

## Bioenergy development from agricultural waste on Northern California farms

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### Summary

This project will convert agricultural waste, including food waste, rice straw, and other organic farm waste to bioethanol through bacterial fermentation. The project will evaluate the technical feasibility of producing bioethanol from organic farm waste and also evaluate the economic feasibility of producing bioethanol from organic farm waste. Farming in Northern California can be sustainable via reduction in solid waste and generation of energy from organic sources. Northern California produces approximately 2 million tons of rice over 450,000 acres of land every year according to the California Rice Commission. Over 1 million tons of rice straw is removed from the fields and thrown away, buried in the ground, or burned. However, burning rice straw can cause significant air pollutants including, particulates, carbon monoxide, hydrocarbons, nitrogen oxides, sulfur dioxide, carcinogenic polynuclear aromatic hydrocarbons, and airborne silica fibers. Generating bioethanol locally can help farmers reduce a significant cost to their farming business. Fuel costs and electricity costs can be reduced using a local bioreactor. Creation of a self sustaining biofuel reactor is very challenging. Government programs should help farmers be more self sufficient. The biofuel project can help farmers be more productive, more sustainable, and help the environment by reducing their dependence on petroleum based products and producing less, air, water, and land pollution. If support is not provided to farmers to create a farming enterprise that is better for the environment and better for their local business, then more farms will have financial trouble, more land will be polluted with solid waste, and more communities will suffer with more air pollution. Several potential scientific advances will be addressed in the research that includes bacterial conversion of cellulose based organic waste to glucose and then fermentation to ethanol. Manufacturing technologies will be discovered to produce ethanol with economically favorable methods and techniques. The research can help provide societal changes of local farming practices that enable small-scale sustainable farming production of agricultural products with lower pollution and lower waste generation. Several entity groups that could provide funding and support for the research project, including, USDA, regional farming collectives, and petroleum companies.