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## Detoxification Summary

In this issue we address the broad subject of detoxification. We acknowledge the vast number of pollutants present in our environment; stress the importance of identifying how you may reduce exposure and “body burden” with links to reliable sources of information; and provide practical options that you may implement to help decrease your toxic load.

## Chemicals and Your Body

The contamination of our environment, and bodies by synthetic chemicals is of increasing concern. The United States alone has developed, distributed, and discarded more than 80,000 chemicals into the environment<sup>1</sup> and the majority of these have not been tested for potential toxic effects in humans.<sup>2</sup>

The quantity of a chemical substance in an individual or population is defined as a “body burden.” Bio-monitoring studies have identified contamination throughout the life-cycle and for an extensive number of chemicals. For example, newborns in the U.S. have an average of 200 industrial chemicals, pollutants, and pesticides identified within their umbilical cord blood<sup>3</sup> (see Figure 1). The Centers for Disease Control and Prevention have routinely examined the blood and urine of a sample of the U.S. population and it is clear that all U.S. citizens have ingested, inhaled, or absorbed a variety of chemicals.<sup>4</sup>

While health concerns have been identified with numerous chemicals, uncertainty exists regarding if and at what concentrations many of these chemicals cause adverse health outcomes.<sup>5</sup> (see Table 1).

Awareness and precaution are important tools to prevent exposure to synthetic chemicals and protect health. To learn more about public health and the environment refer to the Environmental Working Groups website at [www.ewg.org](http://www.ewg.org) where you can find a clearinghouse of information including a cosmetic safety database, pesticides in produce, tuna calculator, pollution solutions, and more.

– RP

> [References](#)

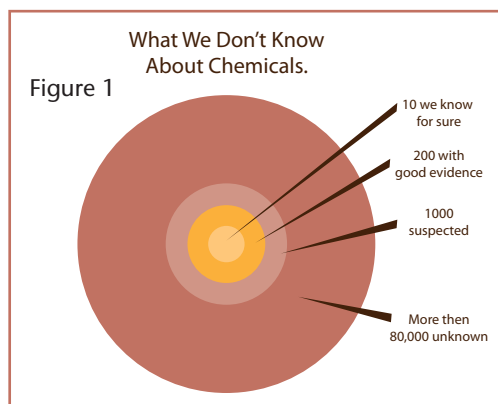










Table 1

## Chemicals and pollutants detected in human umbilical cord blood

	<p><b>Mercury (Hg) - tested for 1, found 1</b></p> <p>Pollutant from coal-fired power plants, mercury-containing products, and certain industrial processes. Accumulates in seafood. Harms brain development and function.</p>
	<p><b>Polyaromatic hydrocarbons (PAHs) - tested for 18, found 9</b></p> <p>Pollutants from burning gasoline and garbage. Linked to cancer. Accumulates in food chain.</p>
	<p><b>Polybrominated dibenzodioxins and furans (PBDD/F) - tested for 12, found 7</b></p> <p>Contaminants in brominated flame retardants. Pollutants and byproducts from plastic production and incineration. Accumulate in food chain. Toxic to developing endocrine (hormone) system</p>
	<p><b>Perfluorinated chemicals (PFCs) - tested for 12, found 9</b></p> <p>Active ingredients or breakdown products of Teflon, Scotchgard, fabric and carpet protectors, food wrap coatings. Global contaminants. Accumulate in the environment and the food chain. Linked to cancer, birth defects, and more.</p>
	<p><b>Polychlorinated dibenzodioxins and furans (PCDD/F) - tested for 17, found 11</b></p> <p>Pollutants, by-products of PVC production, industrial bleaching, and incineration. Cause cancer in humans. Persist for decades in the environment. Very toxic to developing endocrine (hormone) system.</p>
	<p><b>Organochlorine pesticides (OCs) - tested for 28, found 21</b></p> <p>DDT, chlordane and other pesticides. Largely banned in the U.S. Persist for decades in the environment. Accumulate up the food chain, to man. Cause cancer and numerous reproductive effects.</p>
	<p><b>Polybrominated diphenyl ethers (PBDEs) - tested for 46, found 32</b></p> <p>Flame retardant in furniture foam, computers, and televisions. Accumulates in the food chain and human tissues. Adversely affects brain development and the thyroid.</p>
	<p><b>Polychlorinated Naphthalenes (PCNs) - tested for 70, found 50</b></p> <p>Wood preservatives, varnishes, machine lubricating oils, waste incineration. Common PCB contaminant. Contaminate the food chain. Cause liver and kidney damage.</p>
	<p><b>Polychlorinated biphenyls (PCBs) - tested for 209, found 147</b></p> <p>Industrial insulators and lubricants. Banned in the U.S. in 1976. Persist for decades in the environment. Accumulate up the food chain, to man. Cause cancer and nervous system problems.</p>

Source: Chemical analyses of 10 umbilical cord blood samples were conducted by AXYS Analytical Services (Sydney, BC) and Flett Research Ltd. (Winnipeg, MB).

# Modified Citrus Pectin: An Effective Detoxifying Agent



Globally, heavy metal toxicity can cause significant health problems of varying degrees in multiple systems. The two most common heavy metals that cause adverse effects are mercury and lead.<sup>1</sup> Addressing heavy metals as part of an integrative medical plan can aid in the prevention and treatment of these multiple ailments. Briefly, we present the results of two studies that utilize modified citrus pectin (MCP) in adults and children with a high toxic load.

## What is citrus pectin and modified citrus pectin (MCP)?

Pectins are gel-forming polysaccharides from plant cell walls, especially apple and citrus fruits. Pectins are a type of viscous dietary fiber and vary in the length of their polysaccharide chains, from 300-1,000 monosaccharides. Although pectins are not digestible by humans, modified citrus pectin (MCP) is altered to increase their absorbability. Pectin from citrus rinds is depolymerized through a treatment with sodium hydroxide and hydrochloric acid. The resultant smaller molecule is comprised predominantly of D-polygalacturonates and may be more easily absorbed by the human digestive system.<sup>2</sup>

## The Role of Modified Citrus Pectin as an Effective Chelator of Lead in Children

Lead toxicity is an ongoing concern worldwide. Children, the most vulnerable to the long-lasting effects of lead exposure, are in urgent need of a safe and effective heavy metal chelating agent to overcome the heavy

metals and lead exposure challenges they face daily.

A pilot clinical study (N = 7 children) was performed to determine if the oral administration of modified citrus pectin (MCP) is effective at lowering lead toxicity in the blood of children between the ages of 5 and 12 years. Hospitalized children with a blood serum level greater than 20 ug/dL who had not received any form of chelating and/or detoxification medication for 3 months prior were given 15 g of MCP (PectaSol) in 3 divided dosages a day for up to 4 weeks. Blood serum and 24-hour urine excretion collection analysis were performed on day/s 1, 14, 21 and 28.

The study showed a dramatic decrease in blood serum levels of lead (P = 0.0016; 161% average change) and a dramatic increase in 24-hour urine collection (P = 0.0007; 132% average change). The need for a gentle, safe heavy metal-chelating agent, especially for children with high environmental chronic exposure, is great. There were no observed adverse effects in this pilot study.<sup>3</sup>

## Integrative Medicine and the Role of Modified Citrus Pectin/Alginates in Heavy Metal Chelation and Detoxification

Five adults demonstrated a reduction in toxic heavy metals (lead and mercury—74% average decrease) without side effects with MCP alone or in combination with alginates. It is thought that the gradual decrease of total body heavy metal burden played an important role in each patient's recovery and health maintenance.<sup>4</sup>

**Dosage:** MCP often comes in powder form. Mixing the powder with a liquid three times daily is the most efficient method of dosing. It also comes in 800 mg capsules which would require 6 capsules three times a day to approach 15g daily.

– SKK

### Foods with the highest amount of pectin include:

- Citrus Rind (grapefruits, oranges, apricots)
- Apples
- Legumes
- Bananas
- Beets
- Cabbage
- Carrots
- Cereal

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# Sweating for Health

Detoxification is the cellular processes whereby the body identifies, neutralizes, and eliminates toxic substances and metabolic by products. A number of safe and health-promoting lifestyle changes can be implemented to safely increase your body's natural ability to detoxify.

The five general areas of detoxification include exercise, healthy nutrition, relaxation techniques, massage, and regular sauna use.<sup>1</sup> The body stores many of its toxins in the subcutaneous fat; and sweating is an effective therapy to help release some of these toxins. Regular physical exercise and saunas are two effective methods to help stimulate the health benefits of a good sweat.

A relaxing sauna increases the air temperature to 160-200°F (~70-90°C) thereby maximizing sweating. This process diverts blood to the skin where excess sodium, nitrogen, and toxins are slowly released. In the last fifty years, research on regular sauna use has demonstrated a positive effect on stress reduction, detoxification, lower blood pressure, and decreased pain. Appropriate sauna use is safe for most people of all ages; although people who have had recent surgery, unstable cardiovascular conditions such as recent MI or CVA, multiple sclerosis, acute lung infections, and pregnancy complications should check with their primary care practitioner.<sup>3</sup>

In general, the guidelines for a healthy, fun, and safe sauna are simple:

- Start out with short sessions (~10-15 minutes)
- Take frequent breaks to cool off
- Drink a lot of water
- Avoid alcohol during a sauna
- Wait approximately one hour after eating
- Don't wear any metal or jewelry (glasses, rings, earrings)
- Sit on a towel for hygiene
- Be aware of your body's changes
- Relax

Applying approximately one cup of water periodically to hot rocks will increase the humidity and temperature. Some people like to place a few drops of their favorite essential oil to the rocks for the added benefit of aromatherapy (check with an aroma therapist for the best way to administer essential oils).

After the sauna, rinse off with a cool shower or take a dip in a lake. Taking a sauna after exercise or massage will enhance relaxation and the release of toxins. Lower temperature infra-red saunas do not use steam. Instead they utilize skin penetrating infra-red light at lower temperatures (~120°F) to induce mild sweating. It is a good option for those who cannot tolerate the higher temperatures of a traditional sauna.



For further reading on the healthy effects of sauna therapy, refer to a resourceful book entitled:

**The Holistic Handbook of Sauna Therapy** by Nenah Sylver.<sup>4</sup>

– LF

## Five ways to facilitate your body's detoxification

1. Exercise
2. Healthy nutrition
3. Relaxation techniques
4. Massage
5. Regular sauna use

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# Fish Eating Guidelines: To Eat or Not to Eat Fish

The American Heart Association and the scientific committee that updated the Dietary Guidelines for America both agree that two servings of fish a week for most people is beneficial. Collectively, fish are an excellent source of proteins, vitamins, and minerals. The fats are largely unsaturated and are especially rich in omega-3 fatty acids, specifically eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). These fats are found in the brain and thought to be important for normal infant nervous system development. Nearly all health authorities advise pregnant women to eat fish once or twice a week.

Unfortunately the salt and freshwaters of the world are overflowing with toxic chemicals and diminishing fish populations. According to Marion Nestle, a noted food expert, the most troubling health dilemma is balancing the benefits of fish consumption with the harm that may be caused by its content of unsafe chemicals.

## How to avoid methylmercury in your fish?

- Carry a seafood card from an advocacy group that lists fish lowest in methylmercury (see website suggestions)
- Eat the safest tuna—canned chunk to light tuna that is not labeled “white”
- Avoid shark, swordfish, tilefish, king mackerel, albacore tuna, or any other predatory fish at the top of the food chain
- Decline to eat any fish caught by recreational means

- Eat all other fish in small amounts
- Feed your children small amounts of fish

## Questions to ask to avoid/reduce methylmercury/PCBs in your fish

- Where does the fish come from? (Different bodies of water have different loads of toxic chemicals)
- Is it farmed or wild? (Wild salmon may have less toxic chemicals depending on where it is caught; farmed fish, if fed fish meal and oil, can higher levels)
- Where is it on the food chain? (Predatory fish eat smaller fish and increase their chemical load stored in the fat)
- Is it listed in a state advisory? (Check Seafood Watch Guidelines for your region)
- How much fat does it contain? (The higher fat content, the potentially higher chemical load)

The websites listed on the following page provide resources for your region. We have included the MBA Midwest Seafood Watch Guidelines in this issue.

– SKK

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## Mercury/Methylmercury

Mercury alone is not very toxic. When mercury is exposed to water, however, microorganisms methylate it and convert it to methylmercury which is quickly and easily absorbable. If pregnant, methylmercury crosses the placenta and goes directly to the brain and nervous system of a developing fetus, with potentially disastrous brain and nervous system damage.

## Polychlorinated biphenyls (PCBs)

PCBs are organic hydrocarbons usually with chlorine or bromine attached. They include some agricultural pesticides such as chlordane, dieldrin, and DDT, as well as PCBs and dioxins from industrial waste and emissions. Many of these chemicals have been banned or discontinued for years yet they persist in our oceans, lakes and streams worldwide. PCBs and related chemicals can cause the same problems as methylmercury with an additional problem. All fish contain PCBs and farmed fish—those fed fish meal and fish oils—have more.



- To use your pocket guide:
1. Cut along outer black line
  2. Fold on grey lines

<p><b>How to use this guide</b></p> <p>The seafood in this guide may occur in more than one column based on how it is caught, where it is from, etc. Please read all columns and be sure to check labels or ask questions when shopping or eating out.</p> <ul style="list-style-type: none"> <li>• Where is the seafood from?</li> <li>• Is it farmed or wild-caught?</li> <li>• How was it caught?</li> </ul> <p>If you're not sure, choose something else from the green or yellow columns.</p> <p>This Seafood Guide was last updated in <b>October 2007.</b></p>	<p><b>Make Choices for Healthy Oceans</b></p> <p><b>You Have the Power</b></p> <p>Your consumer choices make a difference. Buy seafood from the green or yellow columns to support those fisheries and fish farms that are healthier for ocean wildlife and the environment.</p> <p>Contaminant information provided by: <b>ENVIRONMENTAL DEFENSE</b></p>	<p><b>Learn more</b></p> <p>Visit <a href="http://www.seafoodwatch.org">www.seafoodwatch.org</a> for:</p> <ul style="list-style-type: none"> <li>• More detailed information about these recommendations</li> <li>• Recommendations for seafood not on this list</li> <li>• The latest version of this and other regional guides</li> <li>• Information on seafood and your health and much more...</li> </ul>  <p><b>MONTEREY BAY AQUARIUM</b></p> <p>The seafood recommendations in this guide are credited to the Monterey Bay Aquarium Foundation ©2007. All rights reserved. Printed on recycled paper.</p>	  <p><b>Central US Seafood Guide</b> <b>2009</b></p>
<p>Seafood may appear in more than one column</p> <p>Council standard. Visit <a href="http://www.mscc.org">www.mscc.org</a></p> <p>Visit <a href="http://www.oceansalive.org/actcm">www.oceansalive.org/actcm</a></p> <p>Some or all of this fishery is certified as sustainable to the Marine Stewardship Council standard. Visit <a href="http://www.mscc.org">www.mscc.org</a></p> <p>* Limit consumption due to concerns about mercury or other contaminants.</p> <p>* Mid-Atlantic = North Carolina to New York</p> <p>Northeast = Connecticut to Maine</p> <p>Key</p> <p>Other marine life or the environment.</p> <p>Caught or farmed in ways that harm the environment.</p> <p>Approved for now as these items are caught or farmed in ways that harm the environment.</p> <p>Good Alternatives are an option, but there are concerns with how they're caught or farmed – or with the health of their habitat – due to other human impacts.</p> <p>Best Choices are abundant, well-managed and caught or farmed in environmentally friendly ways.</p> <p>Good Alternatives are an option, but there are concerns with how they're caught or farmed – or with the health of their habitat – due to other human impacts.</p> <p>Approved for now as these items are caught or farmed in ways that harm the environment.</p>	<p><b>AVOID</b></p> <p>Chilean Seabass/Toothfish*</p> <p>Cod: Atlantic</p> <p>Cod: King (imported)</p> <p>Crab: King (imported)</p> <p>Founders: Soles (Atlantic)</p> <p>Groupers*</p> <p>Hallbut: Pacific*</p> <p>Hallbut: Atlantic</p> <p>Lobster: Spiny (Caribbean imported)</p> <p>Mahi mahi/Dolphinfish (imported)</p> <p>Monkfish</p> <p>Orange Roughy*</p> <p>Rockfish (Pacific)</p> <p>Salmon (farmed, including Atlantic)*</p> <p>Scallops: Sea (Mid-Atlantic)</p> <p>Sharks*</p> <p>Shrimp (imported farmed or wild)</p> <p>Snapper: Red</p> <p>Sturgeon*: Caviar (imported wild)</p> <p>Swordfish (imported)*</p> <p>Tuna: Albacore, Bigeye, Yellowfin (longline)*</p> <p>Tuna: Bluefin*</p>	<p><b>GOOD ALTERNATIVES</b></p> <p>Basa, Swai (farmed)</p> <p>Cod: Pacific (trawled)</p> <p>Clams (wild)</p> <p>Cod: Pacific (trawled)</p> <p>Crab: Blue*: King (US), Snow</p> <p>Crab: Imitation/Surimi</p> <p>Founders: Soles (Pacific)</p> <p>Herring: Atlantic/Sardines</p> <p>Lobster: American/Maine</p> <p>Mahi mahi/Dolphinfish (US)</p> <p>Oysters (wild)*</p> <p>Oysters (farmed)</p> <p>Scallops: Sea (Northeast and Canada)</p> <p>Shrimp (US farmed or wild)</p> <p>Squid</p> <p>Swordfish (US longline)*</p> <p>Tuna: Bigeye, Yellowfin (troll/pole)</p> <p>Tuna: Canned light, canned white/Albacore*</p>	<p><b>BEST CHOICES</b></p> <p>Barramundi (US farmed)</p> <p>Catfish (US farmed)</p> <p>Clams (farmed)</p> <p>Cod: Pacific (Alaska longline) +</p> <p>Cod: Dungeness, Stone</p> <p>Hallbut: Pacific +</p> <p>Herring: Atlantic/Sardines</p> <p>Lobster: Spiny (US)</p> <p>Mussels (farmed)</p> <p>Oysters (farmed)</p> <p>Pollock (Alaska wild) +</p> <p>Salmon (Alaska wild) +</p> <p>Scallops: Bay (farmed)</p> <p>Striped Bass (farmed or wild)*</p> <p>Sturgeon, Caviar (farmed)</p> <p>Tilapia (US farmed)</p> <p>TROUT: Rainbow (farmed)</p> <p>Tuna: Albacore (US +; British Columbia troll/pole)</p> <p>Tuna: Skipjack (troll/pole)</p>

**Web Resources**

The following are some excellent sources for the clinician and consumer to consult when making more sustainable and healthier fish consumption choices. Many of the links provide downloadable guides on fish consumption practices by fish species and/or geographical region.

- [www.blueoceaninstitute.org](http://www.blueoceaninstitute.org)
- [www.farmedanddangerous.org](http://www.farmedanddangerous.org)
- [www.seafoodchoices.com](http://www.seafoodchoices.com)

- [www.environmentaldefense.org](http://www.environmentaldefense.org)
- [www.oceansalive.org](http://www.oceansalive.org)
- [www.seafoodwatch.org](http://www.seafoodwatch.org)

This summary article is entirely based on the information provided by Marion Nestle, What To Eat. North Point Press, 2007, pp. 181-247 (The Fish Counter).

# Foodways Focus: Wild Rice Nation

Spanning the watersheds surrounding the Great Lakes in the midwestern United States and southern Canada, Wild Rice has strong extant traditions of ricing, fishing, and hunting. Although farming occurs at many sites within the region, orchard production, wild foraging, and meat procurement are its most distinctive traditions. The rituals associated with wild rice persist among most of the Anishnabe, Chippewa or Ojibwe, Cree, and Menominee peoples of the region, although cheap California-grown rice still economically threatens the economic well-being of authentic ricers. Immigrant cultures, including the French, Scots, English, Germans, Belgians, Norwegians, and Swedes, have also had a profound impact on the region's land use and culinary history. In the seventeenth century, the Metis culture unique to the region evolved among the descendants of marriages between indigenous people—woodland Cree, Ojibwa, Saulteaux, and Menominee—and Europeans—French Canadians, Scots, and English. Their foodways have remained relatively stable, although a number of fish stocks have declined due to introduced invasive species. At least 32 traditional foods are now at risk in Wild Rice Nation.

Nabhan GP, Ed. *Renewing America's Food Traditions: Saving and Savoring the Continent's Most Endangered Foods*. Chelsea Green Publishing, 2009.



Image courtesy of:  
<http://www.garynabhan.com/press/gpn000012.html>

## Match the Toxin

Match the toxin on the left to its description on the right.

- |  |  |
|--|--|
| 1 Hg (Mercury (methylmercury)) and PCB (Polychlorinated biphenyls) | A Banned in the US, persists in the environment, can cause cancer  |
| 2 OC (Organochlorine pesticides)                                   | B High levels found in fish  |
| 3 PAH (Polycyclic aromatic hydrocarbons)                           | C Active ingredients or breakdown products of Teflon, Scotchgard, fabric and carpet protectors, food wrap coatings; global contaminant, collects in the food chain; linked to cancer and birth defects |
| 4 PFC (Perfluorinated chemicals)                                   | D Pollutant from burning gasoline and carbon, can cause cancer, accumulates in the food chain  |

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Answers: 1-B, 2-A, 3-D, 4-C

# References

## CHEMICALS AND YOUR BODY

<sup>1</sup>United States Government Accountability Office Report to Congressional Requesters. June 2005. GAO-05-458.

<sup>2</sup>Bio-monitoring of Industrial Pollutants: Health & Policy Implications of Chemical Body Burden. Public Health Reports. 2002.

<sup>3</sup>BodyBurden.The Pollution in Newborns.Environmental Working Group July 14, 2005. <http://archive.ewg.org/reports/bodyburden2/contentindex.php>.

<sup>4</sup>Centers for Disease Control and Prevention. Third National Report on Human Exposure to Environmental Chemicals. Atlanta (GA): CDC, 2005.

<sup>5</sup>The Use of Biomonitoring Data in Exposure and Human Health Risk Assessments. Environ Health Perspect. 2006;114:1755–1762.

## MODIFIED CITRUS PECTIN: AN EFFECTIVE DETOXIFYING AGENT

<sup>1</sup>Eliaz I. et al. 2007. Integrative Medicine and the Role of Modified Citrus Pectin/Alginates in Heavy Metal Chelation and Detoxification—Five Case Reports. Forschende Komplementarmed 14:358-364.

<sup>2</sup>[www.naturalstandard.com/monographs/herbssupplements/modifiedcitruspectin.asp](http://www.naturalstandard.com/monographs/herbssupplements/modifiedcitruspectin.asp) Accessed on 9/9/2008.

<sup>3</sup>Zhao, ZY et al. 2008. The Role of Modified Citrus Pectin as an Effective Chelator of Lead in Children Hospitalized with Toxic Lead Levels. Altern Ther Health Med. 14(4):34-38.

<sup>4</sup>Eliaz I. et al. 2007.

## SWEATING FOR HEALTH

<sup>1</sup>Wisner, R et al. Treatment of Children with the Detoxification Method Developed by Hubbard. Proc Am Public Health Assoc; 1995.

<sup>2</sup>Crinnion, W. Components of Practical Clinical Detox Programs—Sauna as a Therapeutic Tool. Alt Therapies Health Med; Mar/Apr 2007; 13,2.

<sup>3</sup>Hannuksela, M et al. Benefits and Risks of Sauna Bathing. Am J Med; Feb 2001, Vol 110, p118-126.

<sup>4</sup>Sylver, N. The Holistic Handbook of Sauna Therapy. The Center for Frequency, 2004.

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