1. <u>ANNEXES</u>

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1.1 ANNEXE A. Cooking Method protocol

<u>Raw materials preparation and processing</u>

Two different snacks were designed from the raw potatoes provided by the company. Sweet potato's healthy snacks are: fried, baked, blanched & fried, and blanched & baked. Each product has its own cooking method. This are developed in the next section.

All of them share the raw material preparation method. The sweet potatoes are cleaned with water for removing all the dust remanding on the skin. Then, they are pealed by hand with a potato's peeler. The end of the potatoes (both sides of the potato) is removed. Finally, they are cut with a meat slicer with 3 mm thick. About 300g are needed for each batch of cooking for obtaining approximately100g of cooked potatoes.

For each digestion trial, 200g of processed sweet potatoes is needed.

1. Clean sweet potatoes with water.

2. Peal it and cut ends of the potato.

3. Slide it 3mm.

4. Weight about 300 g for processing

<u>Cooking methods</u>

Fried

The fryer is filled with new soybean oil. It is warmed to 340ºF. Once the oil has the appropriate temperature, 300g of sweet potatoes is introduced in a basket into the oil. They are cooked for 5 min 30s. When the cooked time has elapsed, take the basket off of the oil and let it dry for 10 min in the basket. Then put them in a tray with paper towels.

Preparation

1. Put new oil.

2. Warm oil to 340ºF.

Frying

1. Put 300g sweet potatoes in the basket.

2. Introduce the basket in the oil.

3. Cooked it for 5min 30s.

4. Take the basket off of the oil, let it dry for 10 min in the basket.

5. Put them in a tray with paper towels.

Blanching

For those products that needs a blanching before the main cooking procedure. Put one liter of water in a pot and warm it to 85ºC. Once the water achieved the temperature, out 150g of sweet potatoes in the pot. Cook them for 1 min. Then, immediately take them out of the hot water and put on a bowl with cold water during a minute. Once they are cooled, put them in a new tray with paper towels during 5 min. Then, fry or baked it following the instructions given before.

Preparation

1. Warm water in a pot to 85ºC.

Baking

1. Put 150g sweet potatoes in the pot.

2. Cooked it for 1 min.

3. Take the sweet potatoes off of the pot, put them immediately into cold water and let it cool for 1 min.

4. Put them in a new tray with paper towels during 5 min.

5. Fry or bake them.

1.2 ANNEXE B. Human Gastric Simulator protocol

Buffering Capacity HGS Sweet Potato Digestion Protocol

1. **Put moisture pans in the oven**
2. **Prepare fluids**
   - Calibrate pH-meter
   - Prepare lipase solution
     - 3h digestion →130 mL + weigh 3.03g of lipase
     - 1h digestion → 65 mL
     - Adjust lipase pH to 4.5
   - Measure gastric juice
     - 3h digestion → 700mL + put it in the water bath
     - 1h digestion → 235 mL + put it in the water bath
     - Adjust gastric juice pH to 0.8
     - Add enzyme:
       - ✓ 3h digestion → 5.45g of pepsin (for 700 mL)
       - ✓ 1h digestion → 1.8296g of pepsin (for 300 mL)
   - Measure saliva
     - 3h digestion → 60 mL
     - 1h digestion → 60 mL
     - Adjust saliva pH to 7
     - Add enzyme:
       - ✓ 3h digestion → 0.071g of alpha-amylase (for 60 mL)
       - ✓ 1h digestion → 0.024g of alpha-amylase (for 20 mL)

3. **Cook sweet potatoes**

   - Clean sweet potatoes with water and peal them
   - Slice sweet potatoes with the meat slicer with a thickness of 3 mm
   - Weigh 300 g of sweet potatoes, 3 times to have a total of 900 g of raw sweet potatoes
   - Cook the potatoes
     - o <u>Frying</u>
       - New soybean oil (~3.5 L)
       - Temperature 340 ºF
       - Time 5 min 30 seconds
       - Cool 20 min
     - o <u>Blanching</u>
       - 1L tap water
       - Temperature 85 ºC
       - Time 1 min
       - Dry 10 min

4. Initial properties

— While cooling, prepare stomach bag
— Set up HGS with person 2.
— Process the chips (~300 g) in the food processor during 45s high frequency.
— Weigh quantity necessary for digestion:

$$200 \; g \; dry \; matter \; \times \% \; moisture$$

- 208g for fried (4%)
- 216g for blanched-fried (8%)

— Mix processed potatoes with the saliva

$$g \; sample \; \times 0.2 \; {ml \; saliva}/_{g \; sample}$$

- 208g x 0,2 = 41,6 mL
- 216g x 0,2 = 43,2 mL

— **Prepare HGS**

  o Turn on heating lamp
  o Put the bag
  o Add 70 mL of gastric juice into the bag
  o Fill out pumps
    ▪ Peristaltic pump (gastric juice): 3.0 mL/min
    ▪ Syringe pump (lipase): 0.5 mL/min
  o Start HGS with Natalia
    ▪ Mix processed food with saliva during 30s
    ▪ Introduce processed food into the bag
    ▪ Collocate stomach bag in the right position with tape

— **START GASTRIC DIGESTION**

  o During first 30 min of gastric digestion:
    • Processed chips (0 min)
      ▪ Measure pH
      ▪ Measure moisture content (3 pans)
      ▪ Prepare for particle size (3 samples)
      ▪ Freeze (2 tubes)
    • Processed chips + saliva (0.5 min)
      ▪ Measure pH
      ▪ Measure moisture content (3 pans)
      ▪ Prepare for particle size (3 samples)
      ▪ Freeze (2 tubes)

- Sample of the bag (each 30 min)
  - Weigh the bottle before taking the sample
  - Measure pH
  - Measure moisture content (3 pans for each timepoint)
- Final digestion time
  - Measure pH of the bag (point 6)
  - Measure moisture content (3 pans for top and 3 for bot)
  - Freeze (2 tubes for top and 2 tubes for bottom)

5. Measure buffering capacity

— Initial properties
  - o Buffering capacity processed potatoes
  - o Buffering capacity processed potatoes + saliva

— Final properties
  - o Buffering capacity sample last point of gastric digestion: TOP and BOTTOM

6. Measure bag pH distribution

7. Particle size

a) Set up the computer.
b) Shake the samples in the shaker with some water during 10 min
   - a. To the initials that has not much moisture, do not add water.
c) Each sample is divided in two dishes.
d) Separate the particles with a spatula.
e) Take the picture.

1.3 ANNEXE B. Particle Size Distribution protocol

Particle Size Protocol

Criteria for good images

* Setting up the stage

1. **The photomacrographic (PMG) scale is in view, and relatively parallel to the edge of the image**

    a) This PMG scale is the thing with the lines on it that looks like an L-shaped ruler

2. **The image has no obvious glares or shadows**

    a) If you find it has glare or shadows, you can always adjust the lighting and capture it again.

    b) The optimal lighting seems to be when the ceiling lights are on (but not the red ones), the lightbox set to the brightest setting, and the stage lights (the two yellow ones) pointing straight down, but with the shielded side facing the stage. The stage is the place where the petri dish sits.

3. **The petri dish and the PMG scale are not overlapping**

4. **The almond particles in the petri dish are not overlapping.**

5. **The big petri dish is used**

    a) Double check that the edge is highlighted in black marker. If it is not, use a marker to outline it again. This helps the code find the edge of the dish.

6. **Camera at height of 47cm**

A good example image is shown below:

Note that the outer edge of the dish is darkened with marker. Also note how there are no glares, shadows, objects halfway out of the image, or objects overlapping. Also note that none of the particles are overlapping each other.

* Using the camera

1.   Connect the camera to the computer using the white, micro HDMI cable.

2.   It connects to the camera in a port that is under a rubber flap.

3.   Take off the lens cap

4.   Turn the dial on the top of the camera to "On"

5.   Turn the dial so that the white line goes to "M"

> a. This is the manual setting, which is the one we want

 6. Go to the computer
> a. Password is "OdRbtydb*n*"

7.   Go to "EOS Utility"

8.   Select "control camera"

9.   Select "camera settings and remote shooting"

10. Click on "Live view shoot" near the bottom of the control panel

11. Double check that the stuff in the image is all good (see previous section)

12. Double check that the settings are "1/30", "F8.0", "ISO 100", "AWB"

13. In the window that shows the live camera view, click on the third button from the right and make sure that "Aspect ratio" is 4:3

14. Right below the round, circular button on the top is a folder button. Click it and make sure that the images are being saved to the correct folder. In the same window is a box called "Download images," which should have a check mark.

15. Click the round, circular button near the top to take the photo