

NANO MODIFIED FOOD STARCH and the THERAPEUTIC USE OF ESSENTIAL OILS and OIL BLENDS

IEIA Criteria Document: 01-1113-2009

Committee for an Assessment of the Health and Safety of
Nanotechnology

Division of Field and Applied Research

INTERNATIONAL ENVIRONMENTAL INTELLIGENCE AGENCY
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PREFACE

Today, many of our nation's most creative scientists and engineers are finding new ways to use nanotechnology to improve the world in which we live. These researchers envision a world in which new materials, designed at the atomic and molecular level, provide realistic, cost-effective methods for harnessing renewable energy sources and keeping our environment clean. They are doctors detecting disease at its earliest stages and treating illnesses such as cancer, heart disease, and diabetes with more effective and safer medicines. They picture new technologies for protecting both our military forces and civilians from conventional, biological, and chemical weapons. Although there are many research challenges ahead, nanotechnology already is producing a wide range of beneficial materials and pointing to breakthroughs in many fields. It has opened scientific inquiry to the level of molecules – and a world of new opportunities.

National Nanotechnology Coordination Office
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The above paragraph is a reprint verbatim from the US Government's pamphlet entitled, "**Nanotechnology: Big Things from a Tiny World.**" The National Nanotechnology Coordination Office represents 26 departments and agencies of the U.S. Government participate in the National Nanotechnology Initiative (NNI), which provides coordination to research and development efforts funded by the government.

The International Environmental Intelligence Agency (IEIA) is a private not for profit organization approved with charter foundations as a separate division of the World Life Research Organization, Colton, CA under the former Executive Directorship of Dr. Bruce W. Halstead, MD. IEIA primary purpose is to recognize, evaluate, control and develop technology/programs that correct or reduce the toxicological risk factors for the health and safety of humans, plants, animals and the environment from exposure to any toxic substance. This criteria document has been written to expand the information and knowledge about nano modified food starch and its uses in medicine, food industry and other areas. IEIA has recognized the toxicological risk factors that may be associated from exposure to nano modified food starch that may be implemented into technologies that affect the land, sea and/or air of our planet. It is through the efforts of environmental intelligence our planet should have a healthy and safe existence.

IEIA will develop future criteria documents, sponsor training programs and product certification programs to address exposure to a biological, chemical, genetically modified, biotechnology and nanotechnology, variable energy sources or man-made materials. The environmental stress factors from exposure to these materials may cause harm, genetic mutation, hybridization, adaptation, disease, or death to any and all life forms which may have been exposed to an acceptable level or body burden factor. In many instances, IEIA may be at the forefront of any other scientific or engineering bodies, as they attempt to study the problem, while IEIA has already recognized the problem and processed to the appropriate corrective action that addresses the best quality of life to all exposed without doing additional harm.

IEIA's original charter is in Latin, "Terra – Mare- Et – Aer – Defendo", which translates into, "Defend the Land, Sea and Air." By defending the land, sea and air IEIA brings forth the dimension of environmental intelligence that sees the problem, correction and implementation in many cases prior to any other agency, group, organization, commercial entity, or government. It is IEIA's goal to guide and bring forth the research, knowledge and scientific or engineering data that establishes a comprehensive scholarly wisdom of TRUTH.

Inspector General, IEIA
November 13, 2009

NANO MODIFIED FOOD STARCH, NANO DELIVERY SYSTEM VACCINES, POLYSTYRENE, STYROFOAM® AND THE THERAPUTIC USE OF ESSENTIAL OILS AND OIL BLENDS

IEIA CRITERIA DOCUMENT 01-1113-2009

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Nano Modified Food Starch, Nano Delivery System Vaccines, Polystyrene, Styrofoam® and the Therapeutic Use of Essential Oils and Oil Blends

by Dr. Hildegarde Staninger, RIET-1
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© Friday, November 13, 2009

INTRODUCTION

Quoting from Dow's Building Solutions Media Resources web site, "There's No Such thing as a Styrofoam™ cup." Styrofoam™ Brand Foam is a registered trademark of the Dow Chemical Company and has been a valued asset of Dow Chemical for more than 60 years.¹

The Styrofoam™ Brand name is often misused as a generic term for disposable foam products such as coffee cups, cooler and packaging materials. These materials, however, are made from expanded polystyrene (also known as EPS) and do not have the insulation value, compressive strength or moisture-resistant properties of Styrofoam™ Brand Extruded Polystyrene Insulation products as represented by the Dow Chemical Company's Registered Trademarked products.

Over the last twenty years a new breed of products have been developed by academia, agriculture, governmental agencies, pharmaceutical and industry by incorporating seeded-emulsion polymerization of styrene with waterborne polyurethane stabilizers^{2, 3, 4, 5, 6} in many new technologies such as:

1. Microbeads, nanospheres, pebbles, liquid viral crystals, and gems in biological pesticide technology, nano drug delivery systems, ocular gene therapy and chitosan nanoparticles as gene therapy vector via gastrointestinal mucosa.
2. Mannosylated chitosan nanoparticle-based cytokine gene therapy for cancer treatment, gene transfer using self-assembled ternary complexes of cationic magnetic nanoparticles, plasmid DNA and cell-penetrating Tat peptides.
3. Nano bio sensors for intelligent food packaging, pH dependent silicon nanospheres and nano tubes, and reinforcement of folate absorption using nano technology.

History of Polyurethane, Styrene, Waterborne Polyurethane, Konjac Glucomannan and Modified Food Starch

Polyurethane

Polyurethane (PUR) is any polymer consisting of a chain of organic units joined by urethane (carbamate) links. Polyurethane polymers are formed through step-growth polymerization by reacting a monomer containing at least two hydroxyl (alcohol) groups in the presence of a catalyst.

The pioneering work on polyurethane polymers was conducted by Otto Bayer and his coworkers in 1937 at the laboratories of I.G. Farben in Leverkusen, Germany.⁷ They recognized that using the polyaddition principle to produce polyurethanes from liquid diisocyanates and liquid polyether or polyester diols seemed to point to special opportunities, especially when compared to already existing plastics that were made by polymerizing olefins, or by polycondensation. New Monomer combination also circumvented existing patents obtained by Wallace Carothers on polyesters.⁸ Initially, work focused on the production of fibres and flexible foams. With development constrained by World War II (when PUs were applied on a limited scale as aircraft coating⁹, was not until 1952 that polyisocyanates became commercially available. Commercial production of flexible polyurethane foam began in 1954, based on toluene diisocyanate (TDI) and polyester polyols. The invention of these foams (initially called imitation Swiss cheese by the inventors) was thanks to water accidentally introduced in the reaction mix. These materials were also used to produce rigid foams, gum rubber, and elastomers. Linear fibres were produced from hexamethylene diisocyanate (HDI) and 1,4-butanediol (BDO).

The first commercially available polyether polyol, poly (tetramethylene ether) glycol, was introduced by DuPont in 1956 by polymerizing tetrahydrofuran. Less expensive polyalkylene glycols were introduced by BASF and Dow Chemical the following year, 1957. These polyether polyols offered technical and commercial advantages such as low cost, ease of handling, and better hydrolytic stability; and quickly supplanted polyester polyols in the manufacture of polyurethane goods. Other PU pioneers were Union Carbide and the Mobay corporation, a U.S. Monsanto/Bayer joint venture. In 1960 more than 45,000 tons of flexible polyurethane foams were produced. As the decade progressed, the availability of chlorofluoralkane blowing agents, inexpensive polyester polyols, and methylene diphenyl diisocyanate (MDI) heralded the development and use of polyurethane rigid foams high performance insulation materials. Rigid foams based on polymeric MDI (PMDI) offered better thermal stability and combustion characteristics than those based on TDI. In 1967 urethane modified polyisocyanurate rigid foams were introduced, offering even better thermal stability and flammability resistance to low-density insulation products. Also during the 1960's, automotive interior safety components such as instrument and door panels were produced by back-filling thermoplastic skins with semi-rigid foam.

In 1969, Bayer AG exhibited an all plastic car in Dusseldorf, Germany. The plastic car involved Polyurethane Reaction Injection Molding technology, which allowed for parts to be molded. In 1983, the first plastic-body automobile was built in the United States, the Pontiac Fiero. In the early 1990's, because of these simple volatile chemicals yielding an impact on ozone depletion, the Montreal Protocol led to the greatly reduced use of many chlorine-containing blowing agents, such as trichlorofluoromethane (CFC-11). Other haloalkanes, such as hydrochlorofluorocarbon 1,1-dichloro-1-fluoroethane ((HCFC-141b), were used as interim replacements until their phase out under the IPPC directive on greenhouse gases in 1994. Between the 1990's to present day the advent of nano technology allowed these same compounds to be utilized in the manufacture of nanospheres, nano carbon tubes, single walled nano tubes, multiwalled nano tubes, nano belts, claws, arm chairs, and hooks to name just a few. Along with the time released or pH

controlled release of specific nano delivery systems to be utilized in the pharmaceutical and medicine under the term “nanomedicine” and “gene delivery systems.” No matter, what it is called a plastic polyurethane polymer is still a hazardous material.^{10, 11} (See Table 1)

Polyurethane formulations cover an extremely wide range of stiffness, hardness, and densities. These materials include:

- Low-density flexible foam used in upholstery, bedding, and automotive truck seating.
- Low-density rigid foam used for thermal insulation and RTM cores.
- Soft solid elastomers used for gel pads and print roller.
- Hard solid plastics used as electronic instrument bezels and structural parts.

Polyurethane products are often called “urethanes.” They should not be confused with specific substance urethane, also known as ethyl carbamate. Polyurethanes are neither produced from ethyl carbamate, nor do they contain it.¹² Pesticides that are long lasting and cause acetyl cholinesterase inhibition are termed carbamates and organophosphates. They are usually composed of methylcarbamates or ethylcarbamate.¹³

Styrene

Styrene is primarily used in the production of polystyrene plastics and resins. Acute (short-term) exposure to styrene in humans results in mucous membrane and eye irritation, and gastrointestinal effects. Chronic (long-term) exposure to styrene in humans results in effects on the central nervous system (CNS), such as headache, fatigue, weakness, and depression, CSN dysfunction, hearing loss, and peripheral neuropathy. Human studies are inconclusive on the reproductive and developmental effects of styrene; several studies did not report an increase in developmental effects in women who worked in the plastics industry, while an increased frequency of spontaneous abortions and decreased frequency of births were reported in another study. Several epidemiologic studies suggest there may be an association between styrene exposure and an increased risk of leukemia and lymphoma. However, the evidence is inconclusive due to confounding factors. EPA has not given a formal carcinogen classification to styrene.^{14, 15, 16}

Uses

- Styrene is used predominately in the production of polystyrene plastics and resins. Styrene is also used as an intermediate in the synthesis of materials used for ion exchange resins and to produce copolymers.

Sources and Potential Exposure

- Indoor air is the principal route of styrene exposure for the general population. Average indoor air levels of styrene are in the range of 1 to 9 $\mu\text{g}/\text{m}^3$, attributable to emissions from building materials, consumer products, and tobacco smoke.
- Ambient air in urban locations contains styrene at average concentrations of 0.29 to 3.8 $\mu\text{g}/\text{m}^3$, while styrene in rural and suburban air has been measured at 0.28 to 0.34 $\mu\text{g}/\text{m}^3$.
- Occupational exposure to styrene occurs in the reinforced plastics industry and polystyrene factories.

Assessing Personal Exposure

- Laboratory tests can determine styrene by measuring the breakdown products in the urine. However, these tests are only useful for detecting very recent exposures.

Health Hazard Information

Acute Effects

- Acute exposure to styrene in humans results in respiratory effects, such as mucous membrane irritation, eye irritation, and gastrointestinal effects.
- Tests involving acute exposure of rats and mice have shown styrene to have low to moderate toxicity by inhalation and oral exposure.

Chronic Effects (Noncancerous)

- Chronic exposure to styrene in humans results in effects on the CNS, with symptoms such as headache, fatigue, weakness, depression, CNS dysfunction (reaction time, memory, visuomotor speed and accuracy, intellectual function), and hearing loss, peripheral neuropathy, minor effects on some kidney enzyme functions and on the blood.
- Animal studies have reported effects on the CNS, liver, kidney, and eye and nasal irritation from inhalation exposure to styrene.
- Liver, blood, kidney, and stomach effects have been observed in animals following chronic oral exposure.
- The Reference Concentration (RfC) for styrene is 1 milligram per cubic meter (mg/m^3) based on CNS effects in occupationally exposed workers. The RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious noncancerous effects during a lifetime. It is not a direct estimator of risk but rather a reference point to gauge the potential effects. At exposures increasingly greater than the RfC, the potential for adverse health effects increases. Lifetime exposure above the RfC does not imply that an adverse health effect would necessarily occur.
- EPA has medium confidence in the study on which the RfC was based because, although the study documents concentration-response relationships of CNS effects in a relatively small worker population, the results are consistent with a number of other studies showing central effects in chronically exposed worker populations; medium to high confidence in the database because the chronic laboratory animal studies addressing noncancerous endpoints were not available, although a number of human exposure studies support the choice of critical effect; and, consequently, medium confidence in the RfC.
- The Reference Dose (RfD) for styrene is 0.2 milligrams per kilogram body weight per day ($\text{mg}/\text{kg}/\text{d}$) based on red blood cell and liver effects in dogs.
- EPA has medium confidence in the principal study on which the RfD was based because it was well done and the effect levels seem reasonable, but the small number of animals/sex/dose prevents a higher confidence; medium confidence in the

database because it offers strong support, but lacks a bona fide full-term chronic study; and, consequently, medium confidence in the RfD.

Reproductive/Developmental Effects

- Human studies have not reported an increase in developmental effects in women who worked in the plastics industry, while an increased frequency of spontaneous abortions and a decreased frequency of births were reported in a study on the reproductive effects of styrene in humans. However, these studies are not conclusive, due to the lack of exposure data and confounding factors.
- Animal studies have not reported developmental or reproductive effects from inhalation exposure to styrene.
- Lung tumors have been observed in the offspring of orally exposed mice.

Cancer Risk

- Several epidemiologic studies suggest that there may be an association between styrene exposure and an increased risk of leukemia and lymphoma. However, the evidence is inconclusive due to multiple chemical exposures and inadequate information on the levels and duration of exposure.
- Animal cancer studies have produced variable results and provide limited evidence for carcinogenicity.
- IARC has classified styrene as a Group 2B, possibly carcinogenic to humans.
- Styrene oxide is a reactive metabolite of styrene and shows positive carcinogenic results in oral exposure bioassays. Styrene oxide has been detected in workers exposed to styrene. IARC has classified this metabolite as a Group 2A, probable human carcinogen.
- EPA does not have a carcinogen classification for styrene; the chemical currently is undergoing an EPA Integrated Risk Information System (IRIS) review to establish such a classification.

Physical Properties

- Styrene is a colorless liquid that has a sweet smell.
- The odor threshold for styrene is 0.32 parts per million (ppm).
- The chemical formula for styrene is C_8H_8 , and the molecular weight is 104.16 g/mol.
- The vapor pressure for styrene is 5 mm Hg at 20 °C, and its octanol/water partition coefficient ($\log K_{ow}$) is 2.95.

Waterborne Polyurethane

Waterborne Polyurethanes are fully reacted Urethane polymers dispersed in water. These products contain no residual free isocyanate. They are formulated the same way as polyurethanes, but do not use isocyanates as a catalyst. In many waterborne and regular polyurethanes organometallic compounds based on mercury, lead, tin (dibutyltin dilaurate), bismuth (bismuth octanoate), and zinc are used as polyurethane catalysts. Mercury carboxylates, such as phenylmercuric neodeconate, are particularly effective catalysts for polyurethane elastomer, coating, and sealant applications, since they are very highly selective towards the polyol+isocyanate reaction. Mercury catalyst can be used at low

levels to give systems a long pot life while still giving excellent back-end cure. Lead catalysts are used in highly reactive rigid spray foam insulation applications, since they maintain their potency in low -temperature and high-humidity conditions. Due to their toxicity and the necessity to dispose of mercury and lead catalysts and catalyzed material as hazardous waste in the United States, formulators have been searching for suitable replacements. Since the 1990's, bismuth and zinc carboxylates have been used as alternatives but have short comings of their own. In elastomer applications, long pot life systems do not build green strength as fast as mercury catalyzed systems. In spray foam applications, bismuth and zinc do not drive the front end fast enough in cold weather conditions and must be otherwise augmented to replace lead. Alkyl tin carboxylates, oxides, and mercaptides oxides are used in all types of polyurethane applications. For example, dibutyltin dilaurate is a standard catalyst for polyurethane adhesives and sealants, dioctyltin mercaptide is used in microcellular elastomer applications, and dibutyltin oxide is used in polyurethane paint and coatings, nano enhanced coatings, anti-microbial agent for nano particles/wires and bioengineering applications of DNA/RNA gene therapy.^{17, 18} Tin mercaptides are used in formulations that contain water, as tin carboxylates are susceptible to degradation from hydrolysis.^{19, 20}

Konjac Glucomannan

Konjac Glucomannan is a water-soluble polysaccharide that is considered a dietary fiber. Glucomannan is a food additive used as an emulsifier and thickener. Products containing glucomannan, marketed under a variety of brand names, are also sold as nutritional supplements for constipation, obesity, high cholesterol, acne vulgaris and type 2 diabetes. Though there is some clinical support for potential health benefits, the U.S. Food and Drug Administration (FDA) has not approved any product containing glucomannan for the treatment of these medical conditions. Several companies selling products containing glucomannan have been disciplined by the U.S. Federal Trade Commission (FTC) for misleading or exaggerated claims pertaining to the health benefits of glucomannan. Glucomannan is mainly a straight-chain polymer, with a small amount of branching. The component sugars are β -(1 \rightarrow 4)-linked D-mannose and D-glucose in a ratio of 1.6:1.²³ The degree of branching is about 8% through β -(1 \rightarrow 6)-glucosyl linkages.

Glucomannan comprises 40% by dry weight of the roots or corm of the konjac plant. It is also a hemicellulose that is present in large amounts in the wood of conifers and in smaller amounts in the wood of dicotyledons. Clinical and pre-clinical studies have shown several potential health benefits of glucomannan. Konjac glucomannan, waterborne urethane/polystyrene and modified food starch has been used in many forms of thin film nano lithography and other related technologies in creating nano composites and Sol-gel integrated technologies.^{23, 24}

Glucomannan is a soluble fiber, and as such, has been investigated for the treatment of constipation. Glucomannan may relieve constipation by decreasing fecal transit time. In the treatment of chronic constipation, glucomannan significantly improved symptoms of constipation while being well-tolerated and free of relevant side effects.^{25, 26, 27}

Obesity

Clinical evidence suggests glucomannan may be beneficial in weight loss.²⁸ Because it is a soluble fiber, it absorbs water to form a viscous gel-like mass. This mass may promote feelings of satiety while traveling through the gastrointestinal tract. In obese patients, taking 1 gram of glucomannan with 8 ounces (250 ml) of water 1 hour before each of 3 meals daily over 8 weeks resulted in an average weight loss of 5.5 pounds (2.5 kg).²⁹

Cholesterol and other Lipids

Glucomannan has demonstrated statistically significant improvements in the total cholesterol of obese patients.²⁹ In healthy men, 4 weeks of taking 3.9 grams of glucomannan decreased total cholesterol, low-density lipoprotein, triglycerides, and systolic blood pressure; notably, triglycerides dropped by 23%.³⁰ Glucomannan has also been tested in children with high cholesterol in conjunction with a diet. Interestingly, greater decreases in total cholesterol and low-density lipoprotein were observed in female children when compared to male children.³¹ When used in conjunction with chitosan, glucomannan decreases serum cholesterol possibly by increasing steroid excretion via the feces.³²

Type 2 Diabetes

Glucomannan may be useful as a therapeutic adjunct for type 2 diabetes. It has been shown to improve the lipid profile and alleviate the fasting blood glucose levels of type 2 diabetics.³³

Commercial Use

As a food additive, glucomannan is used as an emulsifier and thickener. It has E number E425(ii). Glucomannan also makes up the majority of shirataki noodles and an ingredient in modified food starch with waterborne polyurethane nano delivery systems for time released materials for internal consumption.

In 2002, a number of products containing konjac-derived glucomannan were recalled as choking hazards.³⁴ Innovative plasticized starch films modified with water borne polyurethane from renewable sources were developed using rapeseed oil and then modifying the glycerol plasticized starch to develop water resistant materials were developed by scientists at the university of Reims, France.³⁵

Modified Food Starch

Modified starch is a food additive which is prepared by treating starch or starch granules, causing the starch to be partially degraded. Modified starch is used as a thickening agent, stabilizer, or an emulsifier. Apart from food products, modified starch is also found in pharmaceuticals, paper and many other applications.

Starches are modified for a number of reasons. Starches may be modified to increase their stability against excessive heat, acid, shear, time and cooling or freezing; to change their texture; to decrease the viscosity, or to lengthen or shorten gelatinization time.

A modified starch may be an instant starch which thickens and gels without heat, or a cook-up starch which must be cooked like regular starch.

Acid-treated starch (E1401), usually simply called "modified starch", is prepared by treating starch or starch granules with inorganic acids, breaking down the starch molecule and thus reducing the viscosity.

Other treatments may produce modified starch with different E numbers, such as alkaline-modified starch (E1402), bleached starch (E1403), oxidized starch (E1404), enzyme-treated starch (INS: 1405), acetylated starch (E1420), and acetylated oxidized starch (E1451).

Pre-gelatinized starch is used to thicken instant desserts, allowing the food to thicken with the addition of cold water or milk. Similarly, cheese sauce granules (such as in Macaroni and Cheese or lasagna) or gravy granules may be thickened with boiling water without the product going lumpy. Commercial pizza toppings containing modified starch will thicken when heated in the oven, keeping them on top of the pizza, and then become runny when cooled.

A suitably-modified starch is used, quite successfully (with respect to the taste), as a fat substitute for low-fat versions of traditionally fatty foods, e.g., reduced-fat hard salami having about 1/3rd the usual fat content. For such uses, it is an alternative to the product Olestra.

Modified starch is added to frozen products to prevent them from dripping when defrosted. Modified starch, bonded with phosphate, allows the starch to absorb more water and keeps the ingredients together. Modified starch acts as an emulsifier for French dressing by enveloping oil droplets and suspending them in the water. Acid-treated starch forms the shell of jelly beans. Oxidized starch increases the stickiness of batter.

Genetically Modified Starch

Modified starch should not be confused with genetically modified starch, which refers to starch from genetically engineered plants, which have been genetically modified to produce novel carbohydrates which might not naturally occur in the plant species being harvested. The modification in this sense refers to the genetic engineering of the plant DNA, and not the later processing or treatment of the starch or starch granules.

Genetically modified starch is of interest in the manufacture of biodegradable polymers and noncellulose feedstock in the paper industry, as well as the creation of new food additives such as the following: Dextrin (E1400), Starch gelatinization, Retrogradation (starch), Resistant starch, glucose syrup and glucose. High Fructose Corn Syrup that has been made with genetically modified corn may be in this same category if made into corn starch.

Waterborne Polyurethane, Nanosilica and Modified Starch

The field of nanotechnology has grown in the last three years from 1.7 million papers on the subject to over 75 million papers, which translates into the industrialization of applied nanotechnologies. Nanosilica in the form of nano tubes, belts, gels, and special architected advanced nano materials may become the new leader as compared to carbon nano tubes in the field of nanomedicine and gene therapy. Nano-SiO₂ has been used in experiments at the College of Chemistry, Central China Normal University, Wuhan, People's

Republic of China to modify waterborne polyurethane. The morphology and performance of the waterborne polyurethane in these tests showed that nano-SiO₂ could be evenly dispersed in the waterborne polyurethane and had a better resistance to high temperature and water. Properties and structure tests were performed by Fourier transform infrared spectra (IR) and other analytical methods.³⁶

In 2006, Fang Zheng, et.al., wrote a paper on the use of chitosan nanoparticle as a gene therapy vector via gastrointestinal mucosa administration using three different types of vectors with a green fluorescent protein. The materials to create the encapsulated plasmid DNA (pDNA) for gene therapy utilizes waterborne polyurethanes and further encapsulation with modified starches. The green fluorescent protein (GFP) was found in the mucosa of the stomach and duodenum, jejunum, ileum and large intestine in 100%, 88.9%, 77.8%, and 66.7% of the nude mice in the experiment with an optimal chitosan/pDNA being 3:2:1.³⁷

In 2007 to present date in California aerial spraying has occurred for the Brown Moth, West Nile Virus, and many other vectors that come under the Chemical and Biological Warfare Act of 1949, US EPA, and other governmental agencies. The spraying of the Brown Moth utilized a pesticide known a Check Mate, which was a new biological pesticide using pheromone technology on micro beads or nanospheres. These materials were sprayed over specific areas of the State of California. After the spraying of these materials a yellow fluorescent dye was found in the sclera of exposed individuals eyes.³⁸ The micro beads were made of polyurethanes, silicon, polystyrene and other plastic polymer material at a specific diameter size due to various criteria set by its manufacturer or manufacturer's client.

Essential Oils the Missing Link in Polystyrene Cellular Exposures

Plants not only play a vital role in the ecological balance of our planet, but they have also been intimately linked to the physical, emotional, and spiritual well being of people since the beginning of time.³⁹

The plant kingdom continues to be the subject of an enormous amount of research and discovery. At least 30 percent of prescription drugs in the United States are based on naturally occurring compounds from plants. Each year, millions of dollars are allocated to universities searching for new therapeutic agents that lie undiscovered in the bark, roots, flowers, seeds, and foliage of jungle canopies, river bottoms, forests, hillsides, and vast wilderness regions throughout the world.⁴⁰

The primary areas of the plant, which contains the most powerful ingredient in therapeutic essential oils and plant extracts, have been a universal tapestry of history since the beginning of time, when she was in love with eternity.⁴¹ Essential oils are aromatic volatile liquids distilled from shrubs, flowers, trees, roots, bushes, and seeds.

The chemistry of essential oils is very complex: each one may consist of hundreds of different and unique chemical compounds. Moreover, essential oils are highly concentrated

and far more potent than dried herbs. The distillation process is what makes essential oils so concentrates. It often requires an entire plant or more to produce a single drop of distilled essential oil.^{42, 43}

Essential oils are substances that definitely deserve the respect of proper education. Users need to be fully versed in the chemistry and safety of the oils. However, this knowledge is not being taught at universities in the United States and that is why many integrated medical programs and essential oil manufacturers have created continuing education and certification programs. In the United States there is a lack of institutional information, knowledge, and training on essential oils and the scientific approach to aromatherapy.

The American Chemical Society, since its inception as Chartered by the U.S. Congress in 1876 has been the premier membership organization of chemists, chemical engineers, and allied professionals worldwide. This was the original organization that offered to chemist a special training course that was used to identify chemicals by smell, which was adapted early on in the National Institute of Occupational Health and Safety Institute and the Occupational Safety and Health Administration for chemical identity through smell.^{43, 44, 45}

Many essential oils and their oil blends have been used as an anti-microbial agent as seen in the Middle Ages, when a blend of oils commonly known in modern times as Thieves® by Young Living Essential Oils® was used by gypsies and other individuals to guard against infection from exposure to the Bubonic Plague.⁴⁶ During World War II, *Melaleuca alternifolia* (Tea Tree Oil/melaleuca) was found to have very strong antibacterial properties and worked well in preventing infection in, open wounds.⁴⁷

Other essential oil blends, such as Inner Solution containing juniper, fennel, mugwort, germanium, lavender, orange, peppermint, capsicum extract, jojoba and cinnamon are mixtures of oils and extracts that have been known as an ancient Euro-Asian recipe dating back to the days of Marco Polo when he traveled the Silk Road Trail. Inner Solution addresses specifically the metabolism of fat as it breaks up the actual cause of the fat build-up in the cells and systemic organs of the body.⁴⁸ Many times individuals experience weight gain, severe inflammation, loss of breath, and increased cholesterol. These symptoms may be the buildup of hazardous materials and hormones in the localized areas of the body that stimulate the production of cholesterol and triglycerides that lead to the manufacture of fat. The manufacture of fat is the body's natural way of protecting and encapsulating the toxic substances in the body so they do not destroy nerves or deplete minerals and vitamins which may stimulate the initiation of disease. The use of waterborne polyurethane with modified food starches as biological pesticide inert ingredients, food additives, nano drug delivery systems, and DNA gene may be the real cause of the United States obesity problems.^{49, 50}

Polystyrene and Essential Oils or Oil Blends

The essential oils of Thieves® and Inner Solution™ contain the oils that have been used for respiratory distress, nasal infections, and other types of infections for over 800 years or more an experiment was designed to address internal exposure to modified food starch with

waterborne polyurethane or chitosan and waterborne polyurethane/styrene (ingestion), inhalation of starch incorporated nanospheres, nano gems, microspheres or pebbles that are used in weather modification and security sensing throughout the United States and abroad.^{51, 52}

The Experiment

The following is a description of a simple experiment utilizing a total of three (3) polystyrene foam cups (6 ounce size). Each cup contained 4 ounces of Los Angeles, California tap water. The experiment was designed to determine the rate of time it would take to melt the polyurethane-styrene cup foam. These same materials are used in making many advanced nano materials as previously discussed in this report. The contents of the cups were as follows:

Cup No. 1 was the CONTROL, which had nothing added to it except the tap water.

Cup No. 2 contained Tap water with 6 drops of INNER SOLUTION™.

Cup No. 3 contained Tap water with 6 drops of THIEVES®.

The cups were observed for visual observations over time. See Table 2. By referring to Table 2, one can observe that NO reaction occurred in the Control Cup, while the Inner Solution™ cup had melted/etched through the polyurethane-styrene foam cup within 11 minutes and 36 seconds.

The Thieves® containing cup etched through the cup, leaving a distinct ring on the inner side of the cup, but did not completely melt or etch through the cup in 11 minutes and 36 time. The conclusion of the experiment was when the reaction time for melting/etching the polyurethane-styrene foam occurred. See Photograph 1: Control Cup; Photograph 2: Inner Solution™ Cup; and Photograph 3: Thieves® Cup.

Referring back to Photographs 1 – 3 or the respective cups noting the times showing the comparative reactions as stated in Table 2, one will observe the melting away of polyurethane-styrene. This experiment was conducted to show the possible applications of therapeutic grade essential oils and oil blends to aid in dissolving the build-up residue upon cell membranes and organ system tissues from internal exposure to the accumulative effects of waterborne polyurethane mixed with modified food starch.

Waterborne polyurethane-styrene with modified food starch has been used to make nanospheres and some forms of pebbles or gems. These later nanotechnology materials are used in the production of materials for weather modification and location intelligence surveillance. Nano pebbles and gems are the new breed of smart dust and smart crystal motes.⁵² Mankind is facing the Brave New World⁵³ of the commercialization of these materials into their everyday life without the advanced nano materials being tested for health and safety concerns. The US EPA has scheduled their outlined criteria for risk assessment guidelines for environmental concerns of exposure and utilization of advanced nano materials to be released in 2013, but what is happening NOW to the individuals and the environment. Exposure to plastic vapors and its degradation products in the work place has been recognized as a highly hazardous work environment, when engineering controls

and other measures are not utilized to protect the workers. The advent of advanced nano technologies that can be absorbed into the skin by determine its internal function by the layers of dispersion through various pH's within the human body will be of great concerns for the individuals that do not protect themselves from internal residual exposures. See Photograph 4 – Nanospheres housing Chinese lantern silicon nano tubes, note adjacent red blood cells human.

Looking at Photograph 5 – Human, Caucasian female Upper skin surface biopsy showing green nano horns on its surface. The nano horns identified were composed of polyurethane-styrene. The photographs confirm exposure to polyurethane-styrene based nano technology with its core containing silicon nano tubes called Chinese lanterns (Photograph 4). The silicon nano tubes may be loaded with a gene therapy of DNA plasmids, siRNA, HELA cells, or many other substances like virons or vaccines to name a few. These types of bio or nano technologies are the currently the new nanomedicine and gene therapy pharmaceuticals be used by the medical community with Medicare reimbursement as they replace the petroleum based pharmaceuticals.^{56, 57}

CONCLUSION

The current use of advance nano materials in pharmaceuticals, pathogen countermeasures, drug delivery systems, coatings, vaccine actuators, DNA/RNA vaccines, viral protein envelopes, adenoviral delivery systems, anti-microbial agents, artificial blood and many other areas without the comprehensive evaluation process as performed on standard chemical categories by our governmental regulators, mankind and the environmental will be see diseases as they never had before at an accelerated rate. A prime example being the use of nano chrysotile asbestos particles with nano dyes to determine specific tumors within the lungs and stomach lining of humans. The smaller the size of an asbestos fiber, will only allow its penetration into the cell membranes at an accelerated rate, especially if the individual has been exposed to the contaminant of a polio vaccine – Simian Virus 40 mutation.⁵⁵ Many of the universities that make the advanced nano materials, such as Sencil™ does not have an appropriate Material Safety Data Sheet upon healthcare providers request as required under US OSHA General Industry Standard 1910.1200 Hazard Communication Standard (Right to Know).

The General Industry Standard 1910.1200 commonly known as the Right to Know standard, specifically states that the employee has the right to know if the chemicals they are working with in the workplace are hazardous substances as such as carcinogens, skin sensitizer, reproductive toxin, physical hazard, poison (class A or B), radiation, oxidizers, noise, and other similar categories of exposures that are associated with occupational diseases. Currently, industry addresses these chemicals through training and engineering controls, but these same substances are being used in the manufacture of advanced nano materials for nanotechnology. The smaller the size of the molecule laced with hazardous substances and materials the greater the risk to health. The routes for exposure being inhalation, absorption and ingestion are still the same. The only factor being that the smaller the agent material the greater the ability for it to get into the cell membrane, cytoplasm and through

the nuclear membrane and do its damage or repair in the case of gene therapy without the immune system responding.

Exposure to advanced nano materials will be the new challenges for industrial hygienist, environmentalist, safety engineers, health care provider and many others, in the decades to come. All of these and other professionals will have to approach the hazardous effects upon the human body and the environment with a mind. This type of mind must be able to accept the reality of the cybordization of mankind and environment from its initial inception of exposure to advanced materials such as Smart Dust.⁵⁸ The time is NOW to address these concerns not the years to come. Already the mass population of the world is already experiencing plastic growing from their own bodies as a two part polyester resin with a silicon head^{59, 60} under the ICD-Code of C17.800.518 – Morgellons Disease or Fiber Disease, which should really be called by its real name category – “Toxicological Effects from Exposure to Advanced Nano Materials.” The use of essential oils and oil blends may be the only therapeutic means for individuals and professional health care providers to remove advanced materials, such as waterborne polystyrene based nano spheres that bind to nasal and lung cellular membranes as they reduce cellular respiration levels of oxygen in other organ systems. A simple 800 plus year remedy and effective non-invasive modality to be used, when conventional therapeutic modalities do not address exposure to advanced nano materials that are composed of mixtures of polyurethane and styrene composite materials.

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GLOSSARY of TERMS

NOTE: Terms and definition were taken from the text: *Nanotechnology for Dummies* by Richard Booker and Earl Boysen. Wiley Publishing, Inc. Hoboken, NJ © 2005 pages 333-342.

adenosine triphosphate (ATP): Organic molecule that stores energy in a biological cell.

amines: Organic compounds used as attachment points for molecular structure.

amphiphile: A molecule that has two distinct parts; a hydrophilic (water loving) head and a hydrophobic (water-fearing) tail.

atom: smallest particle of an element, composed of three types of charged particles; protons (positive), neutrons (neutral), and electrons (negative).

atomic force microscope (AFM): A scanning probe instrument that measures the atomic force acting on its tip as it moves along the surface of a sample.

band gap: The energy difference between the top of the valence band and the bottom of the conduction band in semiconductors and insulators. In insulators, the band gap is large – it requires a lot of energy to move valence electrons to the conduction band. Adding impurities to the semiconductor (called doping), can change the band gap and the amount of energy needed to move electrons. In conductors (metals), the valence band and conduction band overlap, resulting in no band gap.

benzene: A ring of 6 carbon atoms, each with one hydrogen atom.

bioactive materials: Materials capable of interacting with living tissue.

bioavailability: The extent to which a drug successfully targets specific cells. Used in measuring the effectiveness of a drug.

biometrics: Identification based on personal features such as face recognition or fingerprint.

biomimetics: Applying systems found in nature to the design of engineering systems and modern technology. Velcro is an example of biomimetics: the plastic hooks and loops resemble plant burs (hooks) that cling to animal fur or clothing (loops).

biosensor: A sensor that detects biological molecules such as proteins.

bottom-up fabrication: A construction process that works with the smallest units of a material first (in this context, atoms) and builds them up into the form of the final product. Compare *top-down fabrication*.

buckyball: Short for buckminsterfullerene; a molecule containing 60 carbon atoms in a soccer-ball orientation. Also known as fullerene or C₆₀.

cantilever: A solid beam allowed to oscillate at one end. Used in atomic force microscope (AFMs)

carbon nanotube: a graphite sheet rolled up into a tube.

catalyst: A substance that reduces the amount of energy required during a chemical reaction. Its presence increases the rate of reaction without the consuming the catalyst.

chirality: The “twist” of a carbon nanotube. Twisting carbon nanotubes down the length of the tube gives them unique properties that depend upon the degree of the twist. (For example, specific twists make a nanotube either metallic or semiconducting.)

colloidal self-assembly: A process by which colloids assemble themselves into useful alignments; used in developing photonic crystals.

colloids: Very small particles (within the 1 nm to 1000 nm range) that remain dispersed in a liquid for a long time. Their small size prevents them from being filtered easily or settled rapidly.

colorimetric sensors: Sensors that provide an indicator for quick macroscopic analysis by changing color.

composite: An engineered material composed of two or more components.

conduction band: The energy at which electrons can move freely through the material.

covalent bond: Atoms that bond sharing two electrons.

curing: Process of hardening. In this context, heat is added to a liquid polymer to harden it.

data mining: sifting through large amounts of data, trying to find relationships and patterns within the information.

decoherence: Decoherence is the breakdown of quantum properties (super position and entanglement) changing the behavior of the system from quantum mechanical to classical physics. This is usually the result when a quantum mechanical system interacts with its environment.

dendrimer: An artificial, polymer-based molecule that resembles a foam ball with a tree sprigs shooting out of it in every direction. Contains a great number of voids between the sprigs, which allows it to carry drug molecules.

deoxyribonucleic acid (DNA): The nucleic acid that carries the genetic blue-print for all forms of cellular life.

diffraction: The spreading or bending of light as it passes by an object. An example of diffraction is using a prism to spread sunlight into a spectrum of color.

doping: Adding specific impurities ("dopants") to give a material desired properties, - as in the process that creates either n-type or p-type silicon.

electrochromatics: Materials that change color when energized by an electrical current.

electroluminescence: Converting electrical energy into light.

electron-beam lithography (EBL): Fabrication method that uses a tight beam of electrons to form nano-scale features on a surface.

electro-osmosis: A method that uses an electric field to move liquids through a nano-channel. The sides of the nano-channel's wall are charged, allowing the liquid to slip through at a constant rate.

electrophoresis: A method of using an electric field to move particles through a nano-channel and separate them by size. The particles move at a rate inverse to their mass: the larger ones are slower than the smaller ones.

endocytosis: A process whereby cells absorb particles by enveloping them with the help of vesicles formed from the cell wall.

enigma: A mystery wrapped in a riddle. "Atomic interactions at the nano-scale are an enigma that is yet to be fully understood. To Rich, nanotechnology and women are both enigmas.

entanglement: Relationship in which the quantum states of two or more objects are always described with reference to each other, even if they're physically separate.

exocytosis: The removal of particles by enveloping them in a vesicle and releasing them outside the cell wall.

extreme ultraviolet (EUV): Light whose wavelengths are in the range of 10 to 200 nm, outside the higher end of the visible spectrum.

nanometer (nm): One billionth of a meter.

nanoshells: Gold-coated silica spheres which, when injected into the blood stream, attach themselves to cancer cells. The nanoshells are then illuminated with a laser, giving off heat and killing the tumor cells.

nanotechnology: Technology developed at the atomic and molecular range (1 nm to 100 nm) to create and use structures, devices, and systems that have novel properties because of their small size.

nanowire: Very small wires composed of either metals or semiconductors.

optical tweezers: A strongly focused laser beam used to grasp and move micro and nano-size translucent particles.

organic molecules: Carbon-based molecules that make up the solid portions of living things, as well as certain materials such as plastics and oil.

organic surfaces: Surfaces that are non-metallic, such as skin, wood, or fabric.

Oxidation: Chemically combining oxygen with another substance; fire and rust are two examples.

parallel processing: Simultaneous execution of the same task on multiple processors. Fast, nano-scale processors could make this technique possible on an unprecedented scale, as in the quantum computer.

pharmacogenetics: The study of how a patient's genetic make-up will affect his or her response to medicines.

phospholipids: Naturally occurring amphiphiles that make up human cell walls.

photolithography: A computer-processor fabrication technique that uses light to expose a photosensitive film, resulting in the needed pattern of circuits as a much smaller scale.

photon: A particle that is a packet of light.

photonic band gap: A band gap that corresponds to a specific wavelength of light used in photonic crystals. Photons that have this particular wavelength have to travel within this photonic band gap, restricted from the surrounding material. Useful for diverting light at the molecular level.

photonic crystal: A "light insulator" – materials that control how much (or what kind of) light is allowed to pass through the nanocrystal.

photonics: The science of manipulating photons.

photo resist: A substance that becomes soluble when exposed to light. Used in photolithography.

piezoelectric transducer (PZT): A material that expands and contracts according to the amount of electric current that travels through it.

plasma: A gas made of charged particles. An example of naturally occurring plasma is lightning. You may have seen plasma lamps, glass globes with sparks shooting around inside.

polymers: Plastic – large molecules made from many smaller molecules usually composed of carbon atoms bonded in long chains.

quantum computer: A computer that exploits the quantum mechanical nature of particles, such as electrons or atomic nuclei, to manipulate information as quantum sized bits (qubit). This quantum computer will be able to perform quick operations in parallel solving problems that can't be solved with today's computer (for example, factoring large numbers).

quantum cryptography: Cryptography scheme that relies on quantum mechanics to ensure accurate key exchange and prevent eavesdropping.

quantum dot: a semiconductor nanocrystal that exhibits quantum behavior in optical or electrical processes.

quantum mechanics: In physics, a theory that describes physical interactions between atoms more accurately than classical physics, often with results that seem strange from an everyday frame of reference.

quantum tunneling: A quantum-mechanical effect of transitioning through a state that classical physics would forbid. An analogy is throwing a ball at a wall and having it appear on the other side.

quantum: In atomic physics, a discrete and basic unit, similar to the way an individual electron is the basic unit of electricity. Plural form is quanta.

qubit: Quantum bit – smallest unit in quantum computing.

random-access memory (RAM): Memory storage that accesses data anywhere on the storage medium.

repeaters: In-line amplifiers that take fading light or electrical signals and resend them with more power.

respirocytes: Tiny mechanical spheres used to store and release oxygen within the bloodstream.

scanning electron microscopy (SEM): Electron microscope that creates images of nanoscale features by bombarding the surface of a sample with a stream of electrons, scanning back and forth, and reading the reflected electrons as they bounce off the surface.

scanning probe microscope: An instrument that studies the properties of surfaces at the atomic level by scanning an atomically sharp probe over the sample. This produces an image of the sample's topography with atomic resolution.

scanning tunneling microscope (STM): The first scanning probe instrument – measures electrons tunneling between a scanning tip and a conducting surface.

Schottky barrier: Area of resistance to electrical conduction, occurring at the junction between the metal wires and the semiconductor in a computer processor.

self-assembled monolayers (SAMs): A single layer of atoms or molecule that has assembled itself under controlled conditions. This makes it possible to design surfaces at the molecular scale.

self-assembly: Process that creates the specific conditions under which atoms and molecules spontaneously arrange themselves into a final product. An example of self-assembly is the automatic arrangement of phospholipids into a cell wall.

semiconductor: Material that has more electrical conductivity than an insulator (which has no conductivity) but less than a conductor; it can be made to insulate or conduct electricity in patterns, as in a computer processor.

shape-memory alloy (SMA): A metal alloy that remembers its geometry. After it is deformed, it is heated to specific temperature and regains its original geometry by itself.

single-electron transistor (SET): A transistor that switches between on and off (in computer terms, 1 and 0) by using a single electron – much smaller than a traditional transistor, which uses many electrons to switch.

single-walled carbon nanotube (SWNT): A carbon nanotube with one wall. Compare multiwalled carbon tube.

soft lithography: A process that uses polymers for molding and printing micro-and nano-structures. Pioneered by George Whitesides and used for microfluidics and its descendant, nanofluidics.

spectrometers: Tools that reveal the composition of things by measuring the light absorbed or emitted by atoms or molecules.

spintornics: "Spin-based electronics" that exploits not only an electron's charge but also its spin.

sputter deposition: A method of creating a thin film of metal by sputtering fine particles on its surface.

stent: An expandable wire mesh used to keep a blood vessel open.

strained silicon: New method of improving processor speed by stretching individual silicon atoms apart so electrons flow through a transistor faster with little resistance. Compare superconductor.

substrate: The supporting surface that serves as a base.

superconductor: A material through which electricity flows with zero resistance.

superlattice: A crystal formed of thin layers. A natural example is graphite.

superposition: When an object simultaneously possesses two or more values of a specified quantity. Useful in the development of quantum computers.

surface tension: The pull of a liquid into its most compact form to minimize the amount of energy used, keeping the surface area to a minimum.

surfactants: "Surface-active" molecules that reduce the surface tension between two liquids. Surfactants are used in many detergents as a dispersant between oil and water.

tetrapods: pyramid-shaped nanocrystals that resemble children's jacks.

top-down fabrication: A construction process in which we first work at the large scale and then cut away until we have a smaller product. This is similar to a sculptor cutting away at a block of marble producing the final product, a statue. Compare bottom-up fabrication.

transistor: A switch that determines whether a bit is a 1 or a 0.

uncertainty principle: In quantum mechanics, a principle made famous by Werner Heisenberg: Measuring one property in a quantum state will perturb another property. You can, for example, measure the position or momentum of an electron – but not both at once.

valence electrons: The electrons in the outermost shell of an atom. These electrons largely dictate the chemical reactions of the atom.

van der Waals: Weak electrostatic forces between atoms.

vesicles: Micelles with two layers; a reverse micelle surrounded by a regular micelle. Resembles the walls of biological cells.

viscosity: The measure of resistance of a fluid – its "thickness."

water window: A range of frequencies in the electromagnetic spectrum that are most easily transmitted through water, making them suitable for optical imaging (800-1300 nm).

wavelength: In physics, the distance between one wave peak and the next in a transmitted wave of radiant energy. Typically measured in nanometers.

TABLE 1: List of Agents that Induce Allergic Reactions Including Exposure to Plastics.

COMPOUND	EXPOSURE	TYPE of ALLERGIC REACTION
Formaldehyde	Disinfectants, cosmetics deodorants, paper, dyes, photography, textiles, inks, wood products, resins	Type IV
Phthalic anhydrides	Saccharin production	Type I
<i>B. subtilis</i>	Detergents	Type I
Pesticides	Food, exterminators, farm workers	Type I, IV
Ethylenediamine	Plastic industry	Type I
Food additives (azodyes, BHT, BHA)	Ingestion of processed foods	Type I
Antimicrobials (e.g. Parabene, EDTA, Mercurials)	Cosmetics, shampoos, creams, lotions	Type IV
Resins and plasticizes (toluene diisocyanate trimellitic anhydride)	Plastics, glues, nail lacquers, wood products, resins	Type I, IV
Platinum compounds	Metal refining	Type I
Nickel	Jewelry, garment fasteners	Type I, IV
Chromium	Leather products, printing	Type IV
Gold, mercury	Medicinal treatments, photography	Type II, III, IV
Beryllium	Manufacture of Alloys	Type I, IV
Drugs (penicillin, quinidine, tetracycline)	Medicinal treatments	Type I, II, III, IV

Information in this Table is taken from Chapter 9: Toxic Responses of the Immune System by Jack H. Dean and Michael J. Murray from Casarett and Doull's Toxicology: The Basic Science of Poisons, 4th Edition. Pg. 303. Pergamon Press. New York © 1991

NOTE: Hypersensitivity Assessment of Immunological Reactions

Type I: Anaphylaxis or immediate hypersensitivity is antibody-mediated IgE in Humans.

Type II: Cytolytic- hemolytic anemia (Ex. Goodpasture's disease) IgG mediated.

Type III: Arthus – systemic lupus, glomerular nephritis, rheumatoid arthritis, serum sickness. Antigen-antibody complexes deposit in various tissues and may then fix complement.

Type IV: Delayed-type hypersensitivity – contact dermatitis, tuberculosis. Sensitized T lymphocytes induced a DTH response.

TABLE 2
Table of Styrofoam® Cup, Essential Oils and Oil Blends Results and Agents that Induce Allergic Reactions from Exposure to Plastics.

A) List of Agents that Induce Allergic Reactions Including Exposure to Plastics.

COMPOUND	EXPOSURE	TYPE of ALLERGIC REACTION
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TABLE 2:

B) Physical characteristic observations of polystyrene, Styrofoam® cups containing 100% pure Therapeutic Grade Essential Oils and Essential Oil Blends with 4 ounces of Los Angeles, CA tap water.

<u>Description</u>	<u>Time, min:sec</u>	<u>Observation</u>
Control	11 min 36 sec	No Reaction
6 Drops Inner Solution™	1 min 45 sec 2 min 24 sec 4 min 54 sec 11 min 36 sec	Bleeding through cup Melting inside of cup Melted through cup walls Melted through cup walls and able to separate cup
6 Drops Thieves®	1 min 45 sec 2 min 24 sec 4 min 54 sec 7 min 00 sec 11 min 36 sec	Etched inside of cup Melting inside of cup Melting deeper into inside of cup Cup started to leak water on side of cup Melting deeper and leaking more Water

Special Observations:

- 1. The control cup did not react at all and no portion of the cup could not be separated.*
- 2. Inner Solution cup melted through the Styrofoam® and could be separated.*
- 3. Thieves Solution cup melted through the cup but could not be separated. Area of more concentration of oil on water surface was where leak occurred in the cup.*

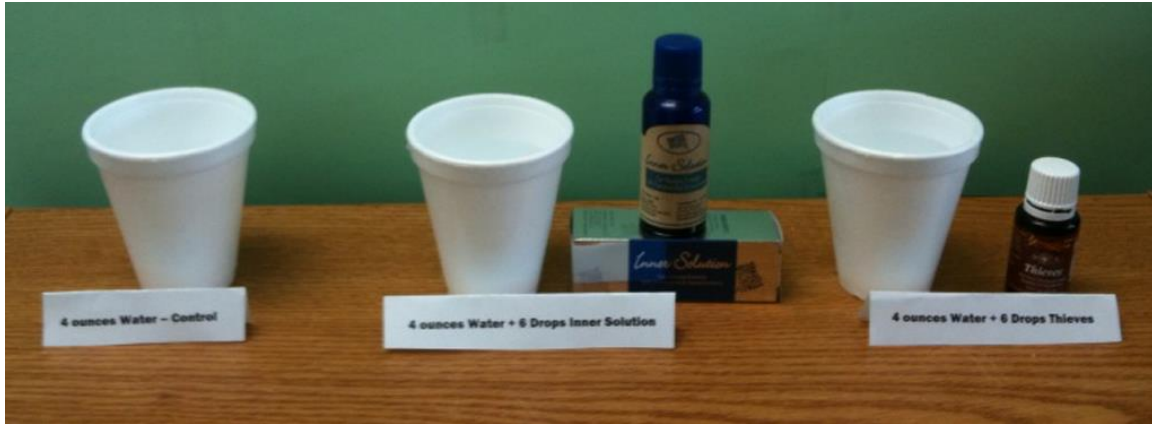
Styrofoam® is a Registered Trademark of the Dow Chemical Company.

Inner Solution™ is a Trademark of MPS Global, Inc./Self-Care Day Spa, W. Covina, CA.

Thieves® is a Registered Trademark of Young Living Essential Oils®, Lehi, UT.

PHOTOGRAPH 1:
Photograph of Control Cup, Inner Solution™ Cup and Thieves®
Essential Oil Cup (at beginning of experiment).

Time, zero, Initiation of Experiment



Control

Inner Solution™

Thieves®

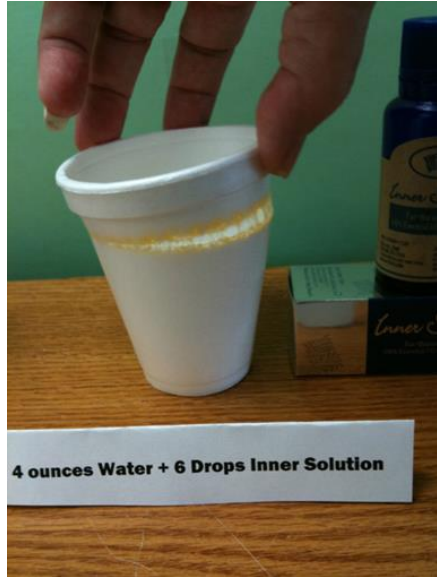


Top Inner Solution™
6 Drops Oil



Thieves®
6 Drops Oils

PHOTOGRAPH 2:
Photograph of Inner Solution™ Cup after 11 minutes 36 seconds.



Melted at 4 min 54 sec



Melted at 11 min 36 sec

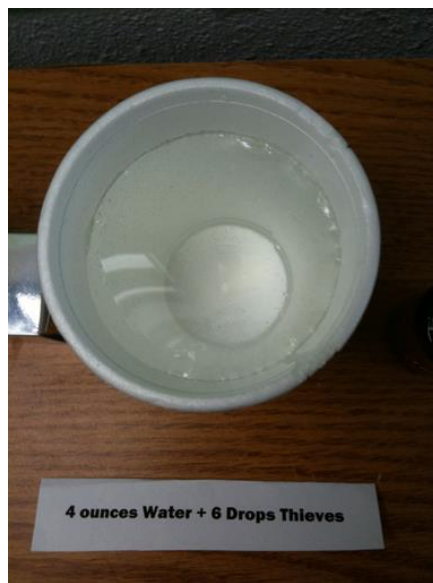


**Melted through cup walls at
2 min 24 sec**

PHOTOGRAPH 3:
Photograph of Theives® Essential Oil Cup after 11 minutes 36 seconds.



**Melted side of cut at
11 min 36 sec**

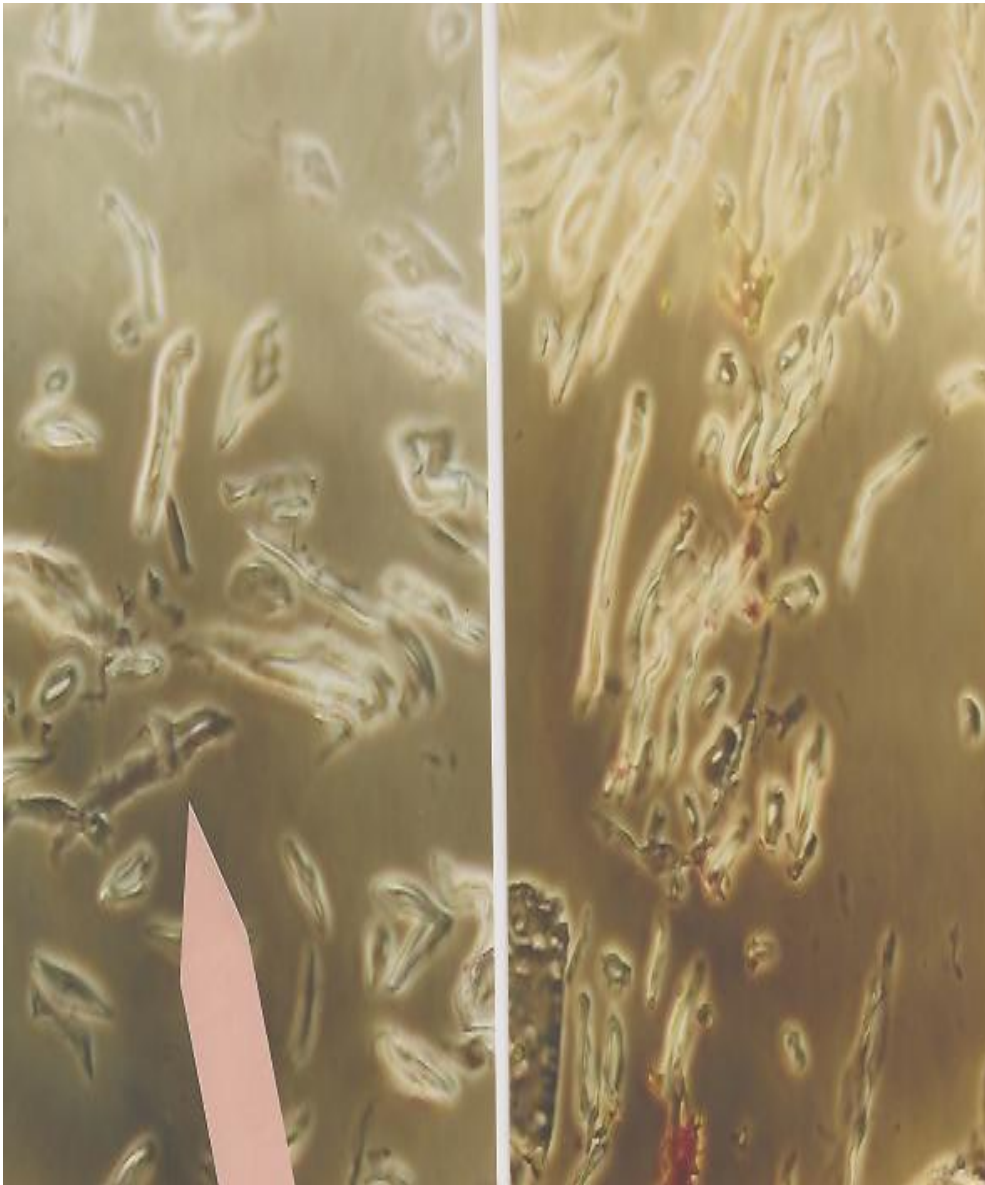


**Note inside of cup where
melted inside 2 min 24 sec**

PHOTOGRAPH 4:

Photograph of Nanospheres housing Chinese lantern silicon Nanotubes; note adjacent human red blood cell and nanotechnology Comparative designs per Dr. Wang, Georgia Institute of Technology.

A) Silicon Nanospheres in Human Blood with various dye coatings with Chinese Lantern Nanotubes in Human Blood. Taken from Project: Fiber, Morgellons & Meteorite. © 2006 H. Staninger. *Photomicrograph taken by Dr. Rahim Karjoo, Pathologist.*



B) Chinese Lantern Nanotubes as diagrammed by Dr. Z. Wang in his article *Silica Nanotubes and Microarrays*, *Advanced Materials Engineering*, Georgia Institute of Technology.

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impregnated in the silica cylinder. Further growth of the nanofibers forms a larger silicon (EDS) wire-like structure. The wire-like Si grows along the [110] direction. In some cases, Si nanowires sheathed by a silica layer can be extensive (Fig. 1c) as the growth direction remains [110]. The diameter of the Si core is ~ 60 nm, and the thickness of the silica sheath is ~ 20 nm.

We have also observed the surprising growth of silicon nanotubes. The initiation of nanotube growth appears to involve seeding by silicon particles along the growth direction. Figure 2a depicts the growth of the silica nanotubes between silicon particles which may also impregnate the tubes. The image displayed in Figure 2b suggests that a Si particle is located at the area that links the aligned nanofibers and the silica nanotube. The outer diameter of the tube is ~ 70 – 80 nm and the wall thickness is ~ 20 nm. It is possible that the Si particle terminates the growth of the nanofibers located inside the bundle, while the outermost fibers continuously grow forming a continuous shell, which constitutes the nanotube. This process is also suggested by the structure shown in Figure 2c, where the formation of a Si particle at the end of a fiber agglomeration again appears to play a key role in the formation of the nanotube. The silica tubular structure can also appear to be “necklace-like” as shown in Figure 2d, where an internal chain-like structure is apparent. The chain-like structure represents an intermediate between the aligned nanofibers and the continuous nanotube. Figure 2e demonstrates a silica nanotube half-filled by a silicon nanowire.

Silica wires can also be made to form a variety of unique three-dimensional structures. Shown in Figures 3a–d are typical cage structures composed of aligned silica nanofibers. The nanofibers grow into bundles, while paralleling a structure that has cylindrical symmetry. The width of the cage is 0.3 – 1 μm —much larger than the diameter of the silica nanofibers (ex. ~ 20 nm). These arrays clearly demonstrate the versatility of the silica nanostructures which can be synthesized. In fact, Figure 3e takes the shape of a “Chinese lantern” structure composed of Si and SiO_2 , where an SiO_2 tube extends from the top of a silica wire bundle.

The nanostructures demonstrated here are dominated by silica forms. Silicon nanocrystals/nanowires are formed in regions that are densely enclosed by the silica nanofibers. The short segment of the Si wire-like structure in Figure 1a is a typical example. This suggests that the growth may be dominated by vapor phase infiltration. In the regions dominated by silica, the local porous structure would appear to permit the diffusion of oxygen and silicon atoms through the material, resulting in the growth of the silica structure. In the regions densely surrounded by silica, the diffusion of oxygen into the structure may be hindered, thus re-

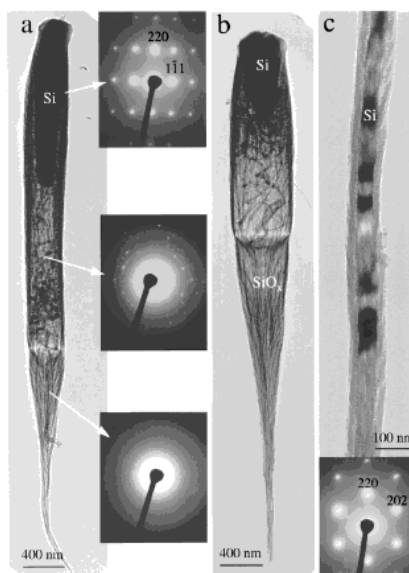


Fig. 1. TEM images of silicon (Si) and silica (SiO_2) nanostructures produced from the pyrolysis of mixed solid Si and SiO_2 powders under nitrogen. Insets are electron diffraction patterns recorded from different segments of the nanostructure, indicating the local crystal structure and growth direction.

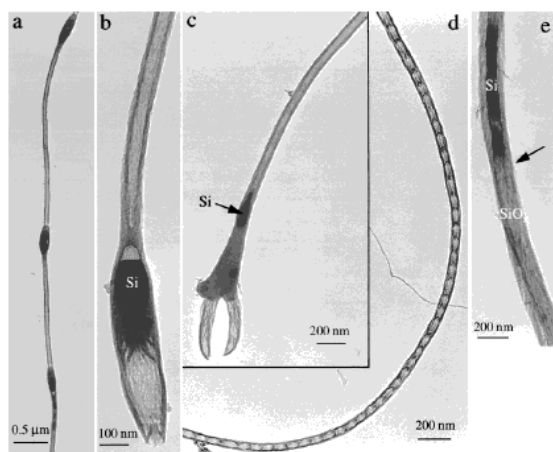


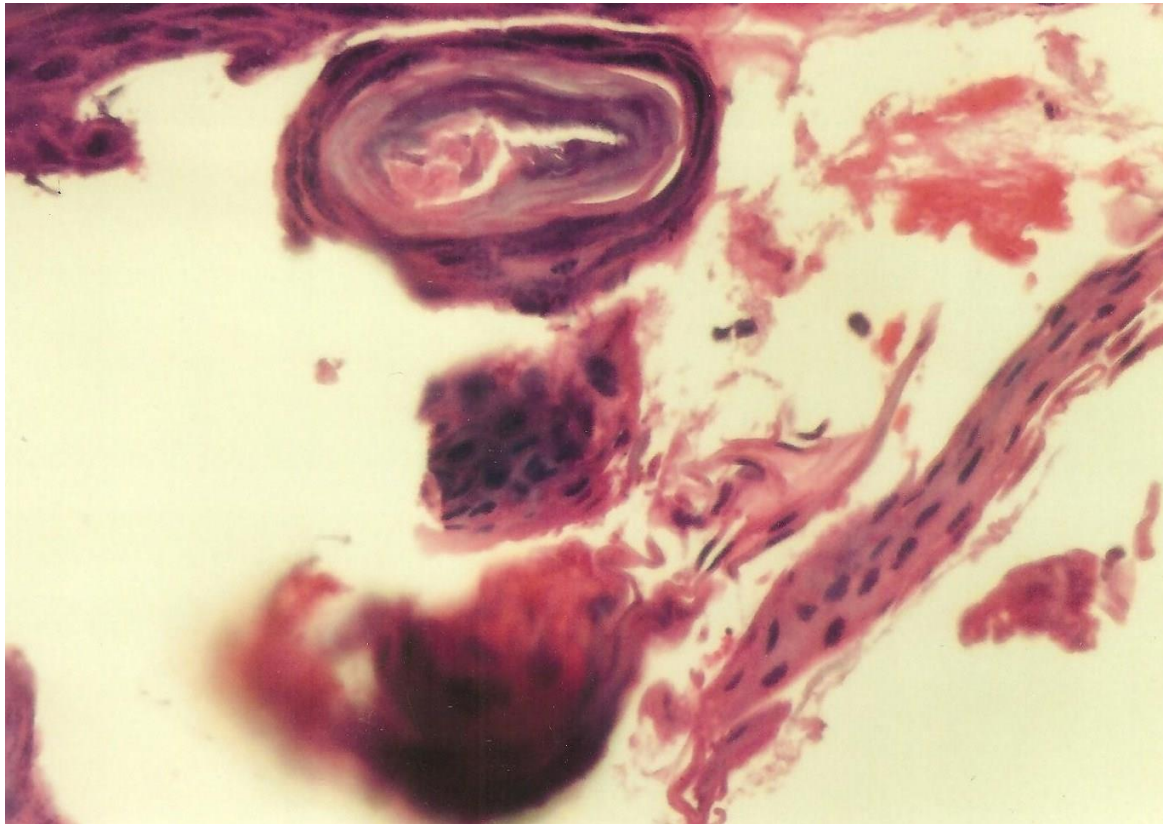
Fig. 2. TEM images of synthesized silica nanotube structures usually formed following the trapping of silicon nanocrystals.

PHOTOGRAPH 5:

Photograph of skin tissue biopsy of a female, upper skin surface showing green nano horns in/on its surface.

Note waterborne polyurethane nano composite material forming styrene nanohorns on human skin surface. Photomicrograph taken by Dr. Rahim Karjoo, Pathologist Project: Fiber, Morgellons and Meteorite © 2006 H. Staninger

(Note: Nanohorn non pinkish area, upper left corner of photomicrograph.)



Note: 3 o'clock center you will see perfect squares, which are styrene nano horns that have been broken.

