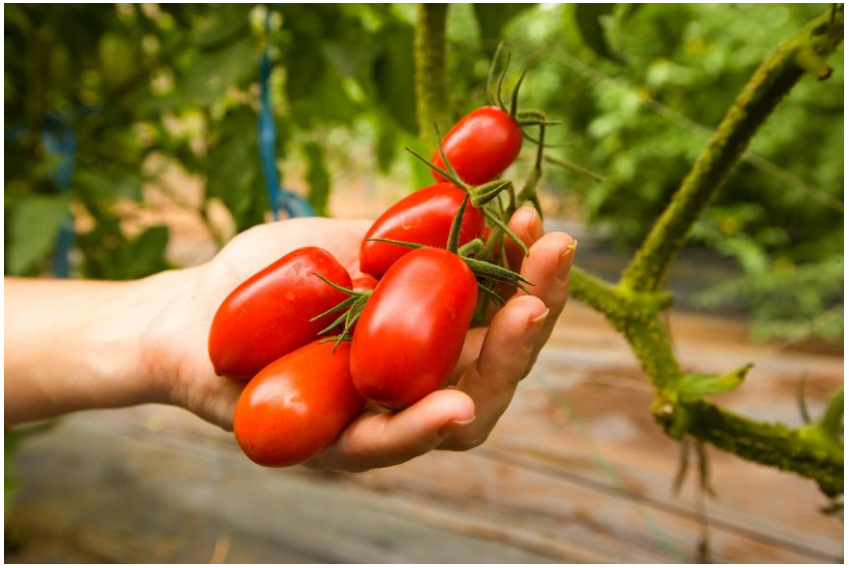
Tomato Processing Equipment



The intention of this project is to promote sustainable, local agriculture by building and utilizing a model food system at the University of Illinois. The Illinois climate action plan recommends a system in which food can be grown locally and served to members of the campus community. This project helps achieve this goal by increasing the amount of food made available to patrons, while providing an excellent tool for teaching and researching sustainable agricultural processing practices. As such, it is important to consider the energy and water usage of the equipment used in the processing line. Additionally, equipment was selected to allow the highest flexibility to add additional products to be processed from the Student Sustainable Farm. Some of them are listed in the following pages.

The Food Science Pilot Plant will be providing the building space, infrastructure, and many pieces of equipment and tools for use in this project. Additionally, the Pilot Plant Manager and faculty guidance will come from the Department of Food Science and Human Nutrition. Standard rates for rental of the Pilot Plant space start at $1000 a day plus the rental cost of equipment and labor of the Pilot Plant staff, faculty, and students. This project will benefit from the utilization of these items at no charge. Some of the assorted equipment that will be available includes the ultrasonic washer, stainless steel kettles and tanks, dicers, micro-cut machine, pH meters, refractometers, and tools such as buckets, spoons, and ladles. Not all equipment is included in this diagram for the benefit of clarity and brevity.

Due to the extensive range of packaging options available, and under the recommendation of the Food & Waste working group, a review of packaging options will take place over the Summer, with a selection by the SSC to be made Fall 2013. Details of this are included in the application. In order to provide a complete picture of the processing steps, one such option is presented in this diagram.

Phase 1 Equipment

Ultrasonic Washer

Phase – FSHN Provided

Uses ultrasonic vibration to clean tomatoes which greatly reduces the water and disinfectant solution necessary to clean produce.

This washer will be able to be used for cleaning a wide range of fruits and vegetables.

Hot Break Tank

Phase – 1

The hot break tank is used to de-activate the pectinase enzymes present in tomatoes. This keeps the sauce from separating during storage and improving other aspects of product quality. The tank requires no water inputs, and has been designed to use minimal steam energy for processing. All product is then pumped to the pulper/finisher.

Pulper/Finisher

Phase – 1

The pulper/finisher is used to separate the seeds and skin from the tomato juice. The juice is pumped to the evaporator while the skins and seeds are collected in a separate container. This waste can be composted or possibly used as fertilizer. An analysis will have to be performed to determine it's suitability as fertilizer due to the high pH of tomatoes.

Can also be used for apples, apricots, bananas, beans, beets, berries, carrots, cherries, dates, figs, grapes, mangoes, melons, peaches, pears, pineapples, peppers, plums, pumpkin, prunes, and more. Some products may require different screen sizes, a minimal cost.

Positive Displacement Pump

Phase – 1

The positive displacement pump is used to transfer viscous product from one processing stage to another. High-efficiency motors were selected to ensure minimal energy use.

Evaporator can be used for tomato sauces, ketchup, barbeque sauces, chili sauces, jams, jellies, broths, stews, gravy, soups, etc. Some applications may require some modifications to the equipment.

Evaporator

Phase –1

The evaporator is used to concentrate the tomato juice into a tomato sauce. Typical evaporation processes require boiling at 250F and the evaporated water is released to the atmosphere, easily making this the most wasteful and energy intensive portion of the process. We have designed a system that will operate under a vacuum, which lowers the boiling point of the sauce under 140F. This will lower energy input greatly, with the added bonus of allowing re-capture of the boiled off water. In a typical 1000-1500 lb. batch of tomatoes, 50-75 gallons of water will be captured, enough to clean the equipment used up to this point. This is a great improvement over the typical piece of equipment used in this process.

Pictures are representative of the equipment that will be purchased/utilized