## Screening and extraction of bioactive volatiles from plant based materials

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### Goals:
- To screen different raw materials for volatile compounds before and after pretreatment.
- To find a new method to extract bioactive volatiles from biomass more cost-effectively and at larger scale.
- To find an effective solvent that can be removed easily at higher temperature.
- To investigate parameters that can affect extraction efficiency, such as temperature, pH, solvent type and loading.

### Statement of Problem:
Bioactive compounds are secondary plant metabolites eliciting pharmacological or toxicological effects in man and animals. For food and feed plants with bioactive compounds, the intakes are usually regarded as beneficial. Most plants can produce bioactive compounds, but we choose sorghum stalk, corn stover, switch grass and wheat straw as materials, since they are abundant and cost-efficiently.

Biomass comes from plant materials. It can be as a source of renewable energy. Due to the limitation of the amount of chemical energy, biofuel has become a promising substitution. A specific compound, farnesene, will be regarded as a target compound regardless of its content in biomass. Farnesene is a major sesquiterpene hydrocarbon, which has great promise as a value-added specialty chemical and can be used as a renewable drop-in fuel. In previous studies, an engineered yeast-based farnesene production method has been developed. They used sugarcane feedstock as the source that made the production much more cost-effective. However, these methods are laboratory-based and will not be cost-effective for large scale operation. So, it is crucial to find an innovative process to modify those methods.

After screening, if some interesting compound is found with significant intensity, then we will try to fine-tune the extraction process for selective isolation of that compound. Our laboratory has developed methods to extract zein protein from corn, we will modify these methods for effective extraction of farnesene and other bioactive volatile compounds from sorghum biomass. GC-MS will be used to quantify the volatile compounds and optimize the extraction process.

### Current Activities:
Cutting and grinding followed by solvent extraction. Screening of different raw materials using three solvents (Dichloromethane, methanol and aqueous NaOH). Bead beating is used to assist extraction. Cold centrifugation of the extract to remove solids.

### Recent Publications:
None