Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Nutrients in Feed

**Purpose**

The purpose of this exercise is to identify nutrients in feed by performing chemical tests.[[1]](#endnote-1)

**Procedure**

 **Materials**

1. Safety goggles 9. Test tube holder & rack
2. Whole milk 10. Test tubes
3. Various food/feeds 11. Ceramic Crucible
4. Hot plate 12. Brown paper bag
5. Large beaker
6. Biuret reagent (Available through science retailer; light blue solution turns pink in the presence of protein.)
7. Lugol’s Iodine (Available through science retailer; dark solution used to test for starch.)
8. Benedict’s solution (Available through science retailer; clear blue solution of sodium and copper salts used to test for simple sugars.)

**Sequence of Steps**

Caution! Follow all lab safety rules when completing this lab. Wear safety goggles and a lab apron. Test small samples at a time and clean materials thoroughly when finished.

1. Test for water
	1. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Place the feed samples in a crucible. Using a test tube holder, hold an inverted test tube over the crucible. Heat the food until only a residue remains. Any fluid that condenses on the glass surface is water. Using a scale of 0-10, 0 representing no water and 10 representing a lot of water, record what you see for each feed sample under “observations”.
2. Test for sugar
	1. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Add 5mL (10 drops) of Benedict’s solution to a test tube containing a feed sample. Heat gently in a boiling water bath. The solution will turn green to brick red, depending on the amount of sugar. Using a scale of 0-10, 0 representing no change in color/no sugar and 10 representing a red color/a lot of sugar, record what you see for each feed sample under “observations”.
3. Test for starch
	1. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Place a drop of Lugol’s iodine on a food sample. The drop will turn blue-black if starch is present. Using a scale of 0-10, 0 representing no starch and 10 representing high starch content, record what you see for each feed sample under “observations”.
4. Test for Fat
	1. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Rub a sample of a solid feed or place a few drops of a liquid feed on brown paper. Hold the paper to light. If the feed contains fat, you will see a translucent spot that will not disappear even when dry. Using a scale of 0-10, 0 representing no fat and 10 representing a high fat content, record what you see for each feed sample under “observations”.
5. Test for Protein
	1. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Add 2-3 drops of Biuret reagent to a test tube containing a feed sample. A color change from pink to purple indicates the presence of protein. Using a scale of 0-10, 0 representing no protein and 10 representing high protein content, record what you see for each feed sample under “observations”.

**Observations**

Table 1. Amount of nutrients observed in feed samples.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Feed  |  |  |  |  |  |  |
| Water |  |  |  |  |  |  |
| Sugar |  |  |  |  |  |  |
| Starch |  |  |  |  |  |  |
| Fat |  |  |  |  |  |  |
| Protein |  |  |  |  |  |  |

**Conclusions**

1. Compare your results with those of other students. Explain any differences?
2. Why do you think milk has long been considered the “almost perfect food”?
3. If you extended this experiment, how could you use the data to help plan a balanced diet? What would you change about the experiment?
4. If a diet is lacking in nutrients, how are major body systems in the animal or human affected? Give 2 examples and explain.
5. How can high energy feeds affect the growth and success of fair project animals (livestock)?
6. Describe how the major body systems remove waste and provide nutrients to the body?
1. Agricultural Biology Curriculum Lesson Plans. Sacramento: California State Department of Education, Agriculture Education Unit, 1990. [↑](#endnote-ref-1)