

BIO-EXTRACTOR SEDIMENT & BIOLOGICAL REPORT FOR NEW METERING SYSTEM

The new metering system for the Bio-Extractor was set to a 0.5" gap between the metering plate and the bottom of the hopper.

Although the sediment load of compost varies based on composition, these graphs give an indication of the sediment allowed by each size of screen.

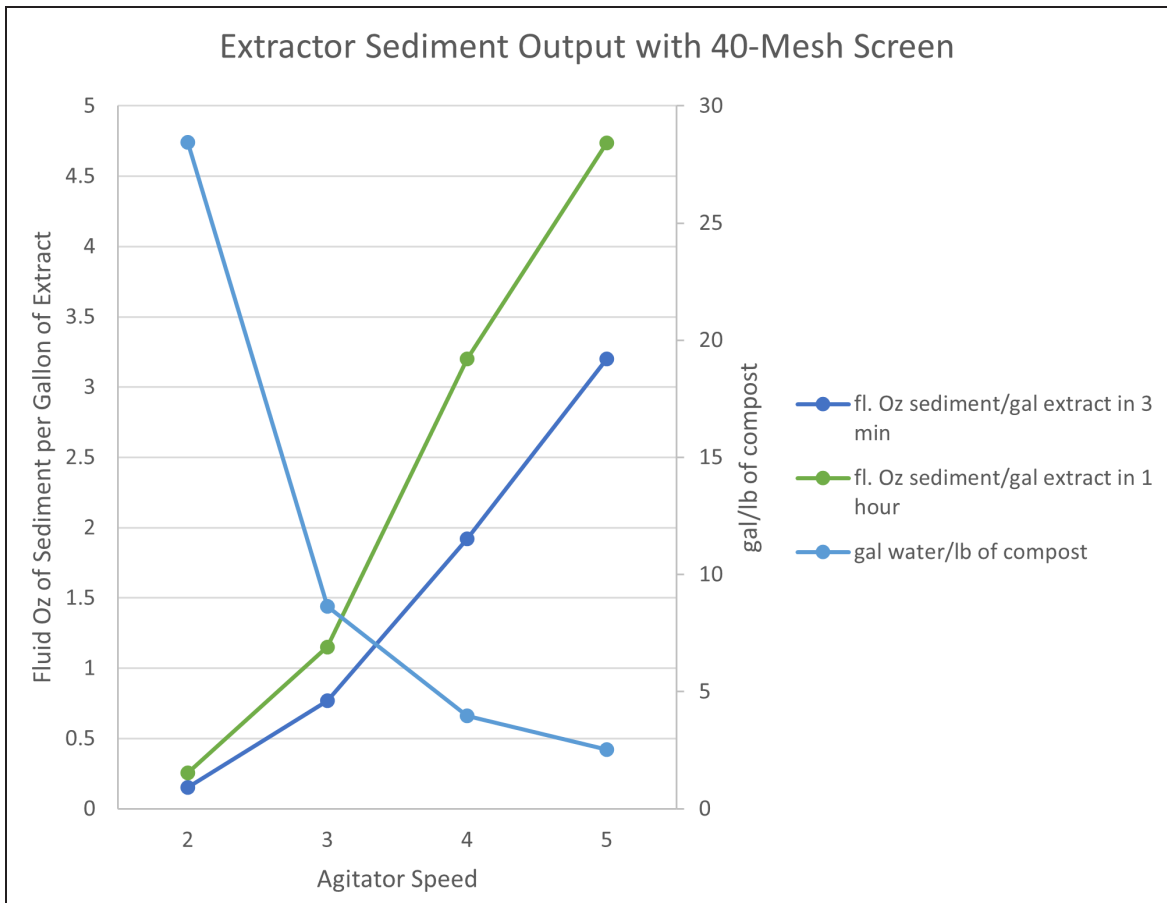
Sediment Data Collection

Hiwassee Products Bulk Worm Castings was used for sediment testing. Each test used 30 lbs, and samples were collected from the bottom of the catch basin to ensure the sediment load was accurately measured. Sediment numbers were measured using an Imhoff Settling Cone. Data was collected at 3 minutes and at 1 hour after settling in the settling cone.

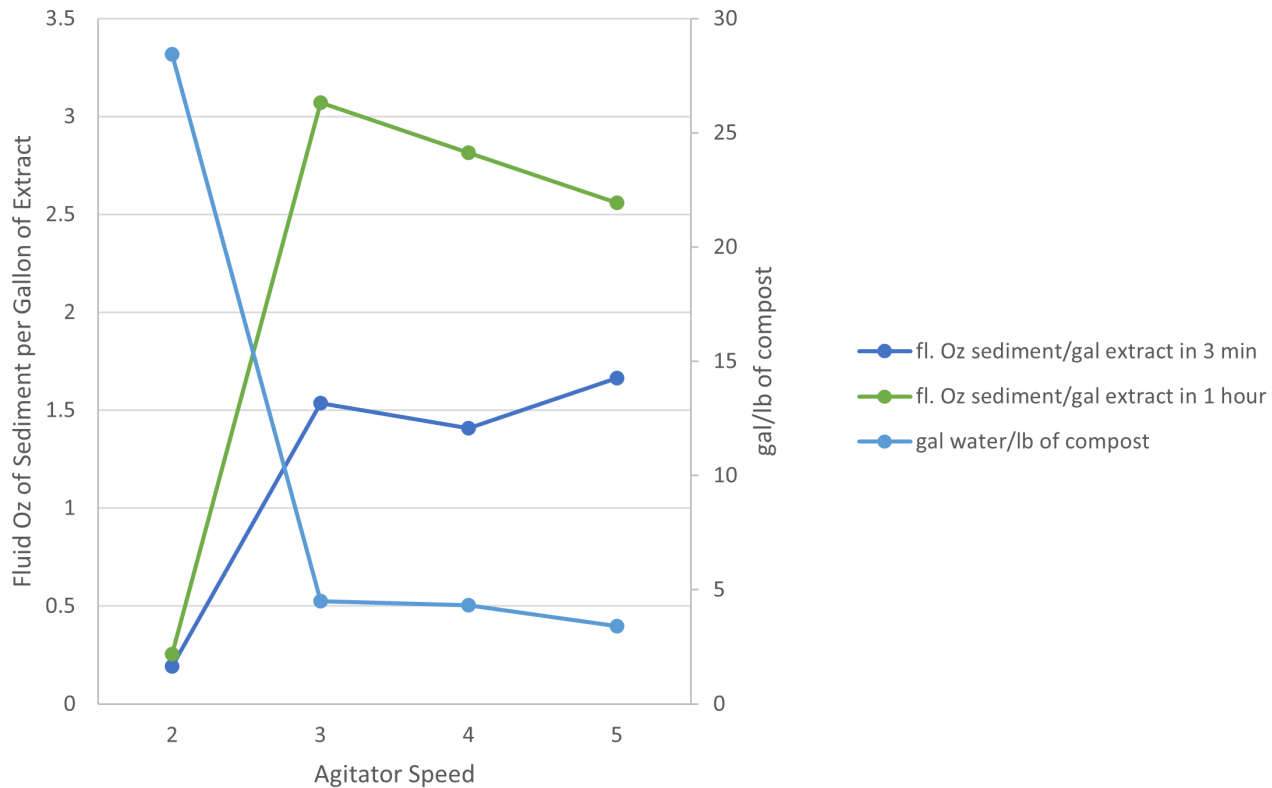
Note: the measurement at 3 minutes is intended to assess heavier sediment which settles out faster and is more likely to plug a sprayer.

Biological Data Collection

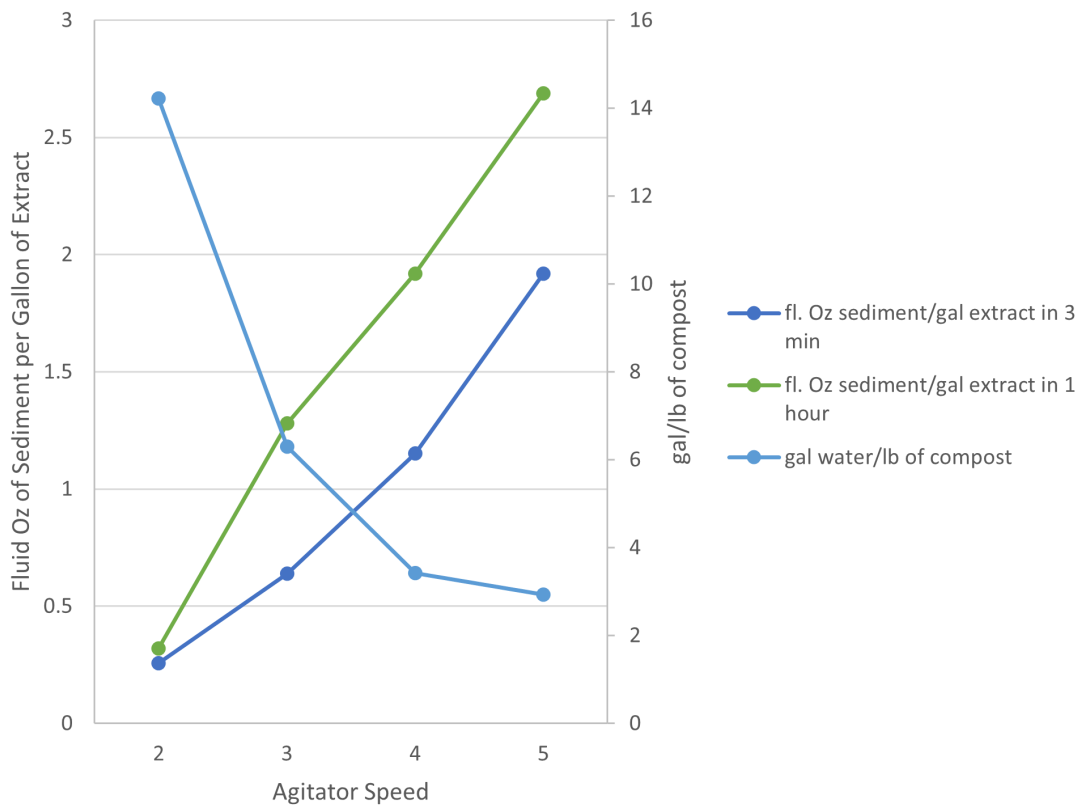
AgriBio Vermi Compost was chosen for biological testing because of its high biological content and complete food web. 10 lbs of compost were extracted at each speed. Biological measurements were taken from the input compost, compost extract and waste material. The SFW shadowing microscopy method was used for the biological testing.



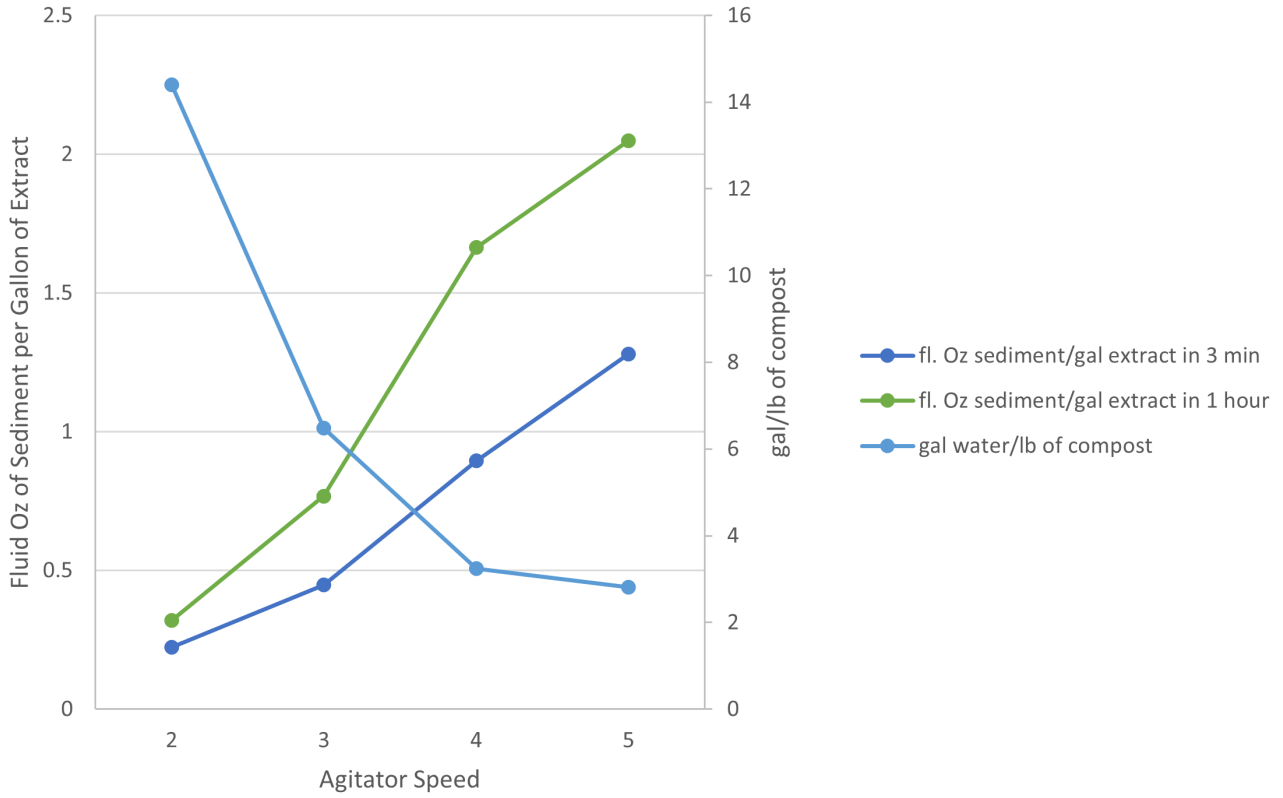
Extractor Sediment Output with 50-Mesh Screen



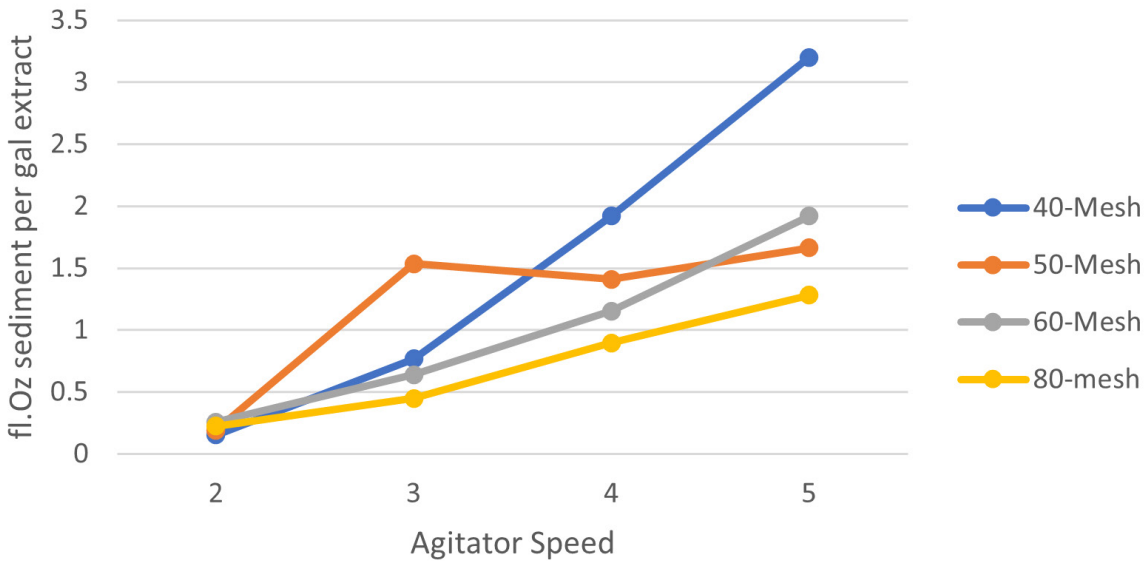
Extractor Sediment Output with 60-Mesh Screen



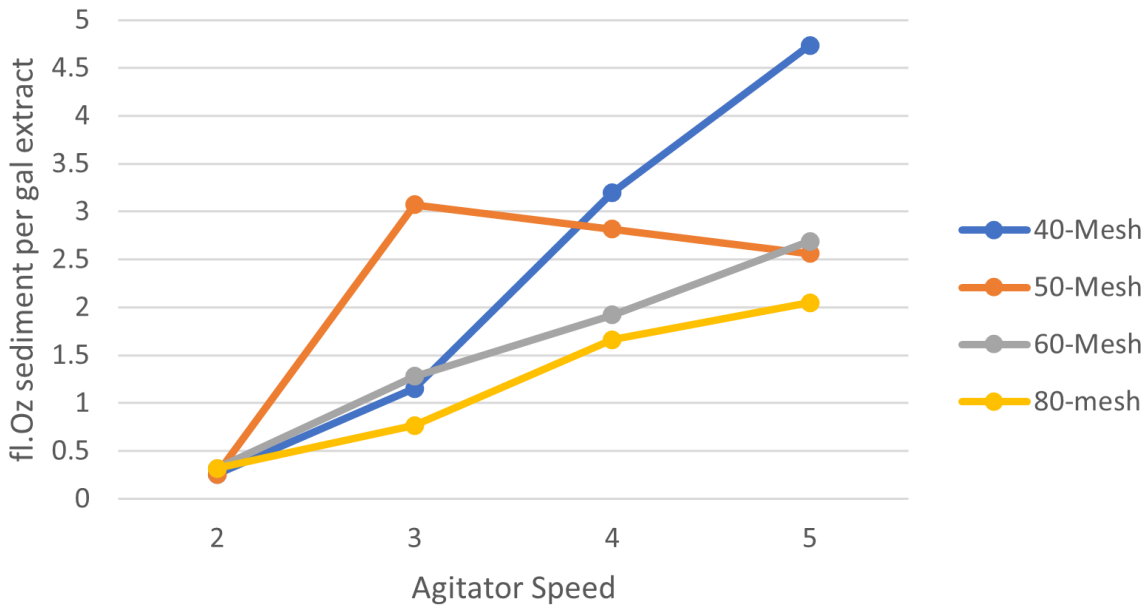
Extractor Sediment Output with 80-Mesh Screen



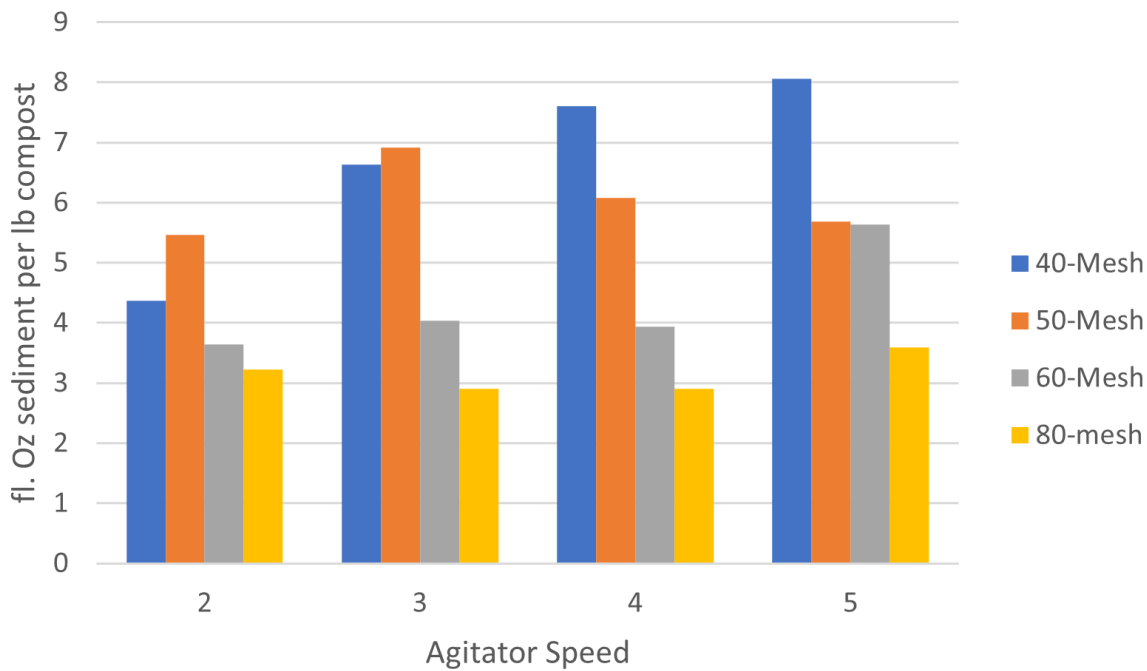
Sediment Volume per gal Extract (3 min)

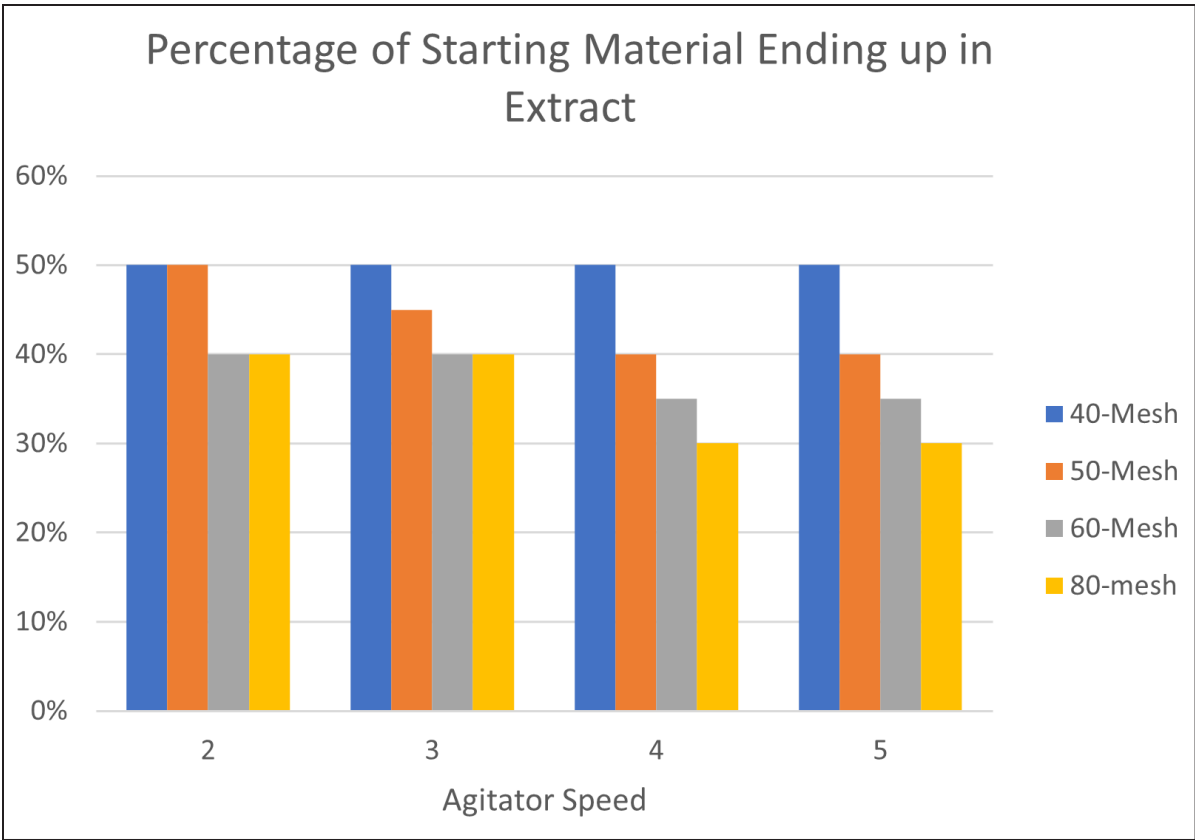


Sediment Volume per gal Extract (1 hour)



Fluid Ounces of Sediment per pound of Compost used



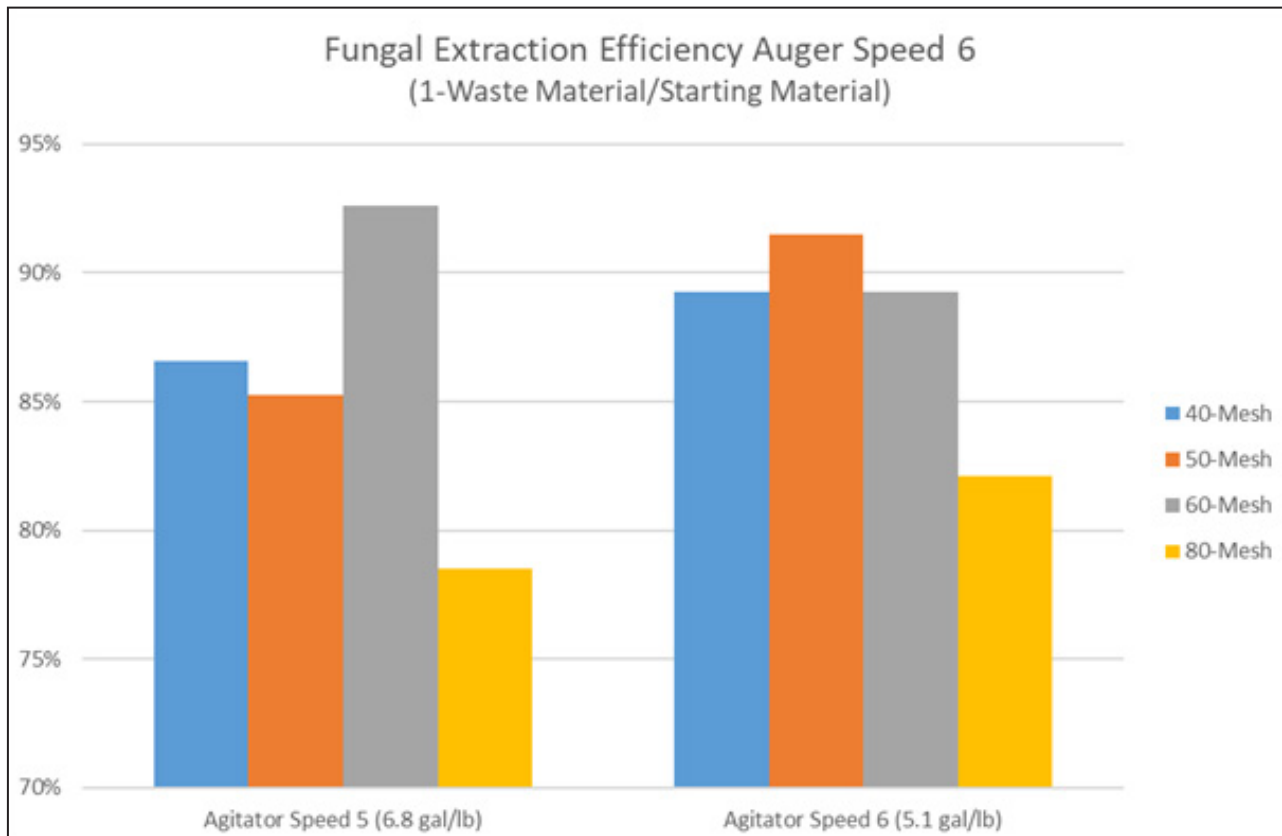
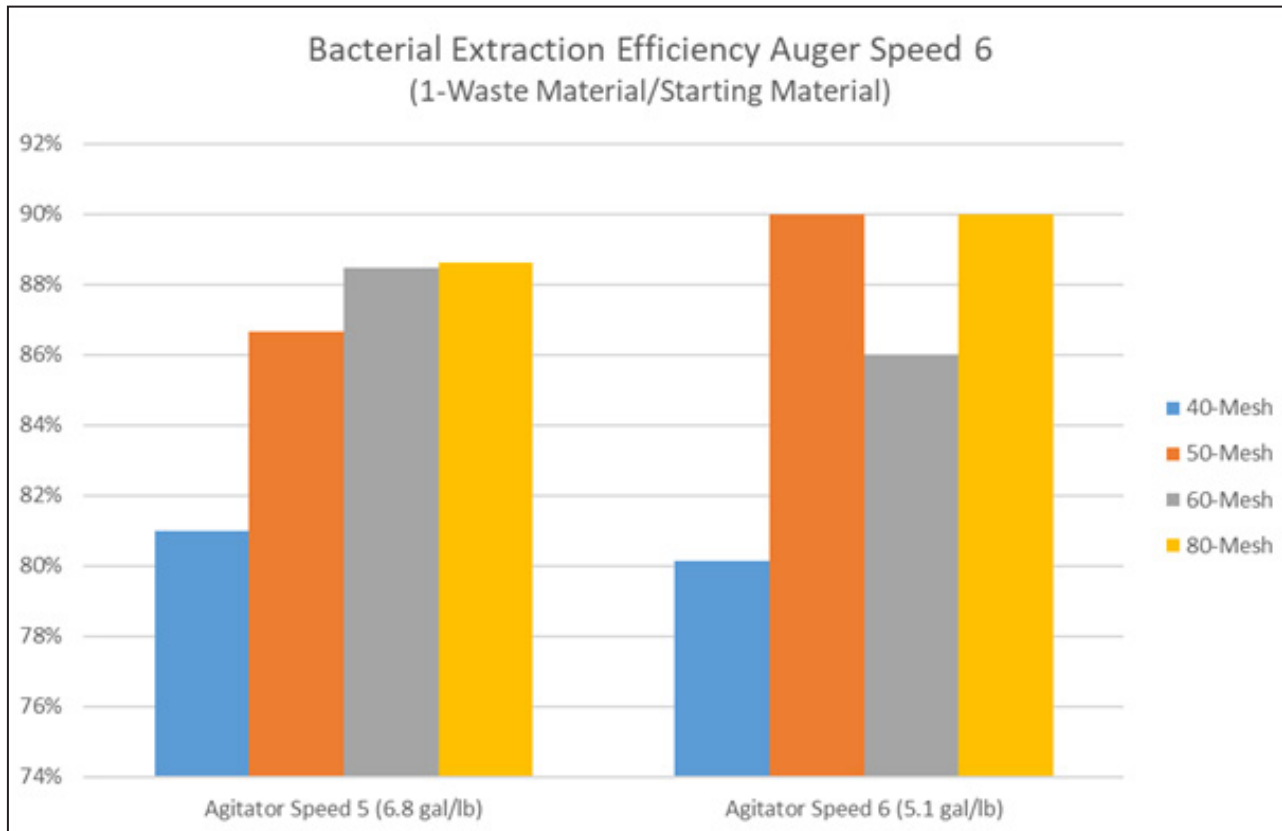


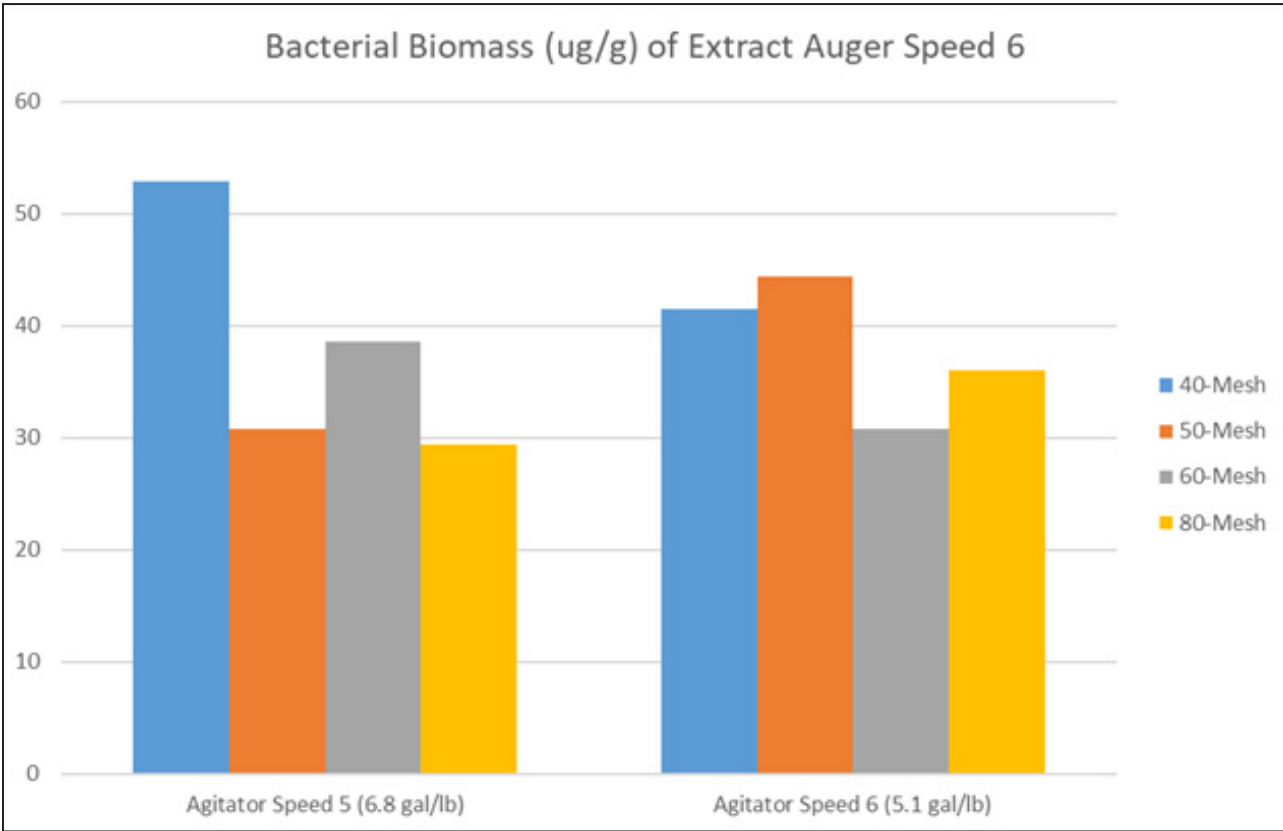
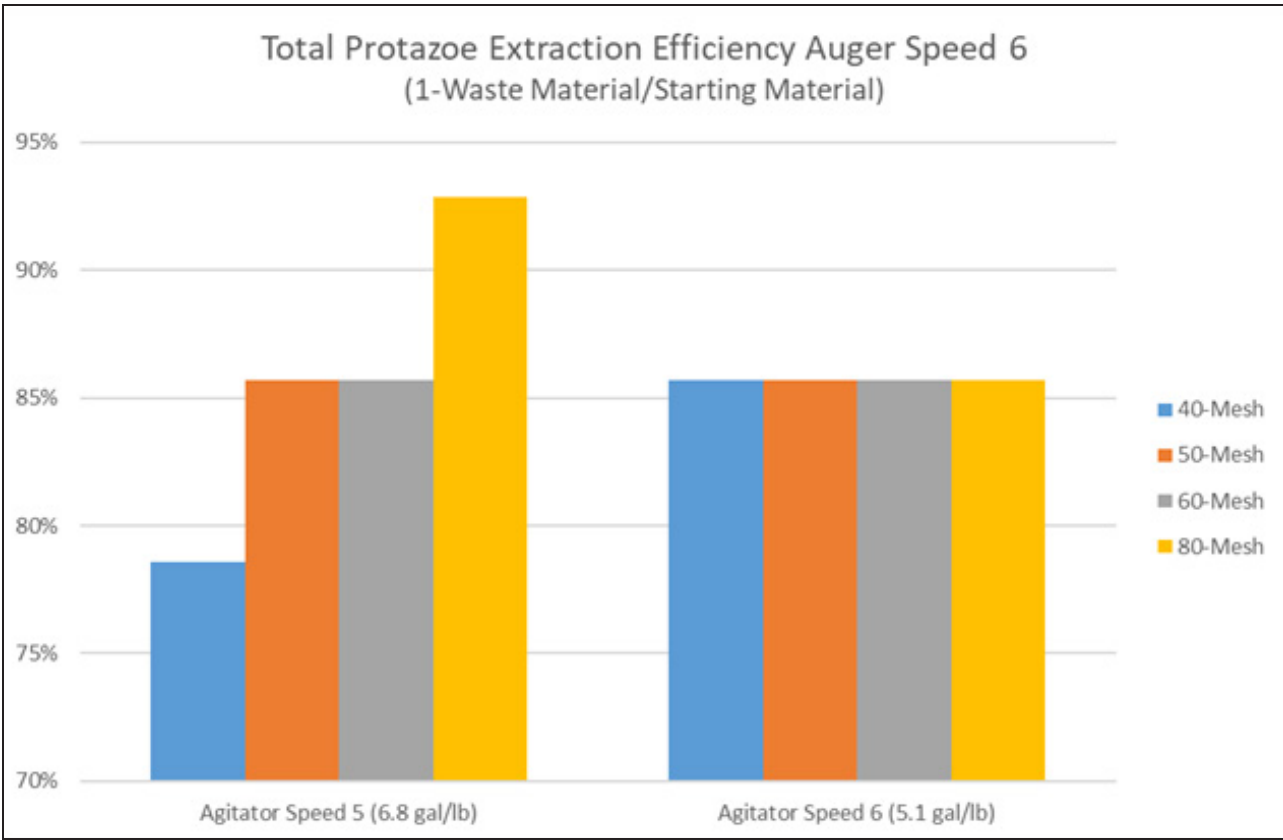
Sediment Testing Discussion

We observed that the 80-Mesh screen had the least amount of sediment in the extract across all agitator speeds and allowed the least amount of sediment per pound of compost used. This observation suggests that 80-Mesh is the best screen size for reducing sediment in Compost Extract. Using the 80-Mesh screen also results in a higher volume of waste material discharge from the front of the Bio-Extractor.

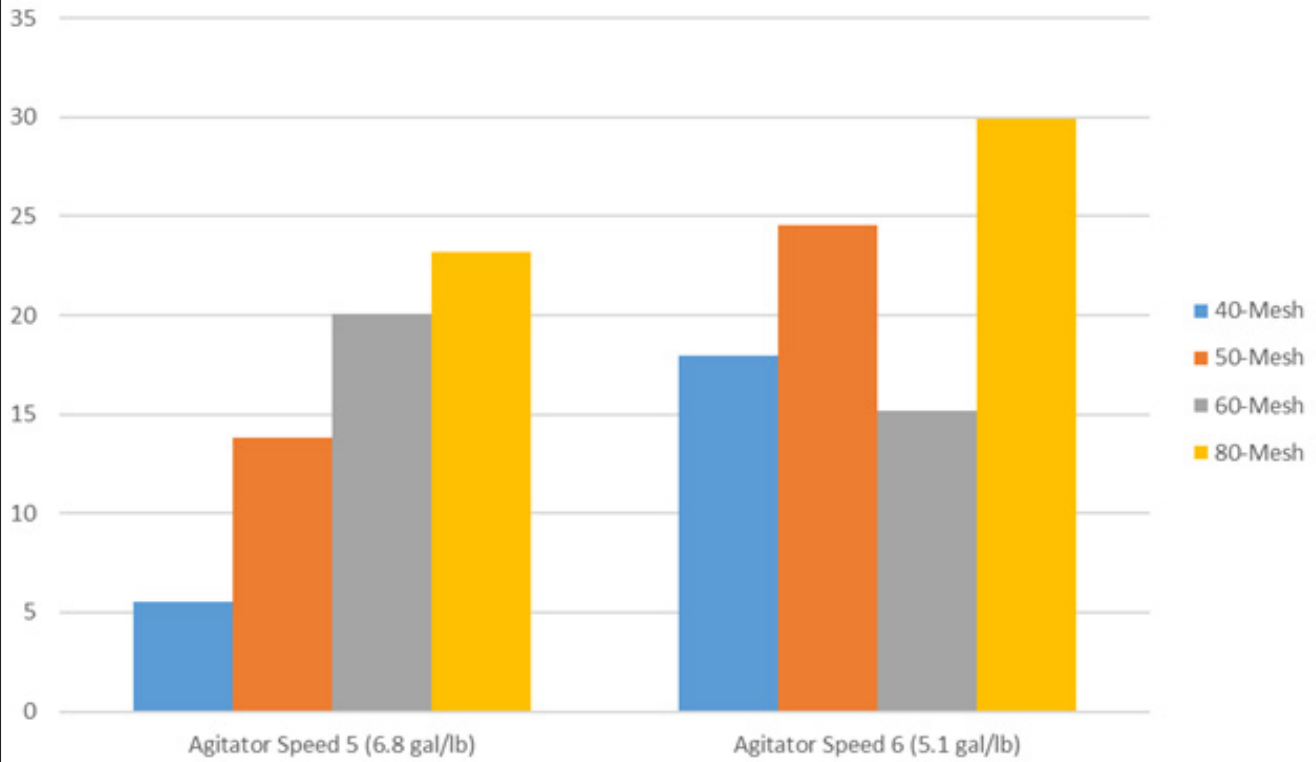
As the graphs indicate, sediment load in extract will increase as the extract is concentrated. The “Fluid Ounces of Sediment per pound of Compost used” graph equalizes all the screen sizes in terms of extract concentration compared to the sediment load. The results indicate that as concentration is increased, the sediment load of the 80-mesh screen remains relatively consistent.

Biological Extraction Comparison

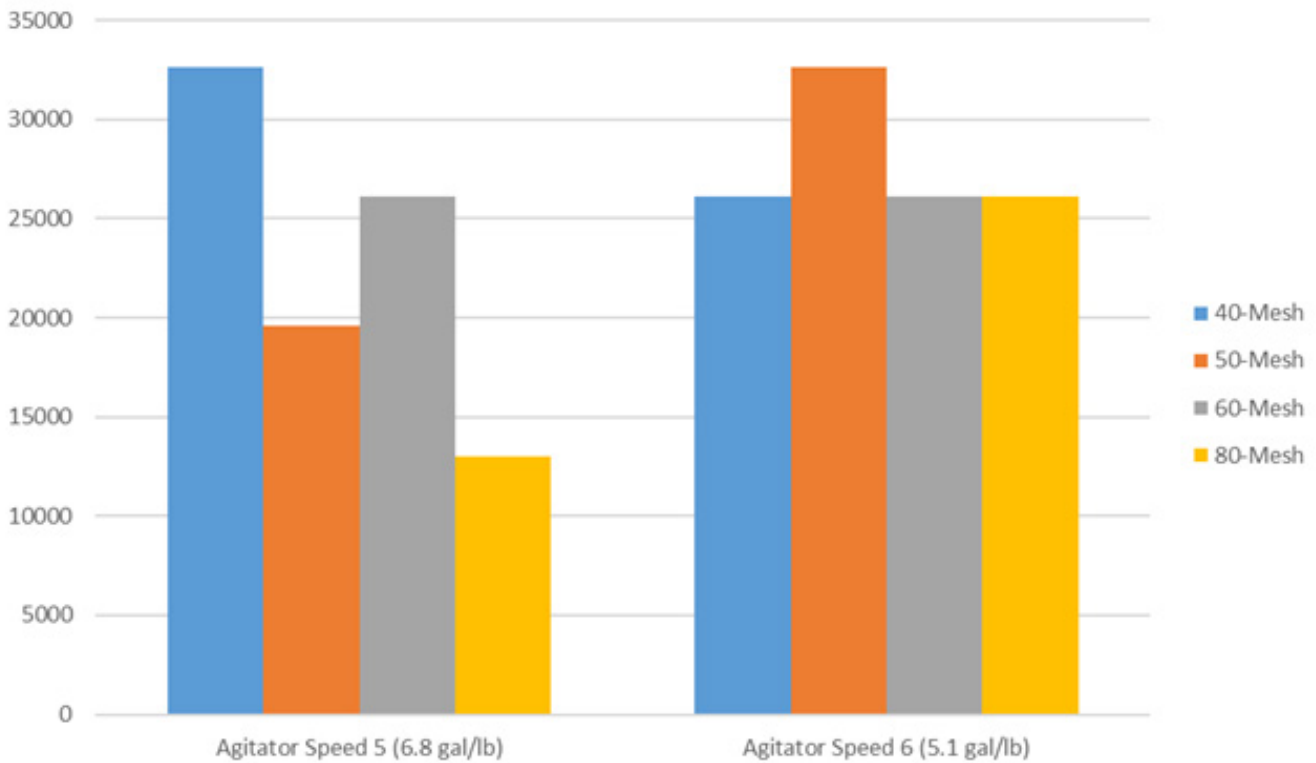


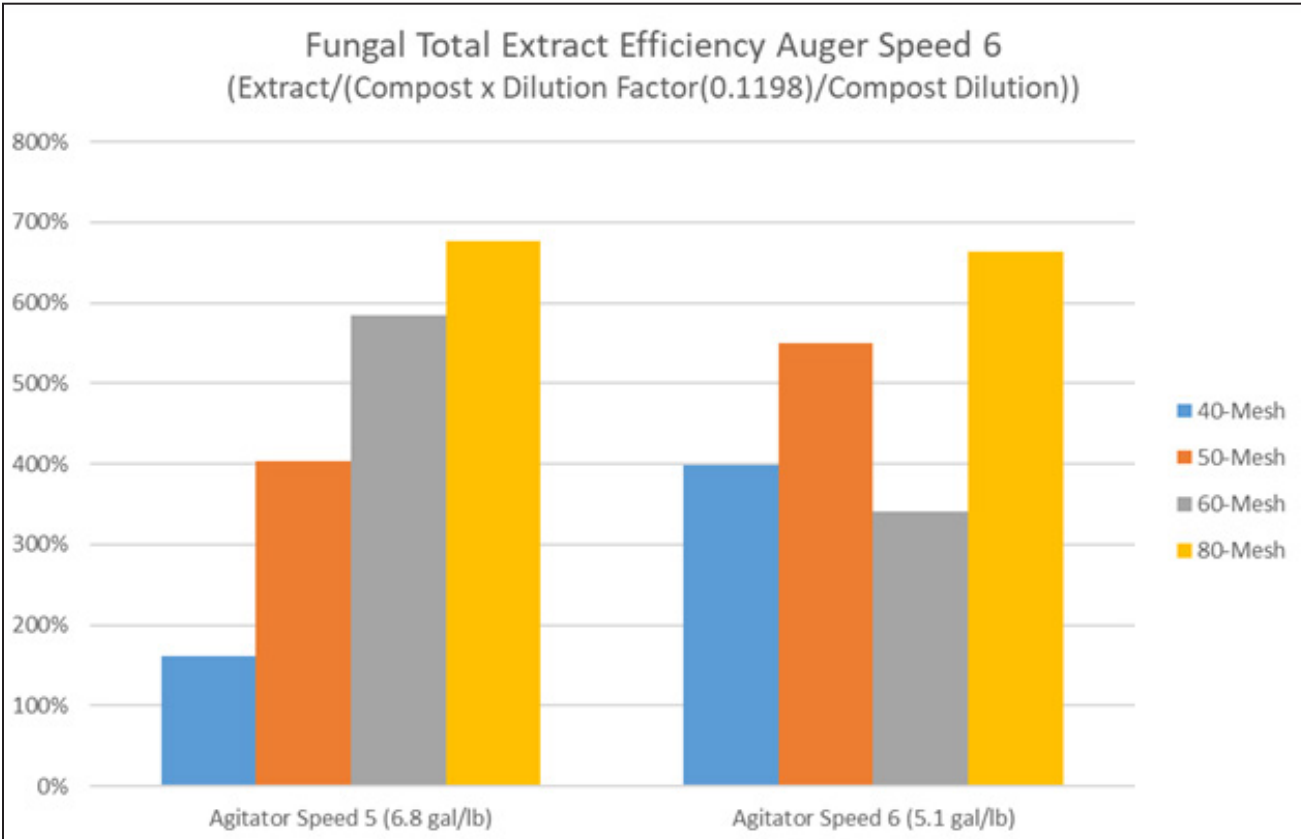
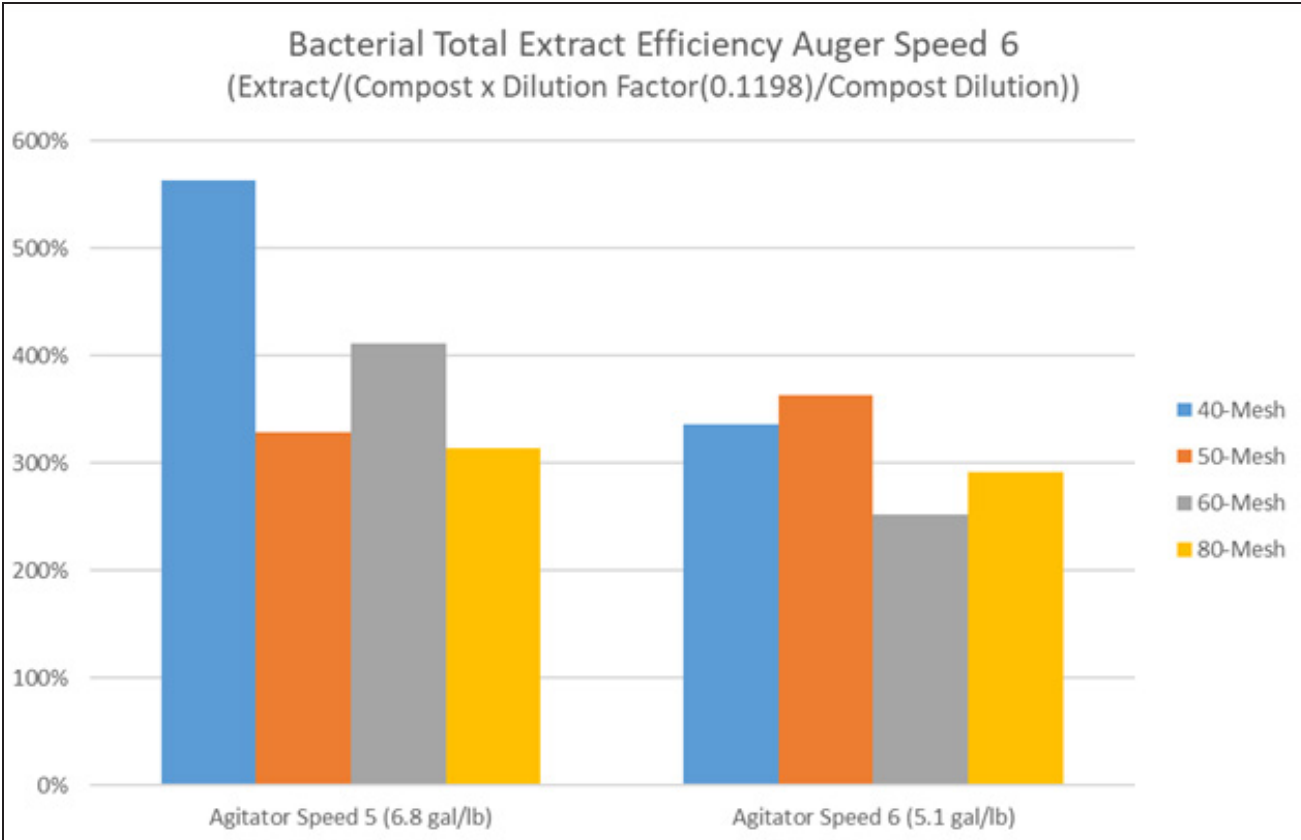


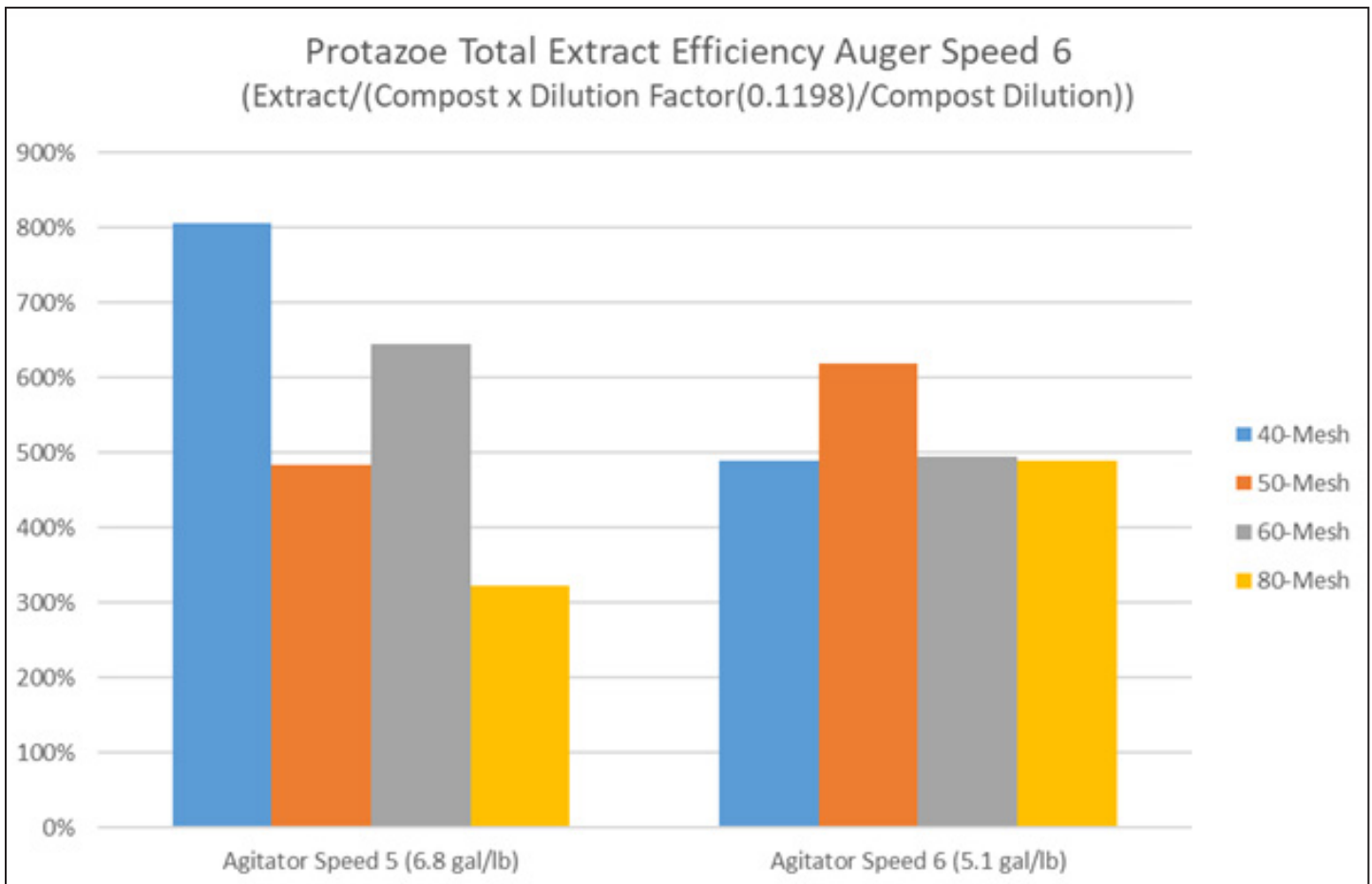
Fungal Biomass (ug/g) of Extract Auger Speed 6



Total Protazoe (number/g) of Extract Auger Speed 6







Biology Testing Discussion

We conclude that the 80-Mesh screen has the highest extraction efficiency for both bacteria and protozoa and the lowest for fungi when comparing the waste material to the starting material. However, the actual concentration of each organism group indicates that the extract made with 80-Mesh had the highest concentration of fungi. We hypothesize that this occurs because compost has more time to breakdown and separate the biology from the sediment particles in the finer screens, as compared to washing the sediment particles through the larger mesh screen with the biology still attached. This hypothesis explains the higher amounts of organisms found in the waste material, as they were separated from the compost particles and thus became more visible when analyzed under the SFW microscope assessment.

As shown by the Total Extract Efficiency graphs, more biology was extracted in the final product than the starting compost was originally determined to contain (based on the dilution factor). This inconsistency can be explained by the fact that the Bio-Extractor extracts biology from compost more effectively than the extraction process used in the microscopy assessment protocol (shake method).

Using this data and the subsequent results, we conclude that the 80-Mesh screen provides the least sediment load and equal or better extraction efficiency for biology with all 4 main organism groups (Nematodes were found in all the extract samples, however the data was too inconsistent to graph due to the high variance).