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# BIO *technology*

## Cannabis Oil Vaporizers

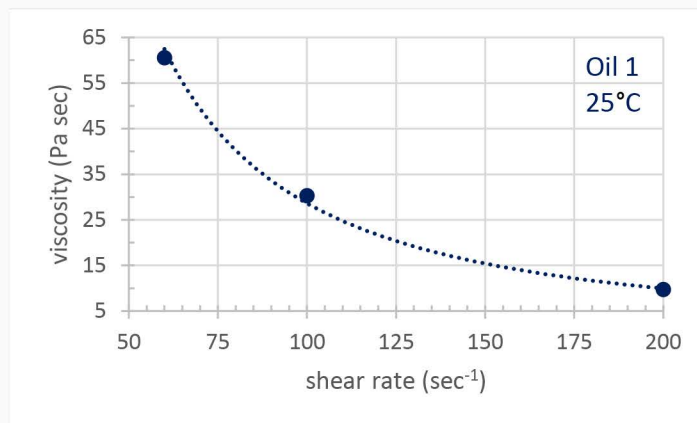
Apart from medical and therapeutical properties, Cannabis is mostly known for its recreative use. To avoid the production of smoke with its harmful toxins, vaporizers or vapor pens were designed within the last years. For this reason, knowing detailed information about Cannabis oil viscosity is an important ally for manufacturing such devices. Cannabis has many chemical components, which vaporize at different temperatures. For this reason it is necessary to understand the viscous behavior of the applied oil at different temperatures.

Such study can be performed using **m-VROC** and **hts-VROC** viscometers.

Since vapor pens performance depends on the transport of Cannabis oil from a cartridge to an atomizer, understanding the viscosity behavior of the oil at different shear rate is very important.

### Experiment

Viscosity study was performed for two different Cannabis oils in a  $60 - 200 \text{ s}^{-1}$  shear rate range and  $25 - 45 \text{ }^\circ\text{C}$  temperature range.



**Figure 1:** Shear rate dependence of Viscosity for Oil 1 at  $25 \text{ }^\circ\text{C}$

As it is shown in Figure 1, viscosity changes with shear rate. Which reveals that the applied oil has a Non-Newtonian behavior. Such behavior can significantly affect the performance of the device.

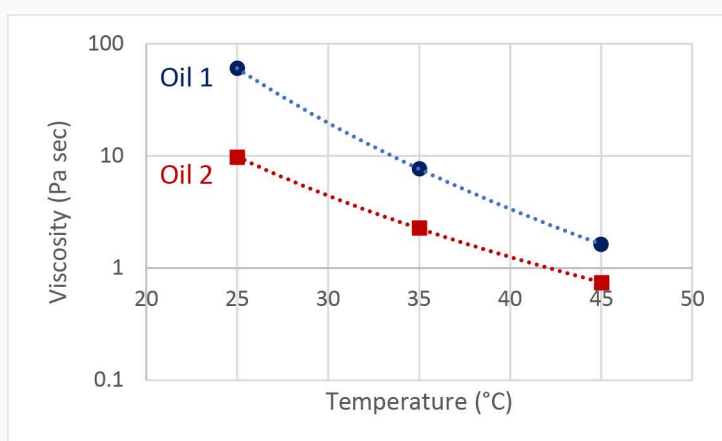




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**Figure 2:** Temperature dependence of Viscosity for Oil 1 and 2

Obtained data (shown in Figure 2) are fit with Arrhenius Equation. From Figure 2 it is possible to observe that the viscosity for both oils dropped by one to two orders of magnitude within a relatively narrow temperature range.



### Conclusion

Viscosity behavior at several shear rates is important to understand the transport mechanism from the cartridge to the atomizer to guarantee a high performance of the vapor pen. Cannabis Oils which have a "bad" viscosity behavior within such a small temperature range are not suitable to introduce into the vapor pen. This can result in smoke formation, which is not the purpose of vapor pens.

