: Digestion of Lipids Answer Key

Answers to Analysis Questions

1. Test tube B will show the fastest colour change.
2. Phenolphthalein is a pH indicator. It is pink in a weak base (above pH 8.3) and turns colourless as the pH decreases. A colour change from pink to colourless (or in this case the milky appearance) would indicate the solution is turning slightly more acidic.
3. Bile is an emulsifier. It breaks large fat drops into tiny fat droplets increasing the surface area for the action of lipase.

Answers to Conclusion Questions

4. *Test Tube A:* Lipase will eventually digest the fat in the cream to fatty acids and glycerol. The phenolphthalein should change colour from pink to colourless but this could take some time.
Test Tube B: Bile emulsifies the fat drops in the cream resulting in tiny droplets. The tiny fat droplets have much more surface area compared to the larger drops. As a result, lipase will digest fats to fatty acids and glycerol. As the concentration of fatty acids increase the pH of the solution will decrease and the phenolphthalein will turn from pink to colourless.
Test Tube C: There will not be a colour change—it will stay pink. This test tube lacks the enzyme lipase so no chemical digestion of the fat in the cream can take place.
5. Test Tube B best mimics conditions in the small intestine.
 - Sodium bicarbonate is found in pancreatic secretions that enter the duodenum, changing the pH of the chyme from a pH of 2 to a pH of approximately 8.
 - The bile salts represent bile that is manufactured by the liver and stored in the gall bladder.
 - When fat enters the duodenum it triggers a hormonal regulated event which results in the gall bladder contracting and secreting bile into the duodenum.
 - Lipase enzymes are produced by the pancreas and small intestine. These enzymes catalyze the breakdown of lipids (fats and oils) into fatty acids and glycerol.