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NFSC 320-Tuesday 3pm lab

Lab Report #3
Week 8&9

Objective: To create a product that has a good source of fiber and protein as having a savory, meat-like flavor. We hope to accomplish this by using the right combination of grain, bean, herbs, spices, and by finding the perfect cooking method to reduce greasiness and improve the flavor and texture.

Hypothesis:

Week 8: Using fresh garlic instead of powdered garlic will improve flavor intensity and umami intensity.

Week 9: Adding fresh sage will give the meatball a fresh and savory flavor. Sage will also compliment the onion in such a way that emulates a meaty undertone. By braising the variable meatball in butter instead of oil before baking, the product will be less greasy.

Experimental Procedures/Methods:

1. Independent/dependent variables:

The independent variables for week 8 were fresh garlic and the baking versus frying method. The dependent variables were the product's flavor intensity, aroma and umami intensity. The independent variables for week 9 were fresh sage and braising the meatball in butter. The dependent variables for week 9 were overall savory flavor, meat flavor/texture and aroma.

2. Treatments:

Week 8: The variation for this week was substituting one clove of fresh garlic for the garlic powder. We used the same cooking method for the variation as last week by braising the meatballs in oil for about 5 minutes and then baking them in vegetable broth in the oven at 350 degrees for about 15 minutes.

Week 9: The variation for this week was adding one tablespoon of chopped fresh sage and braising the meatballs in butter instead of oil. We used only $\frac{3}{4}$ of the garlic clove so it would not be so overpowering. We used the same baking method in vegetable broth and at 350 degrees in the oven.

3. Food Product Preparation Procedure

The recipe for the control meatball is as follows:

vegetable oil 1 $\frac{1}{4}$ tbsp

brown rice 61.8 g

salt $\frac{1}{2}$ tsp

eggs 1

dry bread crumbs 92.55 g

Parmesan cheese 25 g

basil 2 tsp

onion 96.1 g

garlic powder 2 tsp

black beans $\frac{3}{4}$ cup

Procedure: 1. Put all ingredients except the vegetable oil in a food processor. 2. Process until well blended. 3. Form into 1-inch balls. 4. Heat the vegetable oil in a skillet and fry the meatballs until browned on all sides.

The recipe for the variation for week 8 was the same except for 1 clove of chopped garlic was added.

Procedure: First three steps the same. 4. Heat the vegetable oil in a skillet and braise meatballs for 5-7 minutes or until lightly browned. 5. Prepare vegetable broth. 6. Place meatballs in a baking dish and fill the dish with the vegetable broth until the meatballs are halfway submerged in the broth. 7. Bake at 350 degrees for 15 minutes.

The recipe for the variation for week 9 was the same as the original except there was only $\frac{3}{4}$ clove chopped garlic, 1 tbs chopped fresh sage and the oil was replaced with 1 tbs butter.

Procedure: First three steps the same. 4. Heat butter in skillet and braise meatballs for 5-7 minutes or until lightly browned. The rest of the steps are the same.

4. Evaluation Methods

- a. Week 8: To evaluate our product we used a 9-point intensity scale for the tasters to rate the product. The scale ranged from 0 meaning none, to 9 meaning extreme. Tasters were asked to rate the intensity of the flavor, aroma and umami taste. There was also a place to write comments about the product and tasters were asked to write words that described the two meatballs so that we would be able to decide on descriptive characteristics for the product. The descriptive characteristics that we came up with for the different categories are as follows:
 - i. Appearance- brown, plump
 - ii. Aroma- oily, herby/fresh
 - iii. Overall Flavor- rich, savory
 - iv. Flavor-retronasal- herby, garlic flavor
 - v. Texture- firm, chewy, moist
 - vi. Aftertaste- garlic/herby
 - vii. Taste- umami, fresh
- b. Week 9: To evaluate the product for this week we used a 9-point scale, which included ratings for freshness, savory intensity and likeability. 0 meant none and 9 meant very fresh, intense or liked a lot. Tasters also left comments on the survey about the product.

5. Potential Biases:

Not having a trained panel of tasters affects the evaluation results because people have different perceptions of different attributes. For example, everyone seems to have a different opinion of what a meat-like texture is. This makes it difficult to evaluate the true

meat texture of our product. Other biases may include not liking the vegetarian form of a “meatball” since it is a meatless meatball.

Results:

Week 8: The averages of the results of the variation and the original are compared in this table. The scale used was a 9-point intensity scale.

Figure 1

	Prototype 1 (Control)	Prototype 2 (Variation)
Flavor Intensity	5.9	6.0
Aroma Intensity	4.3	4.7
Umami Intensity	5.9	5.3
Comments	Dark brown, greasy, garlic, crunchy, rich, meaty flavor	Soft, juicy, savory, peppery, herby, mushy

The scale was from 0-9 with 0 meaning none and 9 meaning extreme.

Week 9: The averages for the results of the 9-point Likert Scale are presented in this table.

Figure 2

	Prototype 1 (Control)	Prototype 2 (Variation)
Freshness	4.8	3.3
Savory Intensity	6.5	6.7
Likeability	6.7	5.8
Comments	Savory, meat-like texture, crunchy, oily	Crumbly, nutty flavor, meat-like/firm, herby, savory, plump, moist, onion flavor

The scales went from 0-9. The number 0 meant none and 9 meant extreme.

Discussion:

Week 8: The variation, which had the fresh garlic added, seemed to result in a more aromatic and flavorful meatball. However, many of the comments received from this product were that the garlic flavor was somewhat overpowering. We were aware that we needed to add more herbs and spices to achieve the flavor intensity that we desired and planned to add more for the next variation. We also wanted to reduce the oily/greasy aroma, so we planned on braising the variation in butter instead of oil and then baking it. We are also still trying to get the umami flavor of a meatball. Some comments indicated that they like the flavor of prototype 1 but liked the texture of prototype 2 better. This was an indication for us to incorporate more flavors while keeping a similar texture into our next variation.

Week 9: The variation did not improve in freshness as we had hoped but it did improve in the savory category. I think that this may be due to the fact that we used butter instead of oil in our cooking method. I also think that there may have been somewhat of a mix up between the A and B prototype because the results show a lower response for liking the variation while the comments that we received back were that most everyone liked the variation much better than the control.

Our variation for week 9 seemed to have improved significantly and we noted that it was our best variation so far. We noticed that using fresh ingredients made a noticeable difference in flavor as opposed to using dried or powdered ingredients. Our cooking method also made a difference; by braising our variation in butter instead of oil we achieved a less oily aroma and texture in our meatball. We are still trying to find a way to make our product more meat-like. Our variation for next week is going to be adding almond meal to the recipe to try and achieve the meat-like texture of a meatball.