

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

Kirchner, Jessica (School: Berufskolleg Rheine)

Boukamp, Jonas (School: Berufskolleg Rheine)

Purpose of this project is to show whether the toxic 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 km<sup>2</sup> 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