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Advanced analytical techniques for the extraction and characterization of plant-derived essential oils by gas chromatography with mass spectrometry

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In recent years, essential oils have a growing interest with positive health effects of their novel characteristics like antibacterial, antifungal and antioxidant activities. For the extraction of plant-derived essential oils, there is the need of advanced analytical techniques and innovative methodologies. An exhaustive study of hydro-distillation, supercritical fluid extraction, ultrasonic & microwave assisted extractions, solid phase micro-extraction, pressurized liquid extraction, pressurized hot water extraction, liquid-liquid extraction, liquid phase micro-extraction, matrix solid-phase dispersion and gas chromatography (one and two dimensional) hyphenated with mass spectrometry for the extraction through various plant species and analysis of essential oils have been provided. Essential oils are composed of mainly terpenes and terpenoids with lower molecular weight aromatic and aliphatic constituents that are particularly important for public health.

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Conversion of waste plastic into liquid hydrocarbon fuel

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Waste Plastic is a huge problem in USA and around the world. This is global problem and because of various inventions in the 20th century, plastics are everywhere. Society has found ample ways to use plastics. But users are less adept at managing the material when they are finished with it—often after only one use. The volume of plastics being produced, used, generated, and discarded is greater than ever before. Plastics therefore require increasing effort and ingenuity in its management. Annually, of the 120 billion pounds of plastics produced in the United States, only about 6% or 4.8 billion pounds are recycled. Inspite of all the news on plastic ban, plastic production is increasing. Waste Technologies LLC (WTL) has the solution at its disposal. This technology can produce approximately 1.3 liter of "WTL fuel" from one kilogram of plastic waste. The exact yield depends on the type of plastic, and the grade of WTL fuel desired. Typically, the process produces a residue of less than 5% of the weight of the plastic waste. This residue is rich in carbon and may be an environmentally superior substitute for coal with a higher BTU value. The WTL technology is able to cater to a wide range of diverse applications, including but not limited to fuel, gas and electrical generation. NSR's / WTL patented technology, in conjunction with WTL technology and know-how, is a simple and economically viable process to decompose the hydrocarbon polymers of waste plastic into the shorter chain hydrocarbons of liquid fuel. WTL believes that it can convert approximately one tonne of plastic into about 300 gallons of fuel at a cost of about $0.75-$1.00 per gallon and produces 4,205 ft3 (CFT) of light gas (C1-C4) byproduct when developed to commercial size. WTL's refining process is uncomplicated and promises to be very competitive with large crude oil installations. In financial projections WTL uses $30/bbl. ($0.71 per gallon) for preprocessing and refining costs. Other plastic recycling technologies generally have a very narrow band of plastics they can use. Nearly all recycling is done with plastic designations 1 or 2 while designations 3 through 7 are virtually untapped (over 70% of all plastic fall within these categories). A combination of economic and technological factors account for this situation. The advantage of WTL technology is that it can produce a profitable product from material that society generally pays to throw away. It is this low cost feedstock that is the key advantage.

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