ISOPENTYL ACETATE EXTRACTION
TEACHER NOTES

In this experiment, students will extract isopentyl acetate (banana oil) from bananas and purify it. It is intended that this experiment follow the Esterification Lab in which isopentyl acetate is synthesized. Then, the gas chromatograph print-outs from the synthesis and the extraction are compared.

EQUIPMENT:
2 large hot plates, 2 large aluminum pans for sandbaths, sand, two metal thermometers (plus hot mitts and cooling pan for hot sand removal)
2 centrifuges
2 gas chromatographs (plus 2 syringes)

SUPPLIES:
10 mortar and pestles
10 screw-cap centrifuge tubes (15 mL)
10 Pasteur pipets with bulbs
10 capped vials (numbered)
10 funnels
10 spatulas
10 beaker tongs
10 ring stands
10 ring clamps
safety goggles

CONSUMABLES:
5 bananas, 500 mL hexane, 10 vials Na₂SO₄, paper towels, commercial imitation banana extract

PURPOSE:
To extract and identify isopentyl acetate (banana oil) from bananas.

PROCEDURE:
Refer to the student handout for procedure.

1. Explain to the students that isopentyl acetate (banana oil) is soluble in the hexane they are using when smashing the bananas.

2. The centrifuging should be done long enough for a good separation. (Sometimes more than 5 minutes.)

3. Filtration is necessary to remove pulp that would damage the gas chromatograph.

Prepared by:  Luann Smith, Eagle Rock HS
Sandy Comouche, Notre Dame HS

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4. Remove excess water with Na₂SO₄ crystals.

5. Watch the hexane mixture on the sandbath because it has a low boiling point and evaporates very quickly.

6. If the mixture is cloudy, filter again before putting it in the GC.

7. Have students bring their print-outs from the Esterification lab and have the print-out from the teacher's notes of that lab available.

8. Here are some possible values for the two print-outs: (Do not give to students.)

<table>
<thead>
<tr>
<th>Synthesis</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compound</strong></td>
<td><strong>Retention</strong></td>
</tr>
<tr>
<td>water</td>
<td>0.400</td>
</tr>
<tr>
<td>acetone</td>
<td>0.819</td>
</tr>
<tr>
<td>isopentyl alcohol</td>
<td>2.441</td>
</tr>
<tr>
<td>isopentyl acetate</td>
<td>4.457</td>
</tr>
</tbody>
</table>

9. This extraction can be done with ethanol as the solvent.

MORE EXTENSIONS:

1. Compare commercial mint extract with the extract from mint leaves.

2. Synthesize wintergreen and compare with the extract from wintergreen.

3. Compare to the extract from pears.