

EFFECTS ON SERUM LEVELS OF TOXIC CHEMICALS, XENOBIOTICS AND RELATED SYMPTOMATIC SCORES THROUGH THE USE OF A 21-DAY WHOLE FOOD PURIFICATION PROGRAM

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ABSTRACT

There is scientific evidence that toxins have been shown to be a contributing or causative factor for many diseases and disorders. Toxin levels can be reduced and the body's own detoxification systems can be supported and enhanced to function at optimal levels through use of the whole food complexes. In this outcome paper, nine individuals completed the 21-Day Standard Process Whole Food Purification Program. After comparing their pre and post Metametrix Toxic Effects Profiles, (which provides serum/whole blood levels of chlorinated pesticides, polychlorinated biphenyls (PCBs), volatile solvents, cholesterol, triglycerides, and total lipids), individuals displayed significant changes in lowering the levels of these analytes as well as improvement in symptomatic results as measured by a standardized screening questionnaire. The results indicate the 21-Day Whole Food Purification Program has positive effects on the mobilization and clearance of toxins that individuals are exposed to on a daily basis.

INTRODUCTION

Exposure to toxins – including pesticides, industrial compounds, pollutants, volatile solvents, heavy metals, plasticizers, dental amalgams – has been shown to be a contributing or causative factor for many diseases and disorders. Associations have been shown between toxins and vasculitis, cardiomyopathy, respiratory failure and other lung diseases (such as emphysema), many types of cancers, Parkinson's disease, multiple sclerosis, amyotrophic lateral sclerosis, fibromyalgia, gastrointestinal upset, renal failure, bladder and kidney dysfunction, endocrine dysfunctions, chronic fatigue syndrome (CFS), and multiple chemical sensitivity (MCS).^[1,3-8] There are indications that toxins may also affect conditions such as atherosclerosis, diabetes, memory loss, obesity, autism, and more. According to some institutes, 95% of cancers are environmentally induced. Research has demonstrated that toxins have an additive effect, often a synergistic effect, on the magnitude and duration of the inflammatory response to tissue insult or injury.^[1-7] Many chronic conditions can be exacerbated by the interference of toxins with the immune system and its capacity for repair.

The number of human-made chemicals is now estimated to exceed over 160 billion kilograms (352 billion pounds) per year. There are at least 80,000 chemicals in our environment now and there are an immense number of compounds within those chemicals—some estimate 200,000. Foreign materials (xenobiotics) can cause cellular injury leading to disease, and may ultimately lead to death.^[7] In 2009 the Centers for Disease Control (CDC) released its fourth report on Human Exposure to Environmental Chemicals. Some of the chemicals were found in the blood serum of nearly all or all of the participants. Even chemicals such as DDT, which have been banned for decades, are still found in the blood of US residents.^[9] All humans carry a toxic load within their bodies due to lifetime exposure.

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Foods and beverages can also be a major contributor to toxins directly or can stimulate the production of toxins in the body. Pesticide residues, drug and hormone residues, plasticizer-leaching from packaging, synthetic preservatives,

artificial colors and flavors, and other chemicals are found in commercial foods. Refined sugars and grains, altered and refined fats, artificial sweeteners, over-processed foods, foods cooked at high temperatures, and other modified versions of foods that strip nutrients, transforms or degenerates them in some manner, adds or provokes production of toxins.^[12] Even foods considered "healthy," such as certain farm raised fish, have been shown to contain very high levels of toxic chemicals.^[31] Many of these substances are stored in the body,



particularly in fat tissues, organs, and extracellular spaces.

While decreasing the amount of toxins in the environment and minimizing exposure to toxins are important, we cannot escape exposure to all toxins in today's world. Even low-dose daily exposure to toxic chemicals can adversely affect health^[10] by accumulating in bodily tissues over months and years. Toxins, which are not excreted, are stored usually in fat tissues throughout the body. Although many of these compounds can cause a direct acute toxic effect on the body, they can also contribute to disturbances in numerous metabolic pathways at much lower levels through their endocrine-disrupting effects.^[11]

There is scientific substantiation whereby toxin levels can be reduced and the body's own detoxification systems can be supported and enhanced to function at their best. The main components of detoxification within the body include: liver – biotransformation; kidneys – filtration and excretion; lymphatics and biliary pathways – mobilization of lipid stored and cellular toxins; intestines – elimination; skin and lungs – excretion through sweat and exhalation.

Whole food complexes can have a pronounced effect on the mobilization and clearance of various toxins. Elizabeth H Jeffery, PhD explains: "Having reviewed the mechanisms of action of food components, it appears easy to understand how multiple food components trigger up-regulation of detoxification systems and that whole foods and mixtures may provide greater effects than single components."^[21, 22,23] According to William Rea, MD, director of the Environmental Health Center in Dallas, "All of the main detoxification systems are run with nutrients."^[7] Nutritional deficiencies are common and can be exacerbated by toxic load. Gastrointestinal, hepatic and renal damage due to toxins may further deplete nutritional status.

Certain foods and herbs have been shown to influence detoxification activity through improved gut microbial function and modulation of various detoxification enzymes, systems, and pathways. These include: **Juniper** – *cholagogue and cholaretic activity, increases urine clearance without affecting*

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electrolyte balance, increases hepatic microcirculation, hepatoprotective, diaphoretic; Burdock – hepatoprotective, free radical scavenging, anti-bacterial, anti-mutagenic, blood purifier; Red Clover – chemoprotective, Phase II hepatic function (quinone reductase), decreases lipid peroxidation, hyperlipidemia and hypercholesterolemia; Oregon Grape Root – tonic and alterative; Cayenne Pepper Powder – chemo protective, Phase I modulation, hepatoprotective, intermediate metabolite antioxidant activity, lipid metabolism; Red Beet Root – supports phase II methylation and sulfation, supports proper bile flow; Celandine – cholaretic; Silymarin – hepatoprotective, Phase I support; Tillandsia Powder – Phase II support, antioxidant support; Buckwheat and Alfalfa – non-specific CYP 450 regulation, inhibits lipid peroxidation, anti-atherosclerotic, chemo protective, cholagogue and cholaretic; Choline – lipid metabolism; Fiber and Pectins – promotes removal of conjugated toxins excreted via bile and may decrease absorption of some toxins; Beetroot – toxin-protective effects on the liver and assists in liver detoxification due, in part, to its high concentration of betaine, a methyl donor in the liver's transmethylation pathway,^[26] Cruciferous Vegetables – rich in numerous phytochemical compounds which can modulate both phase I and II liver detoxification as well as increase glucoronidation.^[27]

CASE ANALYSIS

A retrospective analysis of 9 cases was performed to evaluate the efficacy of a 21-Day Whole Food

Purification Program on the mobilization and removal of various toxic elements as measured by pre and post testing using the Metamatrix Toxic Effects Profile (TEP). The TEP provides serum/whole blood levels of chlorinated pesticides, polychlorinated biphenyls (PCBs), volatile solvents, cholesterol, triglycerides, and total lipids.

Following the 21-Day Purification Program, blood serum/whole blood levels of chlorinated pesticides, PCBs, volatile solvents, cholesterol, triglycerides, and total lipids were measured for comparison to pre-program results. Each individual also performed a pre and post standardized toxicity screening questionnaire (TSQ) to compare symptomatic changes experienced by the individuals after the completion of the program.

21-DAY PURIFICATION PROGRAM DETAILS

The 21-Day Purification Program is designed to support the general health and wellness of individuals as well as support all of the body's detoxification systems and pathways. Thus, it is more comprehensive than most detoxification programs which mainly rely on stimulating phase I and II liver pathways only. The program is constructed of a nutritional supplementation regimen consisting of products manufactured by Standard Process of Palmyra, WI as outlined below: SP Cleanse[®], SP Complete[®], SP Whey Pro Complete[®], SP Whole Food Fiber[®], and SP Green Food[®] as well as dietary modifications including: 1) Increased intake of raw, lightly cooked, or juiced fresh vegetables and fresh fruit 2) Up to one cup of lentils, brown or wild rice per day 3) Four to seven teaspoons of unrefined high-quality oils per day 4) A minimum of 64 ounces of spring water or purified

All individuals examined experienced beneficial changes in the levels of various toxins in their blood and a substantial decrease in their symptomatic scores as recorded on the TSQ.

...This provides evidence that the 21-Day Purification Program appears to have general efficacy toward the goal of reducing toxic burden.

water each day 5) Optional organic apple cider vinegar, sea salt, spices, and fresh or dried herbs as desired. The following could be added to the diet from day 11 to completion on day 21: A total of three to 12 ounces per day of deep sea fish and/or select organic, free range lean chicken. No nuts, seeds, legumes (other than lentils), starchy root vegetables, red meats, dairy, eggs, grains (except wild or brown rice), alcohol, caffeine, tobacco, or other stimulants.

RESULTS

All individuals examined experienced beneficial changes in the levels of various toxins in their blood and a few individuals experienced substantial decreases in the levels of toxins in their blood. Their symptomatic scores also substantially decreased as recorded on the TSQ. In some cases, levels of initially undetected toxins rose, which could be considered a normal, positive effect from the 21-Day Purification Program on the mobilization and clearance of bio-accumulated toxins. This should emphasize the importance of repeating cycles of the 21-Day Purification Program especially in individuals with higher levels of body fat.

CONCLUSIONS

The nine individuals analyzed all showed beneficial changes in their serum/whole blood levels of numerous toxic substances. All nine individuals also recorded substantially lower TSQ scores, which prove a reduction and or resolution of various symptoms. This provides evidence that the program has efficacy toward reducing toxic burden. It is also significant that a comprehensive program which was limited to a relatively short period of 21 days is effective in lowering toxic burden. Additionally, this analysis provided evidence of how some toxicants tend to increase during the initial phase of stimulated clearing, possibly due to their wider distribution throughout all lipid-rich body partitions and/or continued exposure. Procedures such as the 21-Day Whole Food Purification Program and screening tools such as the Metamatrix Toxic Effects Profile and standardized screening questionnaires should be considered as a first line intervention in individuals suffering from or concerned about exposure to various environmental chemicals.

Due to the number and complexity of analytes measured as well as space limitations of this paper, total graphical representation is not feasible. However, the table presented below offers a good representation of the results achieved.

Chlorinated Pesticides	Initially Present	Decreased	Increased	No Change
DDE	7	7	1	0
DDT	0	0	0	0
Dieldrin	0	0	0	0
Heptachlor Epoxide	0	0	0	0
Hexachlorobenzene	1	1	1	0
Mirex	0	0	0	0
Oxychlorane	0	0	0	0
trans-Nonachlor	2	1	1	1
Polychlorinated Biphenyls (PCBs)	Initially Present	Decreased	Increased	No Change
PCB 118	0	0	0	0
PCB 126	0	0	0	0
PCB 156	5	5	0	0
PCB 169	0	0	0	0
PCB 74	0	0	0	0
PCB 138	4	2	2	2
PCB 153	3	2	1	1
PCB 180	4	1	3	3
Lipid Panel	Initially Present	Decreased	Increased	No Change
Cholesterol	9	8	1	0
Triglycerides	9	6	3	0
Total Lipids	9	6	0	3
Volatile Solvents	Initially Present	Decreased	Increased	No Change
Benzene	0	0	0	0
Ethylbenzene	5	5	0	0
Styrene	1	0	6	0
Toluene	0	0	1	0
m,p-Xylene	7	7	0	0
o-Xylene	2	2	0	0
Hexane	7	5	2	0
2-Methylpentane	7	5	2	0
3-Methylpentane	7	6	1	0
Iso-octane	7	0	7	0

For a complete explanation of the various tested analytes and their common routes of exposure please refer to the official Metamatrix "Clinician Interpretive Guides" on Chlorinated Pesticides, Polychlorinated Biphenyls (PCB's) and Volatile Solvents available at Metamatrix.com.

¹ Rea WJ. Improving Lives Through Environmental Health. *Altern Ther*. May/June 2011; 17(3):65-69.
² National Cancer Institute. Environmental Cancer Risk. National Institute of Environmental Health Sciences. Apr 2010; www.nih.gov. CDC. Agency for Toxic Substances and Disease Research. www.cancer.gov/cancertopics/causes.
³ Olmstead MJ. Heavy meal sources, effects, and detoxification. *Altern Ther Complement Med*. Dec 2000: 347-354.
⁴ Racciatti D, Vecchiet J, et al. Chronic fatigue syndrome following a toxic exposure. *Sci Total Environ*. 2001; 270(1-3):27-31.

⁵ Sherer TB, Betarbet R, Greenamyre JT. Environment, mitochondria, and Parkinson's disease. *Neuroscience*. 2002; 8(3):192-197.
⁶ Silkworth JB, Brown JF Jr. Evaluating the impact of exposure to environmental contaminants on human health. *Clin Chem*. 1996; 42(8B):1345-1349.
⁷ Watkins LR, Maier SF. Implications of immune-to-brain communication for sickness and pain. *Proc Natl Acad Sci USA*. 1999; 96:7710-7713
⁸ Baillie-Hamilton PF. Chemical toxins: A hypothesis to explain the global obesity epidemic. *J Altern Complement Med*. 2002; 8(2):185-192.
⁹ National Research Council. *Biologic Markers in Immunotoxicology*. Washington, DC: National Academy Press, 1996; 70.
¹⁰ Centers for Disease Control. Fourth Report on Human Exposure to Environmental Chemicals. 2009 and updates 2012; www.cdc.gov/ExposureReport.
¹¹ Crinnion, WJ. Environmental medicine, part 1: The human burden of environmental toxins and their common health effects. *Altern Med Rev*. 2000; 5(1):52-63.
¹² Geenen S, Taylor PH, et al. Systems biology tools for toxicology. *Arch Toxicol*. 9 May 2012, Epub ahead of print.
¹³ Bravou MC, Miracle foods. *J Amer Coll Nutr*. Feb 2006; 25(1):78.
¹⁴ Bennett P. Working up the toxic patient: Practical intervention and treatment strategies. *Altern Ther Hlth & Med*. Mar/Apr 2007; 13(2):S100-S106.
¹⁵ Costa LG. Contaminants in fish: risk—benefit considerations. *Arch Hig Rada Toksikol*. Sep 2007; 58(3):367-374.
¹⁶ Testai E. The relevance of xenobiotic metabolism in the interindividual susceptibility to chemicals. *Folia Histochem Cytobiol*. 2001; 39(Suppl 2):48-49.
Liska, DJ. The detoxification enzyme systems. *Altern Med Rev*. 1998; 3(3):187-198.
¹⁷ Sligar, SG. Glimpsing the critical intermediate in cytochrome P450 oxidations. *Science*. 12 Nov 2010; 330(6006):924-937.
¹⁸ Jandacek RJ et al. Enterohepatic circulation of organochlorine compounds: A site for nutritional intervention. *J Nutr Biochem*. 2007; 18:163-167.
¹⁹ Baker SM. Who Ingores Individuality fails the patient. *Altern Ther Hlth & Med*. Mar/Apr 2007; 13(2):S88-S95.
²⁰ Bell IR, Baldwin JC, Schwartz GE. Sensitization studies in chemically intolerant individuals: implications for individual difference research. *Ann NY Acad Sci*. 2001; 933:38-47.
²¹ www.webmd.com/content/article/11/1685_52520.htm. Accessed November 20, 2006.
²² Jeffery, EH. Diet and detoxification enzymes. *Altern Ther Hlth & Med*. Mar/Apr 2007, 13(2):S98-S99.
²³ Harris PJ, Sasidharan VK, et al. Absorption of a hydrophobic mutagen to cereal brans and cereal bran dietary fibres. *Mutation Res*. 1998; 412:323-331.
²⁴ Bland J. Managing biotransformation: Introduction and overview. *Altern Ther Hlth & Med*. Mar/Apr 2007; 13(2):S85-S87.
²⁵ Jellin JM et al. *Natural Medicines Comprehensive Database*. 4th ed, Stockton, CA: Therapeutic Research Foundation; 2002.
²⁶ www.sholehealthmd.com/ME2/dirmod.asp?sid=17E09E7CFF640448FFB0B4FC1B7EF0&nm=Reference+Library&type=AWHN_Foods&mod=Foods&mid=&id=27EDDC1594834363A0EE30AB659C2C3&tier=2. Accessed November 20, 2006.
²⁷ Shaikh ZA, Tang W. Protection against chronic cadmium toxicity by glycine. *Toxicol*. 15 Feb 1999; 132(2-3):139-146.
²⁸ Balbis E et al. Whey proteins influence hepatic glutathione after CC14 intoxication. *Toxicol Ind Health*. 2009; 25:325-328.
²⁹ J Pizzorno, Toxic metal elimination. *Integrative Med*. Dec 2010/Jan 2011; 9(6):12.
³⁰ Head KA, ed. Calcium-D-glucarate. *Alt Med Rev*. 2002; 7(4):336-3
³¹ Global Assessment of Organic Contaminants in Farmed Salmon Ronald A. Hites, Jeffery A. Foran, David O. Carpenter, M. Coreen Hamilton, Barbara A. Knuth, and Steven J. Schwager Science 9 January 2004: 226-229

