Biodetoxification Spectrum of the Cigarette Beetle Endosymbiont, Symbiotaphrina kochii, on Carcinogens Found in Cigarette Smoke

Salmon, Katelynn

Symbiotaphrina kochii (S. kochii) is a species of endosymbiotic yeast present in the gut microbiome of the Cigarette Beetle (Lasioderma serricorne). Despite consuming tobacco both pre and post processing the Cigarette Beetle does see any adverse affects. S. kochii has the unique ability to utilize a variety of carbon sources from toxic substances thereby detoxifying the substances. If S. kochii was able to utilize the carbon present in carcinogens in tobacco, this could explain the Cigarette Beetle's immunity to the carcinogens. A series of tests were performed to determine which carbon sources in YM media S. kochii was able to utilize. Then, a carbon utilization assay was performed by eliminating all carbon sources from YM media and adding cigarette smoke extract. S. kochii was grown on the altered media. Also, tests were performed to determine if S. kochii was able to detoxify aqueous cigarette smoke extract to prevent growth arrest in Schizosaccharomyces pombe (S. pombe), a common human cell model. However, errors in experimental design rendered the implications of the results from the detoxification test (no detoxification ability) invalid. Results for all of the tests were determined by observed growth response of the organisms. The results showed that S. kochii is able to utilize carcinogens present in cigarette smoke as a carbon source, detoxifying them. Testing to determine whether or not S. kochii's is able to detoxify carcinogens for the human cell model is ongoing. In addition, S. kochii has the ability to use carbon present in cellulose. This ability could have applications in biofuel production.

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