CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)

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Project Number

S0416

Project Title

The Effect of an Eggshell on the Fermentation of Kimchi

Abstract

Objectives/Goals

In Kimchi¡'s fermentation process, a great deal of Lactobacillus is produced, and this Lactobacillus creates Lactic acid.When Kimchi is preserved for a long time, its sour tastes become stronger due to a higher concentration of Lactic acid. To keep its original taste, my grandmother put egg into Kimchi in order to reduce the sour taste. I've designed this experiment to analyze this fact through a scientific method and principle.

Methods/Materials

Materials: boiled Egg(58.02g), Egg(55.16g), Eggshell(10.02g),Egg white(34.09g)
Egg yolk(16.51g), Red Kimchi 2kg(Aged Kimchi for 7 days), pH Meter, White Kimchi 1Kg, ROCK &ROCK Container, HPLC Analyzer

1) As shown below, prepare 7 samples to measure Kimchi's acidity.2) Check Kimchi's initial pH measure.3) Placing the samples at the room temperature, check pH by date.4) Compare the samples with the control sample, and notice any differences due to pH. 5)Identify the substance of an egg added to a sample, where there has been a change in pH scale. 6) Construct hypothesis in chemical reaction expected from the experiment result. 7) Analyze a solution from Kimchi sample where there has been a change in pH scale and a solution from Kimchi control sample. Then identify an increase in any substance (Test 1st Hypothesis) 8) Find a scientific method to discover the substance that increased in a solution from Kimchi sample where there was a change in pH scale. (Test 2nd Hypothesis) 9) Do a research on the effect this substance has on human health.

Results

It is clearly found that compared with the control sample, the sample with eggshell has higher pH scale even in the Second Experiment where Fresh Kimchi is used. Just like the 1st experiment, this is due to the interaction between Kimchi and eggshell. Thus, what effects pH in the previous experiment result is the reaction between Calcium Carbonate in eggshell and Lactic acid in Kimchi Solution.

Conclusions/Discussion

Throughout the experiments, it was possible to come up with the conclusion on how to reduce sour taste in Kimchi. As the time goes, the concentration of this Lactic acid increases, intensifying Kimchi¡#s sour taste. However, when eggshell is added to Kimchi, Calcium Lactate and Carbon Dioxide are produced due to acid-base Reaction between Lactic acid and Calcium Carbonate, eggshell¡#s major substance. Because of this neutralization reaction, the acidity lowers and the sour taste lessens.

Summary Statement

The interaction between Kimchi(Lactic Acid) and eggshell (CaCO3)

Help Received