CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
22623

Project Title
The Effect of Antioxidants in Preventing Further Oxidation in TBA Analysis

Abstract

Objectives/Goals
My project mainly focused in testing the effects of antioxidants in slowing the rate of oxidation in a TBA analysis using pure pork, beef, and vegetable oil. In the tests I used each of the oils, hexane, and a TBA solution put in three test tubes. By boiling the solution in a water bath for a designated amount of time (3€ or 40 minutes) with or without BHA, BHT, or tocopherol at a concentration of 1%, I then measured the aqueous layer at the bottom in a spectrophotometer and recorded the absorbance number. By comparing and analyzing the absorbance numbers of several tests that used the same chemicals and were heated for the same time, I concluded from my results that using antioxidants did slow the oxidation down in one of the three oils using all three antioxidants.

Methods/Materials
To perform the TBA analysis, three pure oils (free from antioxidants) pork, beef, and vegetable were used. Six grams of each were weighed into one of three test tubes and were dissolved in six milliliters of hexane and eight grams of TBA solution. They were then heated in a hot water bath for either 30 or 40 minutes depending on the run. After heating an watery layer on the bottom of the test tubes was collected with a pipet and read in a spectrophotometer at 510 nm. This method was used for the control. The runs with the variables, this process was repeated except either .2g og BHA, BHT, or tocopherol (antioxidants) was added. The absorbance numbers were recorded and compared to analyize the effects of the antioxidants in slowing the oxidation rate down.

Results
The end results aren't what they were expected to be. All three antioxidants only took affect in the beef oi€ for 30 and 40 minutes and for the pork and vegetable oil they didn't seem to have any effect whatsoever for 30 and 40 minutes. In fact when graphing the results, the samples with the variables had a higher absorption number than samples with the control indicating more oxidation.

Conclusions/Discussion
In conclusion, the explanation for the results would be there wasn't enough malonaldehydes (which is the compounds that come off the oil as a result of oxidation and what the TBA analysis is measuring) in the pork and vegetable oil was low in the control and high in the variable samples. To contine research, the heating time will be decreased and all runs will be repeated so the results will be more accurate.

Summary Statement
My project is about studying the effects of antioxidants in slowing the rate of oxidation in oils in a TBA analysis.

Help Received
Teacher taught me procedures, mentor sent me protocols, answered questions, teacher helped revise report, friend helped me with measurements