CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)

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Project Number

S0607

Project Title

Testing for the Presence of Bisphenol A Diglycidyl Ether in Canned Foods

Abstract

Objectives/Goals

Our objective was to discover if bisphenol A diglycidyl ether (BADGE), a relative of bisphenol A (BPA), is present in canned foods.

Methods/Materials

Materials:

Agilent 1100 Model HPLC machine, HPLC vials, Vydac C4 column, 100% methanol, dIH20, acetonitrile, 25g bisphenol A diglycidyl ether, P-1000/200/20 pipettes & tips, filter paper, 0.45 µm filter, samples (Campbell's Cream of Chicken, Cream of Mushroom, & Cheddar Cheese Soup, Diet Pepsi, Del Monte Sliced Peaches, Del Monte Whole Kernel Corn, Arizona Raspberry Iced Tea, Trader Joe's Whole Kernel Corn, Trader Joe's Black Beans, Trader Joe's Organic Pinto Beans, Trader Joe's Albacore Solid White Tuna, Red Bull, Bumble Bee Wild Alaska Pink Salmon, Snapple Peach Tea)

Methods:

We began by making a stock solution of 10 ppm BADGE in 100% methanol, then 5 dilutions with varying concentrations of BADGE # 100, 50, 20, 10, & 5 ppb. We then took samples of various canned foods and filtered them first through folded filter paper, then a 0.45 µm filter. Reverse Phase High Performance Liquid Chromatography (RP-HPLC) was used to analyze for the presence of BADGE. Using a Vydac Protein C4 column on the Agilent 1100 model, we placed our standard solutions and samples into the machine, and ran them, awaiting results.

Results

All but one sample contained varying amounts of BADGE. In BADGE-confirmed, 2 of 3 had high BADGE concentrations, 1 low. In BPA-confirmed, all samples yielded very high concentrations, while most samples in BPA-free exhibited low concentrations. For our 3 unknowns, while 2 of 3 exhibited very large concentrations, Red Bull exhibited a concentration so low, it was essentially negligible. Highest overall concentration was Arizona Raspberry Iced Tea, at 88.49 ppb. Lowest overall concentration was Trader Joe#s Whole Kernel Corn, at 3.35 ppb. Red Bull was the only sample to exhibit so low a concentration, we assume none is present.

Conclusions/Discussion

Based on samples tested, a majority of canned foods do indeed contain BADGE. While BPA-free foods are best for reducing exposure to these types of toxic chemicals, they are not necessarily free of them.

Summary Statement

In our project, we tested for the presence of bisphenol A diglycidyl ether (BADGE), a relative of bisphenol A (BPA) - both used in the manufacturing of epoxy resins - in canned foods using High Performance Liquid Chromatography (HPLC).

Help Received

supervision and instruction from Dr. Malhotra & Dr. Cauchon, supervision from many parents of students