

## RECIPE

# Protein Cookies

Ready in 20 Minutes

Serves 12



## Ingredients

- 1 cup peanut butter
- 2/3 cup brown sugar
- 1 large egg
- 1/2 cup vanilla protein powder
  - Substituted with flour and oat flour
- Chocolate chips

## Preparation

1. Preheat the oven to 180C/350F. Line a cookie sheet or baking tray with parchment paper and set aside.
2. In a small mixing bowl, combine all your ingredients and mix until combined.
3. Using your hands, form balls of cookie dough and place them on the lined sheet. Press down on each cookie
4. Bake the cookies for 12-14 minutes, or until the edges begin to brown.
5. Remove from the oven and let cool on the baking sheet completely.
6. (Optional) A tablespoon of vegetable oil can be added for moisture

## Hypothesis

If I substitute my protein powder for oat flour or wheat flour I will yield a cookie weaker in structure and softer in texture.

## The science behind baking.

The baking process begins when hot air is used to transfer heat to the object inside your oven. By colliding the molecules of hot air with the molecules of our cookie, and conducting heat from the metal baking sheet to the bottom of the cookies for even baking. Inside a normal cookie, the proteins from the flour and eggs denature when their hydrogen bonds break. The proteins will then coagulate and form large chains then form webs resulting in a soft stretchy dough. However some proteins Bond stronger than others most likely due to their difference in electronegativity. So i wanted to see is casein bonds better than glutenin.

## Experiment Design

In my Experiment, I made 3 batches of these cookies. The first batch was made with protein powder. The second was made with oats blended into a fine powder substituted instead of the protein powder. For the third batch, I used wheat flour. I expected the protein powder cookies to be the firmest and most rigid. The wheat flour cookies are the softest and the oat flour cookies are in the middle. I evenly substitute these ingredients with no other Changes to the recipe.

## Experimental Results

After I had finished making my cookies. I began to notice significant differences in the three batches. The oat flour batch was very flat and dry with an extremely hard structure, They were also not very sweet as they had overcooked. This was all due to the oat flour not trapping moisture in the cookie becoming very dry. and overcooked. My Flour cookies turned out very soft and chewy. The flavor was earthy and sweet which was suspected. This was most likely to the flour holding in moisture to produce a really nice tasting cookie. The protein Powder cookies turned out to be very dry. This could be due to multiple reasons. Protein powder is more dense than flower and most likely did not have enough moisture to become soft enough. I was not hard like the oat flour cookies but was dry and crumbly. My hypothesis predictions did not reflect my experiment results. Most likely due to density of the oat flour and protein powder producing drastically different results.



Oat Cookies



## Personal Commentary

I am friends with several Gymheads. I have been experimenting with athletic products with them like different preworkout supplements and protein powders. I have always had a passion in cookies and I decided to combine the two. Although the results were not what I was expecting.

Sources <https://pubmed.ncbi.nlm.nih.gov/17008153/>  
[Casien.](#)