

Chemistry Seminar

“Determination of Vegetable Oil Residues Found in Fire Debris”

and

“Adapting Dental Stone Shoeprint Casting Techniques to Snowy Conditions”

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Wednesday, Sept. 29
12:00 p.m.
Wick Science Building 122

Abstract:

The bulk of past arson research has focused mainly upon petroleum products such as gasoline and kerosene. This research has become incredibly important to the forensic community but there is still a void of information about other ignitable liquids, such as vegetable oils. This information will be useful to determine if a fire debris sample contains any vegetable oil residues (VOR). From this information it is possible to determine if the fire could have been caused by a spontaneous combustion, or if it was ignited through an external heat source. This is done by comparing the chromatograms and spectra of the transesterified vegetable oil residue with fatty acid methyl ester (FAME) standards. By doing this it is possible to obtain a relative quantity of polyunsaturated fatty acids (PUFA) inside of the original liquid, which corresponds directly with its tendency to autoignite.

Abstract:

Casting shoeprints in snow is quite difficult due to its unique and ever changing texture. The current procedure of melting down sulfur, procures very good detail, but is inefficient for larger casts. Whereas the standard procedure for casting in soil, a mixture of water and a gypsum powder, is very easy to use but doesn't produce as much detail under these conditions. The detail of a gypsum cast can be greatly increased three separate ways; adding a chemical to the mix before casting, using a pre-casting material, and placing a drying agent on top of the cast after it is poured. This research project was designed to adjust each of these three variables, to obtain an optimized procedure for casting shoeprints in snow.