



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Corey J. Willis	Project Number J0533
Project Title The Isolation and Characterization of Lavender Essential Oils	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals NMR (H-1; C-13) spectroscopy was used to characterize the essential oils isolated by steam distillation from lavender Grosso, Provence, Angustifolia, and a blend, to determine if there are any chemical markers in the pure oils so that blends can be made into consistent bulk material .</p> <p>Methods/Materials Unique chemical markers can be identified in essential oils by analytical techniques and used to characterize blends of oils. The essential oils from Lavendula grosso, provence, and angustifolia were isolated by steam distillation. NMR spectroscopy (H-1 and C-13 NMR) were used to analyze the essential oils and the commercial oil blend of the oils. NMR chemical a shift differences and peak heights were compared between each sample.</p> <p>Results The C-13 and H-1 NMR spectra of the pure essential oils from L. angustipholia, provence, and grosso were very similar. There were a few differences however. The H-1 NMR spectrum of L. angustipholia and grosso had a unique peak centered at .85 ppm that was present in only trace amounts in the spectrum of L. provence. The H-1 NMR spectrum of L. provence had a unique peak at 1.64 ppm that was present in only trace amounts in the spectrum of L. angustipholia and grosso. There were more pronounced differences in the ratio seen in each of certain peaks that were present in each of the samples. There were several peaks observed in the C-13 NMR spectra of L. grosso. There were a number of peaks that were not present in the spectra of L. angustipholia and provence.</p> <p>Conclusions/Discussion The NMR results provide that the blend contains all three essential oils. It is more difficult to determine the relative amounts of each essential oil in the mixture. The data of peak height ratios suggest that L. angustifolia is a major component of the mixture.</p>	
Summary Statement NMR (H-1; C-13) spectroscopy was used to characterize the essential oils isolated by steam distillation from Lavendula grosso, provence, angustifolia, and a blend, to determine if there are any chemical markers in the pure oils.	
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