



LINKS TO AGRICULTURE



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Science of Chocolate

Soy lecithin is used in many processed foods, especially chocolate candy bars. It is added to many foods and most people do not even know what it is.

The Power of Soybeans

Soy lecithin is a byproduct of the soybean industry. Soybeans are produced in approximately 30 states in the United States. In the United States we produce thirty eight percent of the world's production. Soybean crops are planted in late April to June and are harvested starting in late September. In the United States soybeans are the second largest crop in cash sales and the number one export crop. They are a vegetable and closely related to the pea family. As the soybean plant grows it will develop pods where seeds grow within. After the plants are mature the seeds will be harvested. Soybeans have many uses. Some will be used in animal's diets as a protein source, turned into soybean oil and soy lecithin.



How Do We Get Soy Lecithin?



After soybeans have been harvested, many will be turned into soybean oil. The soybeans are heated and pressed into flakes and oil is extracted. Once they have the oil they put the liquid in a machine, called a centrifuge, which will spin the liquid very fast. This causes the oil and lecithin to separate from each other.

Soy Lecithin Uses

Soy lecithin is very important and used in many foods. It is especially important in chocolate bars. The lecithin is a natural emulsifier. This means that it will make water and fat compatible with each other. This allows the chocolate and the cocoa butter to stay together in the chocolate bar. Soy lecithin also has nutritional benefits. It contains choline, which is good for heart health and brain development.



How fast does your chocolate melt?

The three most common chocolate chips are milk, dark, and white. Do you know what makes them different? Dark chocolate chips contain a high percentage of cocoa. The more cocoa present, the less sugar which make the chip more bitter. Milk chocolate chips contain more than 12% milk or cream. In this experiment, we will find out if the different ingredients have an effect on melting time.

Materials: milk, dark, and white chocolate chips, and a microwavable dish

1. Begin by tasting each type of chocolate. Rank the chocolates in the order you like the best flavor. Repeat and rank each chip on sweetness. (1 is best.)

Flavor	Rank on flavor (1-3)	Rank on Sweetness(1-3)
Milk		
Dark		
White		

2. Next, individually melt each flavor three times and record the time it took to melt. Then calculate the average of each.

Flavor	Time to Melt- 1	2	3	Average
Milk				
Dark				
White				

3. Was there a time difference between the different types of chips?
4. What do you think this means?



Career Corner

Food Engineer - Food engineers are employed by food companies and government agencies to analyze the process of manufacturing food. They look at regulations and apply them to food systems in addition to creating new and enticing food creations.

How Food Engineers Benefit Agriculture:

- Use products from farms in their work
- Use environmentally friendly packaging

Food Engineers Study:

- Food Science
- Health

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Farm Facts



- The average American consumes seven gallons of soy oil annually.
- Soybeans are the highest natural source of fiber.
- There are over 23 varieties of soybeans.
- Pennsylvania farmers feed 780,000 tons of Soybean Meal to their livestock.

What Do You Remember?



1. What plant does soy lecithin come from?

2. Name two of the three uses of soybeans mentioned?

A) _____

B) _____

3. Why is lecithin important to chocolate candy bars?

4. What is the name of the machine used to separate the oil and the lecithin?
