An Analysis of Bisphenol-A, Bisphenol-S, Bisphenol-F in BPA-Free versus Ordinary Plastic Containers Using Gas Chromatography Mass Spectrometry

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Plastic bottles are manufactured with organic epoxy resins containing Bisphenol A (BPA), Bisphenol S (BPS), and Bisphenol F (BPF). These are carcinogenic and mutagenic substances. People assume a container labeled BPA-Free must be safe, but this may not be true. Companies often substitute BPA with BPF or BPS in BPA-Free containers. One must consider, do BPA-Free containers contain compounds such as BPS and BPF, which may just as dangerous as BPA? It is predicted the BPA-free containers will contain BPF and BPS, as some studies suggest institutions producing BPA-free containers replace BPA with BPF and BPS. To test this hypothesis 10 BPA-Free plastic bottles, 10 non- BPA-Free plastic bottles, and 10 glass bottles will be filled with 100ml of Acetonitrile. The glass bottles will serve as a control. The containers will be left for 72 hours at 55 °C to extract. After extraction the samples will be derivatized with BSTFA in order to be run through the Gas Chromatography/Mass Spectrometry system for identification and quantitation. The results showed that the non BPA-Free containers have the largest amount of BPA and that the BPA- Free containers have the largest amount of BPF. The BPA-free containers contained only a trace amount of BPA. The BPA-Free containers contained low levels of BPS, which are below the limit of quantitation. The level of BPF in BPA-Free containers is 16x the level of BPA in non- BPA-free containers. This supports my hypothesis that companies use BPF, in bottles that are BPA-Free, although BPF is just as dangerous as BPA.

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