

ENGINEERING/TECHNOLOGY

Waste to Resource: Composting Olive Waste in Jordan

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Olive oil production in Jordan, the world's eighth largest producer, provides income for over 80,000 families. Jordan expects to generate 35,536 metric tons of olive oil with four times this amount of waste in the 2012–2013 production year. This project, a partnership between Purdue University's Global Engineering Program and the University of Jordan, focuses on turning olive waste into a valuable resource through composting and anaerobic digestion. Pomace is currently collected and burned as an energy source but not in the most efficient, clean way. Olive pomace compost can have a germination index (a measure of productivity) from 70% to 198%. Currently, research into compost and olive oil production in and outside of Jordan is analyzed in context to this project. We found that the project requires testing a variety of parameters (temperature, carbon/nitrogen ratio, phenol

content, pH, oxygen content) that define quality compost production. We examine the many methods of composting large amounts of organic waste and propose designs for methods best suited for composting olive waste. Issues that make this project challenging and stimulating are: Jordan's arid climate, the presence of polyphenols that may inhibit plant and microbe growth, and designing in general terms rather than specific context. To address these challenges our design requires a watering system, solid additives, and optimizing the composition of the waste for compost. The project will result in a compost procedure for olive oil production facilities in Jordan to reduce waste and increase harvest yield.

Research advisor Nate Mosier writes, "This global design team is a diverse group with different cultural and academic backgrounds working on a challenging problem. The team has learned a great deal about how local cultural and environmental contexts affect engineering design and decision making. A unique aspect of this project is the interactions between the students at Purdue and students at the University of Jordan in addressing olive oil waste in a creative way."