Effect of Cooking Time On Fat Absorption: Donut Holes Lab Lab: 24 points;  [Lab Report:](#t9uzbm92kxu0) 22 points possible

### **Food Science**

### Fats are used in a variety of applications, including as spreads for breads, shortening/tenderizing ingredients in baked products, ingredients in emulsions, flavoring agents, a source of energy, and a cooking medium for deep-fat frying. When deep-frying foods, the amount of fat absorbed by the food product should be minimized. Fat absorption is increased by increasing the contact time of the food and that the fat, lack of a coating or breaking on the food to form a barrier against the fat, increasing the surface area of food exposed to the fat, and increasing the proportion of fat, sugar, or egg yolk in batter. Increased fat absorption results in a less desirable fried product.

**Safety:**

* **Follow all lab protocols as outlined in the** [**Food Science Safety and Sanitation Contract**](https://docs.google.com/document/d/1ZeVfWdx20nT7p0f7wx03nyR35teghrbOpeEqhdpBZDs/edit?usp=sharing)

**Purpose:**

* To demonstrate the influence of cooking time on fat absorption by donut holes.
* To gain experience in using deep-fat frying techniques.

| **Equipment:**  | **Ingredients:** |
| --- | --- |
| * Liquid measuring cup
* Saucepan
* Food thermometer
* Scale
* Timer
* Slotted spoon
* Plate
* Paper Towel
 | * 2 c canola oil
* 4 refrigerated canned biscuits (uncooked)

Optional:* 3 T to ¼ c premixed cinnamon-sugar

 *If premixed isn’t available:** *¼ c granulated or powdered sugar*
* *¼ t cinnamon*
 |

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### **Procedure:**

1. Cut 1 biscuit into fourths. Weigh this group of 4 biscuit dough pieces and record the group weight in Table 1.
2. Heat the oil in a saucepan over medium-high heat to 375℉ (190℃).
3. Fry the biscuits 2 minutes (1 minute per side)
4. Drain biscuits on a plate lined with a paper towel after removing from hot oil. Label the group based on cooking time. **Allow them to cool for 1 minute** and then reweigh the group of donut holes. (**after weighing**, you may choose to apply a light coat of sugar/cinnamon to the donut holes, if desired)
5. Calculate both the weight gained and the percentage of weight gained for each group and record in the table.

 ***Required Variations:***

* **2 minutes-** Follow the basic recipe for donut holes as above.
* **4 minutes-** Follow the basic recipe for donut holes, except fry the biscuit pieces for 4 minutes (2 minutes per side)
* **6 minutes-** Follow the basic recipe for donut holes, except fry the biscuit pieces for 6 minutes (3 minutes per side)
* **10 minutes-** Follow the basic recipe for donut holes, except fry the biscuit pieces for 10 minutes (5 minutes) per side.

Name:

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**Lab:** Record lab data below. 8 pt *(data will be provided following the lab, if absent)*

[](https://docs.google.com/presentation/d/1uU4PdGZw4VqP-SqjXCU0BYPEBJK6u-iAQzVXF4Sr-Jw/edit#slide=id.gc6f9e470d_0_43)

| **Table 1.**  | **Effect of Cooking Time on Fat Absorption at 375℉ (190℃)** |
| --- | --- |
| **Cooking time****In minutes**  | **Weight before cooking (g)** | **Weight after** **Cooking (g)** | **Weight gain (g)** | **% weight gain** |
| **2** |  |  |  |  |
| **4** |  |  |  |  |
| **6** |  |  |  |  |
| **10** |  |  |  |  |

Critically evaluate the sample based on the following criteria. Provide a numerical score (1 being the worst, 4 being the best) and descriptive rationale using sensory evaluation terminology. 4 pt *(data will be provided following the lab, if absent)*

| **Table 2.** | **Numerical score (1-4) & descriptive terminology** |
| --- | --- |
| **Cooking time in minutes** | **Appearance** | **Texture** | **Flavor** |
| **2** |  |  |  |
| **4** |  |  |  |
| **6** |  |  |  |
| **10** |  |  |  |

**Post-lab** Questions:
(If absent from the lab, answer the questions using [presentation](https://docs.google.com/presentation/d/1tKIX4xgB5k8ICzU8mVfm_Q-gk_YIfap-eLjk2ZDWBiM/edit?usp=sharing) and data provided- available following the lab).

| 1. What did you conclude regarding the relationship between cooking time and fat absorption? 1 pt
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| --- |
|  |
| 1. What did you conclude regarding the overall relationship between cooking time and appearance? 1 pt
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|  |
| 1. What did you conclude regarding the overall relationship between cooking time and texture? 1 pt
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|  |
| 1. What did you conclude regarding the overall relationship between cooking time and flavor? 1 pt
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|  |
| 1. What is meant by the term, smoke point? How could smoke point play a role in this lab? 2 pt
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|  |
| 1. How could this experiment be adapted for future trials? What other variations could be used? 2 pt
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|  |
| 1. Research other methods of preparing donut holes. How could you prepare a healthier version than the one in this experiment? Be specific. 2 pt
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