ANALYSIS OF PROTEIN CONTENT IN DIFFERENT TYPES OF FLOUR MARKETED IN SPAIN

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INTRODUCTION

Wheat gluten and many other cereals are responsible for intolerance diseases such as celiac disease and gluten sensitivity.

Gluten is composed of starch, germ, bran and two types of proteins, gliadins and glutenins, insoluble in water, which in contact with water, after kneading and mixing, forms a homogeneous and strong network, which allows fermenting the bread. Gliadins are responsible for celiac disease, because after they are being ingested during the digestion, toxic fragments are formed. These fragments activate your immune system and reacts by causing damage to the intestinal villi. Due to this, the villi isn´t able to absorb iron, vitamins, and nutrients properly. Consequently, a large number of symptoms and health problems can appear.

People with family members who have celiac disease have a higher risk of developing the disease. This disorder is more common in people of European origin.

The use of gluten as an additive and the lack of clarity in the labelling complicates the identification of those products that don´t contain gluten, unless the manufacturer clearly states it on the container or wrapper.

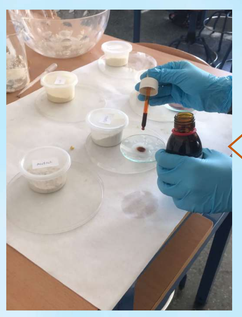
OBJETIVE

- **The main goal of this project is to know the protein content in the most consumed flours: oats, wheat and corn that are usually sold in the most important supermarkets in Spain. These flours can be found in Carrefour supermarkets.**

PROCESS

Picture 1: Samples of the flours selected

Mixing the flour to obtain the dough and extract the proteins. Subsequent, washing with water.



Picture 2:Analytical determination to check the loss of starch with washing

Lugol is added and mixed

Picture 3: Analytical determination to check the loss of starch with washing

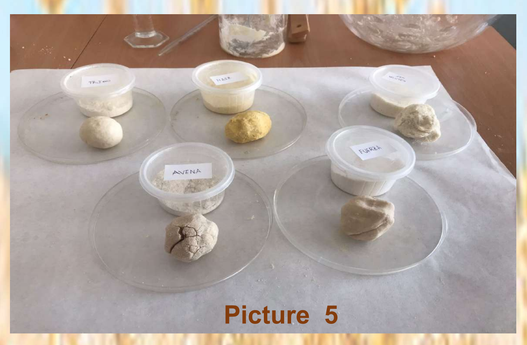
The colour of the mixture depends on the amount of starch it contains and has been extracted

Picture 4: Blue and violet coloration due to reaction of starch with lugol

RESULTS

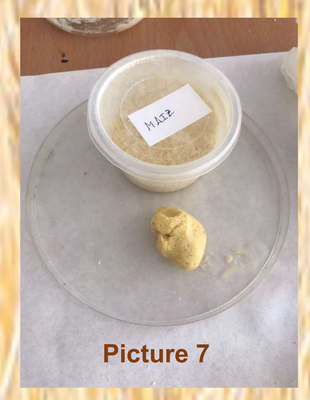
Table 1: Amount of proteins depending on the type of flour

Type of flour	Amount of proteins (g)
Gluten-free flour	5,15
Cornmeal	10,21
Oatmeal	21,50
Wheat flour	14,61
Hard wheat flour	24,11

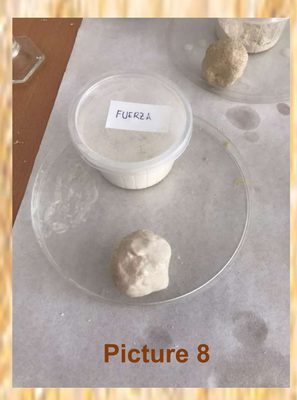


Picture 5

Picture 6



Picture 7



Picture 8

Pictures 5,6 7 and 8: Amount of proteins obtained from each type of flour

CONCLUSIONS

From the results obtained we can draw the following conclusions

1. **Hard wheat flour has a greater amount of protein than wheat flour, which in this type of flour is gluten, since this is what gives the extensibility and flexibility of doughs.**
2. **Cornmeal presented a certain amount of proteins, but since it was a gluten-free flour this must be due to zein, a protein that constitutes the corn grain.**
3. **Oatmeal also has a high amount of proteins, which are avenins. In their pure form they are gluten-free, except for contamination in the extraction process.**
4. **The presence of gluten in gluten-free flour is due to the zein of corn and the proteins of rice, cereals that are constituents of this type of flour.**

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