CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)
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Project Number
J0617

Project Title
Which Oil Makes the Best Ferrofluid?

Abstract

Objectives/Goals
The incentive of this project is to discover the oil that makes the most effective ferrofluid, and the reason behind its favorable quality.

Methods/Materials
I used 9 oils and made 3 different ferrofluids with each oil. Each oil went through four trials. The first trial was testing the quality of the Ferrofluid by putting a magnet under the petri dish to measure the hump produced by the surface tension of the magnetic field from the ferrofluid and the magnet. The second trial was measuring the height of the spikes. The third test was testing the viscosity of the ferrofluid. The fourth and final trial when measuring the amount of ferrofluid attracted by the magnet.

Results
The oil that made the ferrofluid with the best properties was grapeseed oil. Although peanut oil is the oil with the lowest viscosity, it's only made up of 32% (PUFA), polyunsaturated fatty acid while grape seed oil is made up of 70% (PUFA). Oleic acid is an acid found in PUFA and that acid is what improves the quality of ferrofluid. Oleic acid is used as a surfactant to prevent clumping in ferrofluid. The oil with the lowest quality was coconut oil. The reason behind its poor performance was because coconut oil is made up of 1.8% PUFAil

Conclusions/Discussion
In conclusion, the oil that makes the most favorable ferrofluid is grapeseed oil because it contains a high percentage of polyunsaturated fatty acid. The future work of this project will be directed on making nanoparticle suits containing ferrofluid for military soldiers. It will be able to stiffen to provide splints for broken bones so they have a higher chance of survival.

Summary Statement
The incentive of this project is to discover the oil that makes the most effective ferrofluid, and the reason behind its favorable quality.

Help Received
N/A