

Soymeal Separation- Protein from Carbohydrates (Inquiry)

Name _____

Date _____

Background:

Soy protein concentrates are prepared by removing soluble sugars (carbohydrates) from soybean meal flakes. The remaining components are mainly proteins and insoluble sugars. When soluble sugars are removed from the soybean meal, the protein content of the resulting soy product is increased and the undesirable sugars, which cause flatulence, are eliminated. Flatus is gas formed in the gut by bacterial fermentation of non-digestible carbohydrates. Sucrose and the total non-digestible sugars each constitute about eight percent of the soybean meal flakes.*

The separation of the carbohydrates from the protein in soymeal is possible because the carbohydrates are soluble in a 50% ethanol/water solution and soy protein is not. (There is a very small amount of soluble soy protein.)

Procedure:

Design an experiment to separate the soy protein from the soy carbohydrates. To ensure safety, the experiment will be done at room temperature and under atmospheric pressure. The materials you will use are: 20 g of soymeal, 100 ml of 50% ethanol/water solution, a Buchner funnel, a scale, 2 -200ml beakers, ring stand and iron ring, stirring rod. Write the steps of the procedure and be prepared to share with the class your procedure and results. Have your steps checked by your instructor before starting. Be sure your final meal is dry before the final weighing by placing in an oven at 100 °C for a few hours or by placing in a desiccator overnight. Any ethanol/ water should be stored in the fume hood.

Your report should include the following:

Title

- A description of your procedure.
- A picture of your equipment set-up.
- The mass of your initial soymeal and how you obtained it.
- The mass of your final meal and the mass of your final carbohydrates and how you obtained it.
- The calculations of your % yield.
- Do your results correlate with the information provided in this lab? Comment on your answer.
- Suggest ways that your procedure could be improved if done a second time.
(Extra Credit: Research how the separation is currently done in industry. Explain the process in a simplified manner.)

*"Protein Separations," retrieved from Separation Sciences: Food R&D Center on 14 Jun 2013 at <http://foodprotein.tamu.edu/separations/protein.php>.