Risk Analysis: Pyrrolizidine Alkaloids in Honey and the Distribution of Senecio jacobaea

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Purpose of this project is to show whether the toxical pyrrolizidine alkaloids of senecio jacobaea can pollute the local honey. These toxicants are carcinogenic, mutagen and moreover accumulate in the liver for a long time period and increase the risk of cancer. To examine the contamination of the local honey, we used several analytical methods ranging from a pollen analysis to a mass spectrometric analysis of local honey samples and connected these results with an extensive mapping of senecio jacobaea in our hometown. The mapping included 55 km2 and we found more than 8.300 exemplars of senecio jacobaea. Furthermore, we analysed the distribution of senecio jacobaea by dividing our city in sectors, that are based on the land use and thereby the handling of senecio jacobaea. For the pollen analysis we collected pollen samples of local beekeepers, sorted the pollen clusters and thereby examined the composition of the samples. With a positive sample of senecio jacobaea pollen we analysed the contamination of each sample. Furthermore, we could show, that the pollen clusters of some plants are more likely to be contaminated with senecio jacobaea pollen. We then predicted the contamination rate of several honeys regarding the location of their beehive and controlled these with a mass spectrometric honey analysis. We could prove, that bees use senecio jacobaea as a food source within special circumstances and therefore pollute the honey. Furthermore, we could show that the land use has influences on the distribution of senecio jacobaea.

Awards Won:
Second Award of $2,000