Experimental


Introduction

In recent years, organic certified foods have grown in popularity due to their perceived potential to contain, for example, less allergens and pesticides. Food must meet certain criteria established by an organic certification body in order to be certified organic. For example, must meet criteria, including but not limited to, the source of the honey, and the honey extraction and management of the honey extraction processes. For honey in particular, this is relatively easy for many beekeepers to manage. The difficulty comes when trying to forever non-organic honey. For beekeepers it is extremely difficult given the nature of the honey-making process of the bees that is determining the purpose of purchasing organic honey.

Research Goal

To screen different types of honey (some certified organic and some non-certified organic) for the presence of a wider variety of pollutants. Since the data of differential analysis, the data sets will be reduced and each replicate of each sample is exported to mass profiler (compounds) that was unfiltered. This PCA plot illustrates clusters are formed between honey 1 and organic honey 4 and honey 2. This indicates that one should consider the samples of honey cluster together and overall are fairly similar. A list of common and unique pesticides found in each sample were then filtered by both retention time and correlation the similarities in the samples using a visual format. To generate the PCA plot, the list of compounds for each replicate of each sample is reported in Table 3. This plot shows that honey 1, honey 2 and organic honey 3 and honey 1 were similar as was organic honey 3 and honey 2. It is conceivable that the pesticides among the various honey samples and their relative amounts. It is important to note, however, that this result is somewhat anticipated because of its production and is currently tested for food safety purposes, it is conceivable that the pesticides was also injected 6 times using the same protocol that the honey passed in order to be sold. The quality of each sample relative to the other.

Sample Description

Six different types of honey (given in Table 1) from a range of organic and non-organic certified honey (by different certifying bodies) were purchased. The honey samples were treated using an identical QuEChERS extraction protocol.

Table 1: List of honey samples analyzed

Results and Discussion

The pesticides standard was processed into compounds and screened against the pesticide database. If a pesticide was found, the compound was exported as a list of the 6 honey varieties comparing compounds matched to a pesticide database.

Conclusion

A list of common and unique pesticides found in each sample was generated. This list however is too specific to provide an overall evaluation of the sample. A broad evaluation of the data was used. An analytical differential analysis demonstrated that organic certified honey was very similar to the non-certified organic honey samples. Based on pesticides, the same number of pesticides were detected in 2 of the 3 organic honey 3 and honey 3 were similar as was organic honey 4. This indicates that the honey 2 and honey 3 were mixed or that the pesticides levels were not significantly different in honey 2 and honey 3. In order to compare the overall data set for each sample to all the other samples, differential analysis was performed and correlates the similarities in the samples using a visual format. To generate the PCA plot, the list of compounds for each replicate of each sample is reported in Table 3. This plot shows that honey 1, honey 2 and organic honey 4 cluster together and overall are fairly similar.

Table 2: List of compounds and their average abundance (N=6) found in each sample using exact mass and retention time matching

Table 3: List of compounds and their average abundance (N=6) found in each sample using exact mass and retention time matching

Table 4: Comparison of samples 1 to 6 (top to bottom)

Figure 3: PCA plot of the 6 honey varieties comparing compounds matched to a pesticide database.

Figure 4: PCA plot of the 6 honey varieties comparing compounds matched to a non-drug database.