

Automated Production of Fatty Acid Methyl Esters (FAMEs) from Soy Seeds

Applications: Plant Science Solution

Key Technologies: Microlab® STARlet

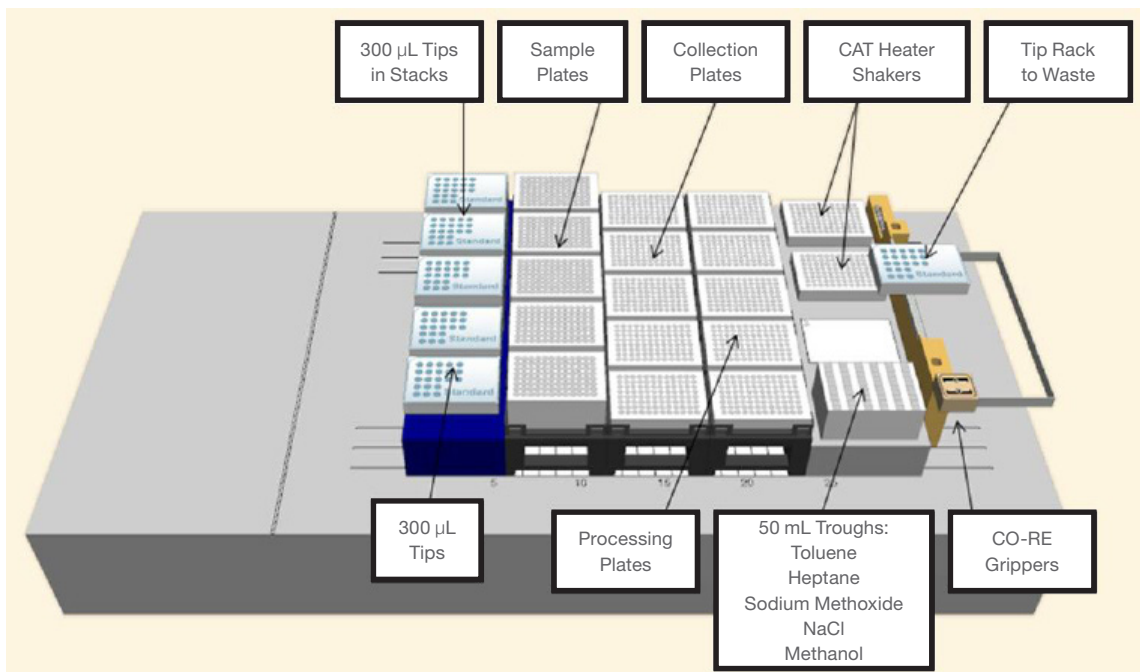
Soy seeds are a good source of several biologics including fiber, amino acids and oil. These seeds and other plant materials are the target of ongoing research into identifying and quantifying new biomolecules. Oil separation coupled with FAME production and characterization involves homogenization of seeds in toluene followed by sodium methoxide catalyzed transesterification and gas chromatography. The main challenges are low yield, considerable variability, laborintensive steps and low sample throughput.

Hamilton Robotics has designed a system to automate oil extraction and FAME production from soy seed samples on the STARlet Automated Liquid Handling Workstation. The system setup allows the user to choose the number of sample plates (up to five) and the number of samples per plate (up to 96). Additional flexibility allows userdefined volumes, mix cycles, shake times and temperature. The method is based on the STARlet with manual loading, eight independent channels and CO-RE Microplate Grippers. Two Hamilton CAT Heater Shakers are also required. The 1000 μ L independent channels are used for all liquid transfers, with the Anti- Droplet Control (ADC) function enabled. Hamilton pressure-based liquid level detection (pLLD) is used for the handling of organic solvents. The CO-RE grippers handle the transfer steps to and from the Heater Shakers.

System Features

- ▶ Multiple user-defined parameters for maximum flexibility.
- ▶ System automates multiple steps including mixing, heating and shaking.
- ▶ Pressure Liquid Level Detection determines the liquid level of organic solvents.

Deck Layout



Process Steps

Step	Process
1)	Add toluene to processing plate.
2)	Add sodium methoxide and methanol to the processing plate.
3)	Pipette sample from sample plate to processing plate.
4)	Add heptane to processing plate.
5)	Move the processing plate to Heater Shaker for several minutes of heating and shaking.
6)	Add sodium chloride to processing plate.
7)	Shake the plate for several minutes.
8)	Move the processing plate from Heater Shaker.
9)	Collect supernatant in collection plate.

System and Materials

System Requirements	Hamilton Part Numbers
Microlab STARlet with 8 independent channels and all necessary carriers and accessories	173020

Labware Required	Hamilton Part Numbers
Multiflex landscape base carrier with the following modules	
▶ MFX Tip Stack Modules x3	188039
▶ MFX Tip Rack Module x2	
Carrier for five deep well plates, PLT_CAR_L5AC_A00 x3	182090
Shaker Carrier	
▶ CAT Heater Shaker x2	187144
▶ DWP module	
▶ 50mL Reagent Trough Module	
300 µL Hamilton CO-RE Tips, Standard	235902

User Supplied Materials
96-well custom deep well plate, Teflon
96-well multi-tier 500 µL glass tube rack
50 mL troughs

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