Biodetoxification of N-nitrosamines by Symbiotaphrina kochii and Quantification of N-nitrosamines via Gas Chromatography Mass Chromatography

Salmon, Katelynn

Gastric cancers are the leading cause of cancer related deaths worldwide. Most cases of gastric cancers are diagnosed late stage. Carcinogens in food, N-nitrosamines being one major group, increase risk of carcinogenesis. This study aims to investigate a system to lower risk of gastric cancer caused by N-nitrosamines ingested in food. It has been previously determined that the yeast-like symbiont of the Cigarette Beetle, Symbiotaphrina kochii, has the ability to detoxify a wide spectrum of toxins by metabolizing them to get carbon present in the compounds. For this project S. kochii's carbon utilization and biodetoxification for the N-nitrosamine, N-nitrosodiethylamine (NDEA), was tested. Different concentrations of NDEA were treated with S. kochii for a one week period. Yeast growth in samples containing NDEA (a carbon source) far exceeded yeast growth in control samples without NDEA (no possible carbon source), indicating that S. kochii was utilizing NDEA as a carbon source as expected. Counts of NDEA in treated samples were compared to counts in untreated samples. There was significantly lower amounts of NDEA present in treated samples (ranging from app. 60% to 90% lower). Carbon utilization evidence (yeast growth) and biodetoxification evidence (NDEA quantification following assay) support the project hypothesis. Additionally, multiple strategies were attempted to increase sensitivity of the GCMS to N-nitrosamines, none successful. Future direction will include monitoring changes in amount of NDEA day by day, wide range testing of biodetoxification ability on many different N-nitrosamines present in food, and work to increase S. kochii's effectiveness at biodetoxification.

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