

## Centrifuge Studies at Tom's Creek Maple

11/16/2021

### Centrifuge/pectin summary

1. Holden was able to pellet pectin from a 2ml walnut sap sample (batch processing with a bench lab centrifuge )

1,000xg yielded 0.20mg

8,000xg yielded 0.10mg

xg and retention time factor into separation for a given liquid viscosity

2. Cream separator 11,000rpm, (because of the mechanism an equivalent xg could not be determined) yielded a visible separation at high concentrations of pectin (\$300).

Extreme raw power (ERP) centrifuge 6,000 rpm or approximately 3,900xg, with a cost of \$1,600  
The question is: will it separate pectin from low concentration walnut sap? Continuous flow centrifuge – what would be needed to process walnut sap

### ERP basket measurements(inches) and calculations

5.482 ID

7.482 OD

Height 2.348

Radius ID 2.471

Radius OD 3.741

OD volume – 103.23 in sq

ID volume – 55.42 in sq

Basket volume – 47.81 in sq

- 0.91

1.69 L total

0.78 L working volume on the bench (the amount of sap that can be held before spillover) With feed rate this can allow us to calculate retention time in the centrifuge.

Experiment #1 – feed in sap until spillover

650 ml walnut sap added to reach observed with the top off.

Continued spinning 4 minutes

Pretty close to the theoretical 780ml calculated above

Experiment #2 – continuous flow feed, lid on

650 ml – spillover

500ml – in 25 seconds

500ml in 45 seconds

Collected samples of raw sap and effluent centrifuged sap for further analysis. If the centrifuged sap contains less pectin than the raw sap, then a separation occurred

Experiment #3 – walnut sap concentration

Raw sap was boiled bringing the brix up from 1.2 to 15.3 degrees brix. It was hoped this would yield enough pectin for lab analysis.

Experiment #4v- Maple syrup spin

End of season 900ml unfiltered maple syrup was spun for 5 minutes. Raw syrup and filtered syrup were left to settle and niter in the bowl was observed. Subsequent observation showed that the spun syrup had significantly less settled solids

