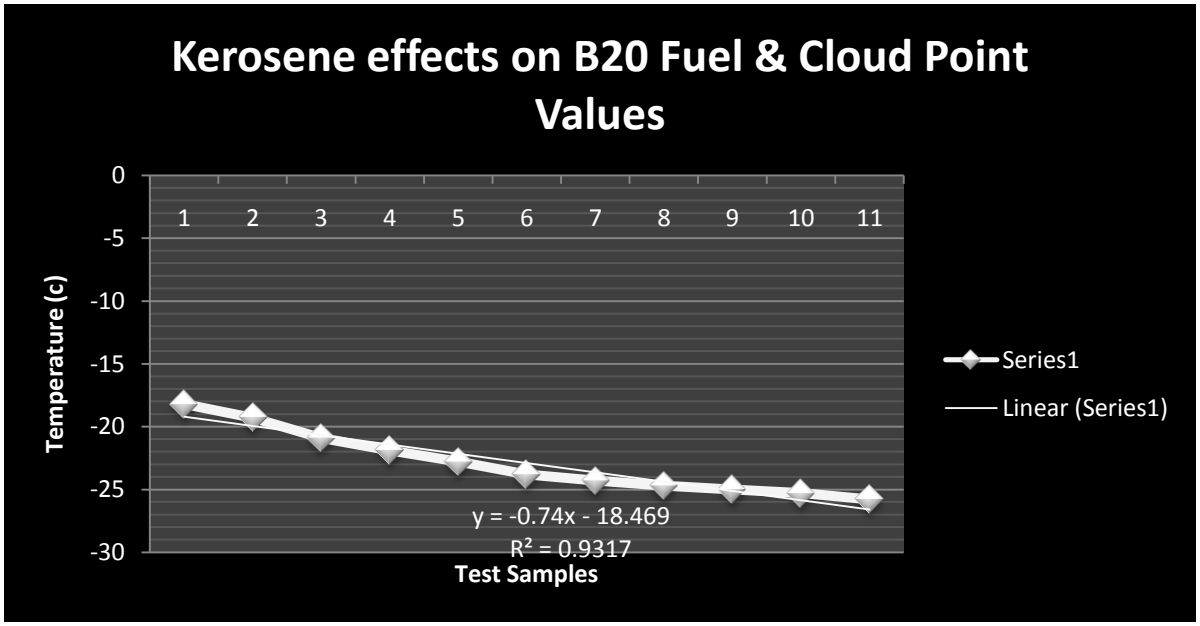
Experiment I

B20 Bio-Fuel Cloud Point Experiment w/Kerosene

Purpose: **The purpose of this experiment is to gather data on the effect of introducing increasing amounts of kerosene to a B20 Bio-Fuel mixture and its effects on depressing its cold temperature properties.**

Procedure: **A series of 200 ml mixtures of Soy Based B20 Bio-Fuel solution will be prepped. In each preparation the amount of kerosene added will increase by 20 ml, with the initial test #1 starting with 0 ml of kerosene, in order to obtain a baseline.**
For example, Test 2 solution will contain 20 ml of Kerosene added to 200 ml of Bio-Fuel solution, while Test 3 solution will contain 40 ml, etc., etc.. A cloud point analysis will be run on each solution with data being recorded and graphed.

Test #	Vol. Kerosene Added (ml)	% Kerosene (v/v)	Cloud Point Result
1	**0**	**0**	**-18.2**
2	20	9.09	**-19.3**
3	40	16.67	**-20.9**
4	60	23.08	**-21.9**
5	80	28.57	**-22.8**
6	100	33.33	**-23.8**
7	120	37.50	**-24.3**
8	140	41.18	**-24.7**
9	160	44.44	**-25.0**
10	180	47.37	**-25.3**
11	200	50.00	**-25.8**



Experiment II

Cloud Point Experiment (Kerosene Addition)

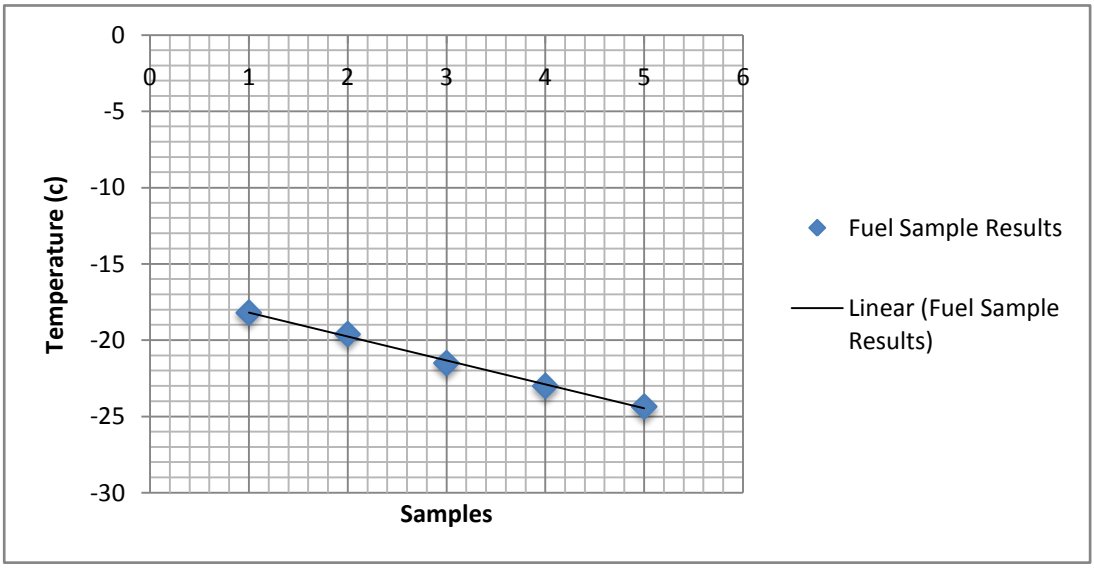
Purpose: To determine the effects of the addition of Kerosene at varying ratios on the cloud points of Bio-Fuels.

Procedure: A volume of 200 ml of solution will be prepared following the mixing ratio scheme below. The sample will then be mixed for a minimum of 10 minutes, at which time a sample will be drawn from the 200 ml stock for cloud point analysis. A second sample will also be drawn from the 200 ml stock solution for analysis for the purpose of accuracy & precision, and the and the average of the two results will be taken.

Mixing Ratio Scheme

Test #	B100(%)	#2 Diesel(%)	Kerosene(%)	Cloud Point Result	2nd	Average
1	20	80	0	-18.3	-18.1	-18.2
2	20	60	20	-19.6	-19.6	-19.6
3	20	40	40	-21.5	-21.5	-21.5
4	20	20	60	-23.0	-23.0	-23.0
5	20	0	80	-24.3	-24.4	-24.35

Graphical representation of sample results:



Conclusion

Based on the data obtained from both experiments it can be concluded that the use of kerosene has a significant effect on the depression of cloud point values of B20 bio-fuels. These effects are linear in nature, as can be seen with experiment II, when manipulating the ratio of components. As for experiment I, which mimics what is likely to be encountered in the field shows that the use of kerosene, again has a significant impact on the depression of B20 cloud point values up to a certain percentage. Again referring to experiment I, at approximately 37.5% by volume of Kerosene relative to total volume, the effects of the use of kerosene for depression purposes is significantly reduced. [1]According to the "Society of Automotive Engineers (SAE), an accreditation organization for automotive fuels and other products, the use of kerosene as a cloud point depressant have been used for many years and historically dilutions with kerosene have been as high as 30%-40%. SAE also cautions that the use of kerosene "may negatively impact the fuel's energy content, cetane number, lubricity, flash point, and density". In conclusion, although the use of kerosene may improve cloud point results as seen by the data represented above, care should be taken in its utilization due to many of the negative influences of its use, as explained by SAE International.

Reference

1) http://www.sae.org/technical/papers/2005-01-3898