TOXDetect PROFILE

REQUISITION #	9900001	COLLECTION TIME	Not Given
PATIENT NAME	Report Sample	COLLECTION DATE	May 1, 2024
DATE OF BIRTH	Apr 10, 2005	SAMPLE TYPE	Urine
GENDER	M	REPORT DATE	Jun 4, 2024
PRACTITIONER	NO PHYSICIAN		

Summary of Elevated Results

The results below lists metabolites with elevated results detected in the profile. You can find all test results and a more detailed description of each metabolite starting on the TOXDetect Profile results section. Please note that each value in the report needs to be considered in the context of the overall health and environment. Contact a qualified healthcare provider for further assistance in interpretation of results.

Color Key LOW MODERATE HIGH

Creatinine Value: * 100.00 mg/dl

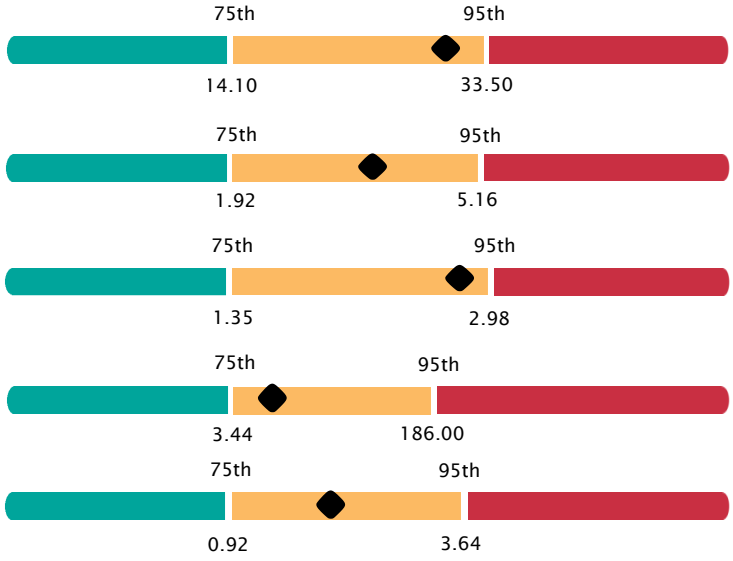
METABOLITE	RESULTS	PERCENTILE
Parent	ug/g creatinine	75% | 95%

HIGH RESULTS

6) **2-3-4 Methylhippuric Acid (2,-3-,4-MHA)** Xylene	**1,603.00**	75th 208.00 · 95th 1010.00
12) **2-Hydroxyethyl Mercapturic Acid (HEMA)** Ethylene Oxide, Vinyl Chloride	**6.20**	75th 1.86 · 95th 4.83
13) **2,4-Dichlorophenoxyacetic Acid (2,4-D)** 2,4-Dichlorophenoxyacetic Acid (2,4-D)	**5.10**	75th 0.58 · 95th 1.60
16) **Diphenyl Phosphate (DPP)** Triphenyl Phosphate	**8.00**	75th 1.63 · 95th 5.60
17) **N-Acetyl (Carbomethyl) Cysteine** Acrylamide	**220.00**	75th 93.40 · 95th 212.00
18) **Perchlorate (PERC)** Perchlorate	**16.00**	75th 4.01 · 95th 9.39

*Methodology: LC-MS/MS. *The creatinine test is performed to adjust metabolic marker results for differences in fluid intake. Urinary creatinine, from a random collection, has limited diagnostic value due to variability as a result of recent fluid intake.*
The results should be interpreted in conjunction with the complete clinical picture, given patient history and presentation, and at the discretion of the medical provider.

MODERATE RESULTS



2) Monobutyl phthalate (MBP) **30.00**
Di-n-butyl Phthalate (DBP)

3) Mono-2ethylhexyl phthalate (MEHP) **3.00**
Di(2-ethylhexyl) Phthalate (DEHP)

8) N-Acetyl Phenyl Cysteine (NAP) **2.80**
Benzene

9) N-Acetyl (2-Cyanoethyl) Cysteine (NACE) **25.00**
Acrylonitrile

19) Bisphenol S (BPS) **1.50**
Bisphenol S (BPS)

TOXDetect PROFILE

TOXDetect Profile Results

The profile results offer a comprehensive breakdown of metabolite levels, grouped by chemical class, which include phthalates, volatile organic compounds (VOCs), pesticides, and other metabolites.

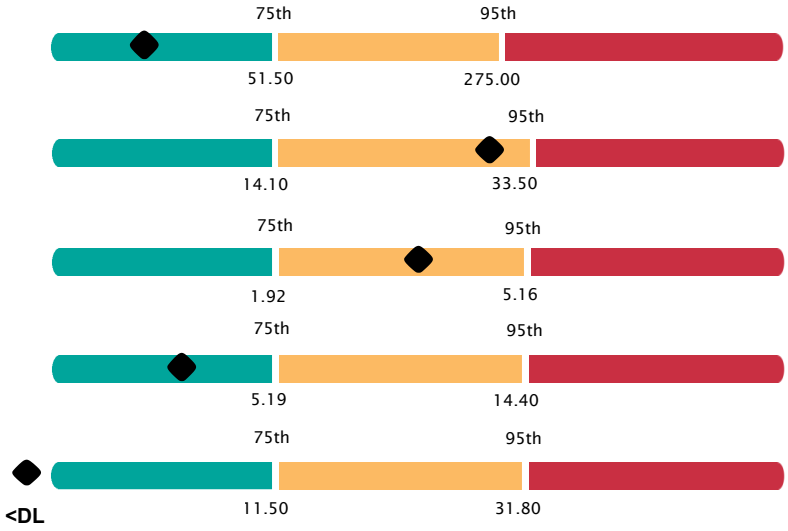
Color Key LOW MODERATE HIGH

Creatinine Value: * 100.00 mg/dl

METABOLITE	RESULTS	PERCENTILE
Parent	ug/g creatinine	75% | 95%

PHTHALATES

Phthalates are a family of widely used chemicals found in most products that have contact with plastics during production, packaging, or delivery. These plasticizers which make plastic more flexible, and durable are associated with a number of health problems including reproductive, neurological, respiratory, and increased risk of certain types of cancer. Most significantly they are known as endocrine disruptors. Phthalates are referred to as “the everywhere chemical” due to the fact they are used in hundreds of products, including toys, food packaging, shampoo, vinyl flooring, and more.



Color Key LOW MODERATE HIGH

Creatinine Value: * 100.00mg/dl

METABOLITE	RESULTS	PERCENTILE
Parent	ug/g creatinine	75% | 95%

VOC - VOLATILE ORGANIC COMPOUNDS

6) 2-3-4 Methylhippuric Acid (2,-3-,4-MHA) Xylene — **1,603.00**

Parent Compound: Xylene

Xylene is widely used in industry and medical laboratories. Xylene is released primarily from industrial sources. One can also come in contact with xylene through automobile exhaust and a variety of consumer products such as cigarette smoke, paints, varnish, rust preventives, and shellac. Literature suggests that xylene exposure causes toxic effects on various systems of the body. Longer term effects can damage the liver and kidneys.

7) Phenylglyoxylic Acid (PGO) Styrene/Ethylbenzene — **120.00**

Parent Compound: Styrene/Ethylbenzene

Styrene is widely used to make plastics and rubber, which are used to manufacture a variety of products, such as insulation, pipes, automobile parts, printing cartridges, food containers, and carpet backing. Exposure may occur through ingestion via transfer to foods, especially fatty foods heated in styrene containers, through breathing indoor air that has styrene vapors from building materials, photocopiers, tobacco smoke, and other products. Styrene and styrene oxide have been implicated as reproductive toxicants, neurotoxicants, and linked to an increased risk of leukemia and lymphoma.

8) N-Acetyl Phenyl Cysteine (NAP) Benzene — **2.80**

Parent Compound: Benzene

Benzene has been used extensively in the past as an industrial solvent; however, due to its toxicity and potential health hazards, its use has been reduced. Exposure can occur occupationally, in the general environment and in the home as a result of the ubiquitous use of benzene-containing petroleum products, including motor fuels and solvents. Benzene exposure has been linked to respiratory, hepatic, cardiovascular, immune, nervous, and endocrine system dysfunction.

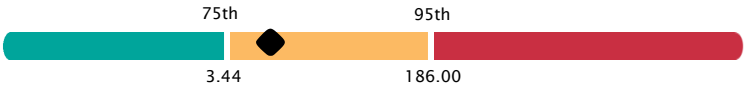
Color Key LOW MODERATE HIGH

Creatinine Value: * 100.00 mg/dl

METABOLITE	RESULTS	PERCENTILE
Parent	ug/g creatinine	75% | 95%

VOC - VOLATILE ORGANIC COMPOUNDS

9) **N-Acetyl (2-Cyanoethyl) Cysteine (NACE)** Acrylonitrile **25.00**



Parent Compound: Acrylonitrile

Acrylonitrile exposure occurs through the use of products containing acrylonitrile, such as acrylic fiber clothing or carpeting, acrylonitrile-based plastics, leaching into foods from plastic food containers, and cigarette smoke. Humans exposed to high levels via inhalation experienced respiratory tract irritation, labored breathing, dizziness, cyanosis, limb weakness and convulsions. It is considered a probable human carcinogen, with evidence suggesting an association with lung cancer.

10) **N-Acetyl (Propyl) Cysteine (NAPR)** 1-bromopropane **6.00**

Parent Compound: 1-bromopropane

1-bromopropane is used as a solvent in adhesives, dry cleaning, degreasing, and electronic and metal cleaning industries. Health impacts of 1-bromopropane exposure include neurotoxicity, reproductive toxicity, hematopoietic disorders, DNA damage, and respiratory toxicity. It can also cause symptoms such as headache, mucosal irritation, decreased sensation, paresthesia, and stumbling.

11) **N-Acetyl (3,4-Dihydroxybutyl) Cysteine (NADB)** 1,3 butadiene **300.00**

Parent Compound: 1,3 butadiene

1,3 butadiene is a petrochemical used to produce synthetic rubber used for car and truck tires and is also an environmental toxicant found in car exhaust, combustion of fuels for warmth or energy production and cigarette smoke. It is associated with adverse health impacts, including cancer, and cardiovascular disease. The International Agency for Research on Cancer (IARC) concluded that 1,3 butadiene is a human carcinogen.

Color Key LOW MODERATE HIGH

Creatinine Value: * 100.00 mg/dl

METABOLITE	RESULTS	PERCENTILE
Parent	ug/g creatinine	75% | 95%

VOC - VOLATILE ORGANIC COMPOUNDS

12) **2-Hydroxyethyl Mercapturic Acid (HEMA)** Ethylene Oxide, Vinyl Chloride **6.20**

Parent Compound: Ethylene Oxide, Vinyl Chloride

Ethylene oxide is a man made substance widely used in the production of various chemicals such as plastics, textiles and antifreeze (ethylene glycol). Additionally, ethylene oxide is commonly used as a sterilizing agent for medical equipment. Inhalation is the most common route of exposure in occupational settings and via tobacco smoke. There is some evidence that exposure to ethylene oxide can cause a pregnant woman to lose a pregnancy. The International Agency for Research on Cancer (IARC) concluded that ethylene oxide is a known human carcinogen, exposure is linked to increased risk of leukemia and non-Hodgkin's lymphoma.

Vinyl chloride is colorless gas used primarily to manufacture polyvinyl chloride (PVC) and widely used in numerous products such as pipes, wire and cable insulation, packaging materials, various construction materials and disposable medical products. Inhalation is the most common route of exposure primarily in occupational settings, also via smoke from cigars or cigarettes. Acute high-level exposure can produce headaches, dizziness, drowsiness, and loss of consciousness. Long term exposure can result in hepatocellular changes and increased incidence of liver cancer. The International Agency for Research on Cancer (IARC) concluded that vinyl chloride is carcinogenic to humans.

Color Key LOW MODERATE HIGH

Creatinine Value: * 100.00 mg/dl

METABOLITE	RESULTS	PERCENTILE
Parent	ug/g creatinine	75% | 95%

PESTICIDES

13) **2,4-Dichlorophenoxyacetic Acid (2,4-D)** 2,4-Dichlorophenoxyacetic Acid (2,4-D)

5.10

Parent Compound: 2,4-Dichlorophenoxyacetic Acid (2,4-D)
2,4-Dichlorophenoxyacetic Acid (2,4-D) is one of the most widely used herbicides in the world. It is commonly used in agriculture and landscaping. Chronic exposure to lower levels of 2,4-D has been associated with potential health effects, including endocrine disruption, reproductive effects, developmental effects, and increased risk of non-Hodgkin lymphoma.

14) **3-Phenoxybenzoic Acid (3-PBA)**
Pyrethoids, Permethrin, Cypermethrin, Cyhalothrins, Fenpropathrin, Deltamethrin, Trihalomethrin

1.00

Parent Compound: Pyrethroids
Pyrethroids are widely used in agriculture, household insect control, and veterinary medicine. Pyrethroids work by targeting the nervous system of insects, causing hyperexcitation and paralysis. The most common potential impacts to health include neurobehavioral, neurodevelopmental, and endocrine disruption. Exposure has also been associated with an increased risk of all-cause and cardiovascular disease mortality.

15) **Diethylphosphate (DEP)**
Organophosphates

<DL

Parent Compound: Organophosphates
Organophosphate pesticides are widely used in agriculture to control pests, as well as in residential settings to manage insects and rodents. The organophosphate pesticides work by inhibiting the activity of acetylcholinesterase, an enzyme essential for proper nerve function. Exposure to organophosphates has been associated with neurological deficits, neurodegenerative diseases, peripheral nerve effects, and neurodevelopmental issues. Additionally, long-term exposure has been linked to oxidative stress, psychological effects, and liver function abnormalities.

Color Key LOW MODERATE HIGH

Creatinine Value: * 100.00 mg/dl

METABOLITE	RESULTS	PERCENTILE
Parent	ug/g creatinine	75% | 95%

OTHER

16) Diphenyl Phosphate (DPP)
Triphenyl Phosphate

8.00

Parent Compound: Triphenyl Phosphate
Triphenyl phosphate is commonly used as a flame retardant in consumer products such as furniture, electronics, and textiles. It is also present in personal care products, such as nail polish and cosmetics, and contact with these products can lead to dermal absorption. Triphenyl phosphate can also be ingested from food and beverages due to migration from packaging materials or contamination during food processing. Exposure to triphenyl phosphate can alter endocrine function and impact reproduction. Altered thyroid function and decreased semen quality has been observed in humans.

17) N-Acetyl (Carbomethyl) Cysteine (NAE) Acrylamide

220.00

Parent Compound: Acrylamide
Acrylamide is formed when starchy foods, such as potatoes, grains, and coffee beans, are cooked at high temperatures. Other potential sources of acrylamide exposure include cigarette smoke, as acrylamide is formed during the combustion of tobacco, and certain cosmetic products that may contain acrylamide as a contaminant. Acrylamide has been linked to an increased risk of cancer, particularly in organs such as the kidneys, ovaries, and uterus. Other potential health effects include neurotoxicity, genotoxicity, reproductive toxicity, hepatotoxicity, immunotoxicity, and increased cardiovascular risk.

18) Perchlorate (PERC)
Perchlorate

16.00

Parent Compound: Perchlorate
Perchlorate is a chemical used in fireworks, road flares, explosives, and rocket fuel. Perchlorates are considered environmental contaminants due to their widespread use and persistence in the environment. Perchlorate can also enter the food supply through contaminated water used for irrigation or through food processing. Milk is also a source of perchlorate, the content in milk is related to the presence of perchlorate in feed. Perchlorate inhibits the thyroid's uptake of iodine. This interference can disrupt thyroid function and lead to health problems such as hypothyroidism (underactive thyroid) or other thyroid disorders. Pregnant women, infants, and children are particularly vulnerable to the effects of perchlorate exposure on thyroid function.

Color Key LOW MODERATE HIGH

Creatinine Value: * 100.00 mg/dl

METABOLITE	RESULTS	PERCENTILE
Parent	ug/g creatinine	75% | 95%

OTHER

19) Bisphenol S (BPS)
Bisphenol S (BPS)

1.50

Parent Compound: Bisphenol S (BPS)
Bisphenols are synthetic compounds used in the production of plastics and resins, commonly found in various consumer products, including food and drink containers, water bottles, thermal receipt papers, dental sealants, toys, cosmetics, and the lining of canned goods. Along with being a known endocrine disruptor, BPA has raised concerns due to potential health impacts related to reproductive and developmental effects, increased risk of obesity, diabetes, cardiovascular disease, and certain cancers. In response to these concerns many companies now produce “BPA-Free” products; however, some BPA alternatives like BPS have also raised concerns about potential similar effects.

Interpretations

The information provided in this report, including the results and commentary, is intended solely for educational purposes and should not be construed as treatment recommendations. It is recommended that you consult with your healthcare provider for any necessary treatment. References related to this report and interpretations can be found at **MosaicDX.com/Test/TOXDetect-Profile.**

PHTHALATES

Color Key — LOW | MODERATE | HIGH

Monoethylphthalate (MEP) Diethylphthalates	LOW	20.00
Monobutyl phthalate (MBP) Di-n-butyl Phthalate (DBP)	MODERATE	30.00
Mono-2ethylhexyl phthalate (MEHP) Di(2-ethylhexyl) Phthalate (DEHP)	MODERATE	3.00
Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP) Di(2-ethylhexyl) Phthalate (DEHP)	LOW	3.00
Monoisobutyl phthalate (MiBP) Di(2-ethylhexyl) Phthalate (DEHP)	LOW	<DL

PHTHALATES

Enhanced insight into phthalate exposure is provided by measuring five phthalate metabolites. Phthalates are a series of widely used chemicals found in most products that have contact with plastics during production, packaging, or delivery. These plasticizers which make plastic more flexible, and durable are associated with a number of health problems including reproductive, neurological, respiratory, and increased risk of certain types of cancer. Most significantly they are known as endocrine disruptors. Exposure can occur through various routes including ingestion - phthalates can leach from food and beverage packaging materials, inhalation - phthalates can be released into the air from products such as vinyl flooring, shower curtains and air fresheners, dermal contact - phthalates can be absorbed through the skin from personal care products, as well as from vinyl gloves and vinyl flooring. Phthalates are metabolized through various pathways, they are conjugated with glucuronic acid or sulfate in the liver, these conjugated metabolites are eliminated from the body through urine or feces. Inducted perspiration can be a useful method to facilitate the elimination of certain toxic phthalate compounds, including DEHP and MEHP.

Interpretation Continued

VOC - VOLATILE ORGANIC COMPOUND

Color Key LOW MODERATE HIGH

2-3-4 Methylhippuric Acid (2,-3-,4-MHA) Xylene	**1,603.00**	**N-Acetyl Phenyl Cysteine (NAP)** Benzene	**2.80**
Phenylglyoxylic Acid (PGO) Styrene/Ethylbenzene	**120.00**		

METHYLHIPPURIC ACID (2,-3-,4-MHA)

Is a metabolite generated as a result of exposure to xylene, an aromatic hydrocarbon widely used in industry and medical laboratories. It is used extensively as a solvent in the rubber, printing, and leather industries. It is also used as a thinner for paints, cleaning agents, and varnishes. Xylene is released primarily from industrial sources. One can also come in contact with xylene through automobile exhaust and a variety of consumer products such as cigarette smoke, paints, varnish, rust preventives, and shellac. Literature suggests that xylene exposure causes toxic effects on various systems of the body. Central nervous system toxicity may lead to headaches, irritability, depression, insomnia, agitation, extreme tiredness, tremors, impaired concentration, and damage to short-term memory. Longer term effects can damage the liver and kidneys. Xylene is primarily eliminated through metabolism in the liver and subsequent excretion of 70-80% of metabolites in urine within 24 hours after exposure. Xylene is metabolized in the liver by side-chain (CH3) dehydroxylation, finally forming the metabolite methylhippuric acid.

PHENYLGLYOXYLIC ACID (PGO)

Is a metabolite generated as a result of exposure to styrene/ethylbenzene widely used to make plastics and rubber, which are used to manufacture a variety of products, such as insulation, pipes, automobile parts, printing cartridges, food containers, and carpet backing. Exposure occurs through breathing indoor air that has styrene vapors from building materials, photocopiers, tobacco smoke, and other products. Styrene may also leach from polystyrene containers used for food products, especially when food is heated in these containers. Short term exposure can cause CNS depression and skin and respiratory irritation. Long term exposure can damage the reproductive system and cause problems such as infertility and birth defects, can cause neurological damage such as memory loss, difficulty concentrating, and can cause impaired motor function. Exposure to PGO has been linked to an increased risk of leukemia and lymphoma. In the liver, styrene is metabolized to styrene-7,8-oxide (SO) by cytochrome P-450 enzymes. SO can then be further metabolized to styrene glycol, mandelic acid, and phenylglyoxylic acid, which are excreted in the urine. Glutathione conjugation is also a significant pathway for detoxification.

N-ACETYL PHENYL CYSTEINE (NAP)

Is a metabolite generated as a result of the exposure to benzene, an industrial solvent. Its use has been reduced due to toxicity and potential health hazards. Exposure has been associated with a range of acute and long-term adverse health effects and diseases, including cancer and hematological effects. Exposure can occur occupationally, in the general environment and in the home as a result of the ubiquitous use of benzene-containing petroleum products, including motor fuels and solvents. Active and passive exposure to tobacco smoke is also a significant source of exposure. Benzene exposure has been linked to respiratory, hepatic, cardiovascular, immune, nervous, and endocrine system dysfunction. High exposure to benzene may cause nausea, vomiting, dizziness, poor coordination, central nervous system depression, and even death. 22,23 The metabolism of benzene is complex and involves multiple enzymatic pathways. Benzene is primarily metabolized in the liver by the cytochrome P450 enzyme system. It undergoes oxidation to form several metabolites. These metabolites can further undergo conjugation with glucuronic acid or sulfate to form more water-soluble compounds that can be excreted in urine.

Interpretation Continued

VOC - VOLATILE ORGANIC COMPOUN

Color Key LOW MODERATE HIGH

N-Acetyl (2-Cyanoethyl) Cysteine (NACE) Acrylonitrile	25.00	
N-Acetyl (Propyl) Cysteine (NAPR) 1-bromopropane	6.00	
N-Acetyl (3,4-Dihydroxybutyl) Cysteine (NADB) 1,3 butadiene		300.00

N-ACETYL (2-CYANOETHYL) CYSTEINE (NACE)

Is a metabolite generated as a result of the exposure to acrylonitrile. Acrylonitrile exposure comes from the use of products containing acrylonitrile, such as acrylic fiber clothing or carpeting, acrylonitrile-based plastics, leaching into foods from plastic food containers, and cigarette smoke. Humans exposed to high levels via inhalation experience respiratory tract irritation, labored breathing, dizziness, cyanosis, limb weakness and convulsions. Long-term exposure to acrylonitrile has been associated with subjective symptoms such as headache, fatigue, and general malaise. Acrylonitrile is primarily metabolized by the liver, involving the conjugation with glutathione by glutathione transferases. This chemical reaction results in the formation of N-Acetyl (2-Cyanoethyl) Cysteine, which is excreted in the urine. It is considered a probable human carcinogen, with evidence suggesting an association with lung cancer.

N-ACETYL (PROPYL) CYSTEINE (NAPR)

Is a metabolite of 1-bromopropane, which is an organic solvent used for metal cleaning, foamgluing, and dry cleaning. Studies have shown that 1-BP is a neurotoxin as well as a reproductive toxin. Research indicates that exposure to 1-BP can cause sensory and motor deficits. Chronic exposure can lead to decreased cognitive function and impairment of the central nervous system. Acute exposure can lead to headaches. Individuals who have high levels of 1-bromopropane should examine their environment to determine their exposure route. 1-bromopropane elimination can be accelerated by the supplementation of glutathione (reduced) either oral, intravenous, transdermal, or its precursor N-acetyl cysteine (NAC).

N-ACETYL (3,4-DIHYDROXYBUTYL) CYSTEINE (NADB)

Is a metabolite generated as a result of exposure to 1,3 butadiene, a petrochemical used to produce synthetic rubber used for car and truck tires and is also an environmental toxicant found in car exhaust, combustion of fuels for warmth or energy production and cigarette smoke. It is associated with adverse health impacts, including cancer, and cardiovascular disease. The International Agency for Research on Cancer (IARC) concluded that 1,3 butadiene is a human carcinogen. Exactly how humans metabolize 1,3 butadiene is unknown. The predominant route of exposure is inhalation, about half of inhaled 1,3 butadiene is broken down and exhaled. The remaining is broken down to its metabolites in the liver and excreted in the urine.

VOC - VOLATILE ORGANIC COMPOUND

Color Key LOW MODERATE HIGH

2-Hydroxyethyl Mercapturic Acid (HEMA) Ethylene Oxide, Vinyl Chloride		**6.20**

2-HYDROXYETHYL MERCAPTURIC ACID (HEMA)

Is a metabolite generated as a result of exposure to ethylene oxide or vinyl chloride. Ethylene oxide is a man made substance widely used in the production of various chemicals such as plastics, textiles, and antifreeze (ethylene glycol). Additionally, ethylene oxide is commonly used as a sterilizing agent for medical equipment. Inhalation is the most common route of exposure in occupational settings and via tobacco smoke. There is some evidence that exposure to ethylene oxide can cause a pregnant woman to lose a pregnancy. The International Agency for Research on Cancer (IARC) concluded that ethylene oxide is a known human carcinogen, exposure is linked to increased risk of leukemia and non-Hodgkin's lymphoma. Ethylene oxide is then metabolized by epoxide hydrolase (EH) and glutathione S-transferase (GST) enzymes. These enzymes handle the breakdown and removal of ethylene oxide from the body. Vinyl chloride is colorless gas used primarily to manufacture polyvinyl chloride (PVC) widely used in numerous products such as pipes, wire and cable insulation, packaging materials, various construction materials and disposable medical products. Inhalation is the most common route of exposure primarily in occupational settings, also via smoke from cigars or cigarettes. Low level exposure is possible via contaminated drinking water. Individuals living near hazardous waste sites and landfills may be exposed to higher levels. Acute high level exposure can produce headaches, dizziness, drowsiness, and loss of consciousness. Long term exposure can result in hepatocellular changes and increased incidence of liver cancer. The International Agency for Research on Cancer (IARC) concluded that vinyl chloride is carcinogenic to humans. Metabolism in humans is attributed to the P-450 monooxygenases in the liver. Intermediates are detoxified primarily via glutathione conjugation and excreted in the urine.

Interpretation Continued

PESTICIDES

Color Key LOW MODERATE HIGH

2,4-Dichlorophenoxyacetic Acid (2,4-D)
2,4-Dichlorophenoxyacetic Acid (2,4-D)
5.10

3-Phenoxybenzoic Acid (3-PBA)
Pyrethoids, Permethrin, Cypermethrin, Cyhalothrins, Fenpropathrin, Deltamethrin, Trihalomethrin
1.00

2,4-DICHLOROPHENOXYACETIC ACID (2,4-D)

Is the result of exposure to 2,4-Dichlorophenoxyacetic Acid (2,4-D) is one of the most widely used herbicides in the world. It is commonly used in agriculture and landscaping. Chronic exposure to lower levels of 2,4-D has been associated with potential health effects, including endocrine disruption, reproductive effects, developmental effects, and increased risk of non-Hodgkin lymphoma. The specific enzymes and genes involved in the metabolism of 2,4-D in humans have not been extensively studied. In animals it is metabolized through processes like conjugation, forming glucuronide, sulfation, and other conjugations, which generate products that are excreted in urine.

3-PHENOXYBENZOIC ACID (3PBA)

Is a metabolite generated as a result of exposure to pyrethroids, one of the most commonly used pesticides in household and agricultural fields accounting for 30% of insecticide used worldwide. They are modeled after the natural insecticidal compounds found in chrysanthemum flowers, known as pyrethrins. They are widely used in agriculture, household insect control, and veterinary medicine. Pyrethroids work by targeting the nervous system of insects, causing hyperexcitation and paralysis. The most common potential impacts to health include neurobehavioral, neurodevelopmental, and endocrine disruption. Exposure has also been associated with an increased risk of all-cause and cardiovascular disease mortality. There is limited information on the metabolism of pyrethroids, their metabolism involves enzymes such as cytochrome P450 isoforms and carboxylesterases.

Interpretation Continued

PESTICIDES

Color Key LOW MODERATE HIGH

Diethylphosphate (DEP)
Organophosphates <DL

DIETHYLPHOSPHATE (DEP)

Is a metabolite generated as a result of exposure to a number of organophosphate pesticides used widely in agriculture to control pests, as well as in residential settings to manage insects and rodents. The organophosphate pesticides work by inhibiting the activity of acetylcholinesterase, an enzyme essential for proper nerve function. Exposure to organophosphates has been associated with neurological deficits, neurodegenerative diseases, peripheral nerve effects, and neurodevelopmental issues. Additionally, long-term exposure has been linked to oxidative stress, psychological effects, and liver function abnormalities. Organophosphates metabolize to dialkyl phosphate metabolites in humans through various enzymatic reactions. Cytochrome P450 (CYP) enzymes and paraoxonases (PONs) play a significant role in the formation of these metabolites.

Organophosphate Pesticides that are converted to DEP

Chlorethoxyphos	Ethion
Chlorfenvinphos	Malathion
Chlorpyrifos- methyl	Parathion
Coumaphos	Phorate
Diazinon	Sulfotep
Dioxathion	TEPP
Disulfoton	Terbufos
Dimathoate	Triazophos

Interpretation Continued

OTHER

Color Key LOW MODERATE HIGH

Diphenyl Phosphate (DPP) Triphenyl Phosphate	**8.00**	**N-Acetyl (Carbomethyl) Cysteine (NAE)** Acrylamide	**220.00**

DIPHENYL PHOSPHATE (DPP)

Is a metabolite generated as a result of exposure to triphenyl phosphate (TPHP), commonly used as a flame retardant in consumer products such as furniture, electronics, and textiles. It is also present in personal care products, such as nail polish and cosmetics and contact with these products can lead to dermal absorption. It can be released into the air from products or during manufacturing processes, causing exposure via inhalation. Another route of exposure is from food and beverages due to migration from packaging materials or contamination during food processing. Exposure to triphenyl phosphate can alter endocrine function and impacts reproduction. Altered thyroid function and decreased semen quality has been observed in humans. TPHP is primarily metabolized by cytochrome P450 enzymes, specifically CYP1A2 and CYP2E1, in the liver. These enzymes catalyze the oxidation of TPHP, leading to the formation of its major metabolite, diphenyl phosphate (DPP).

N-ACETYL (CARBOMETHYL) CYSTEINE (NAE)

Is a metabolite generated as a result of exposure to acrylamide, which is formed when starchy foods, such as potatoes, grains, and coffee beans, are cooked at high temperatures. Other potential sources of acrylamide exposure include cigarette smoke, as acrylamide is formed during the combustion of tobacco, and certain cosmetic products that may contain acrylamide as a contaminant. Acrylamide has been linked to an increased risk of cancer, particularly in organs such as the kidneys, ovaries, and uterus. Additionally, acrylamide exposure has been associated with neurotoxicity, which can lead to cognitive and motor abnormalities. Other potential health effects include genotoxicity, reproductive toxicity, hepatotoxicity, immunotoxicity, and increased cardiovascular risk. To decrease exposure, people can use lower cooking temperatures and opt for cooking methods that produce less acrylamide like boiling, steaming, and microwaving foods instead of baking, roasting, or frying.

Interpretation Continued

OTHER

Color Key LOW MODERATE HIGH

Perchlorate (PERC) Perchlorate	**16.00**	**Bisphenol S (BPS)** Bisphenol S (BPS)	**1.50**

PERCHLORATE (PERC)

Is a chemical used in fireworks, road flares, explosives, and rocket fuel. Perchlorates are considered environmental contaminants due to their widespread use and persistence in the environment. Perchlorates can leach into groundwater from industrial facilities, military sites, or areas where perchlorate-containing products are used or disposed of improperly causing contamination of drinking water. Perchlorate can also enter the food supply through contaminated water used for irrigation or through food processing. Milk is also a source of perchlorate, the content in milk is related to the presence of perchlorate in feed. Certain crops such as leafy greens, vegetables, and fruit have been found to accumulate perchlorate. The main target organ for perchlorate is the thyroid gland. Perchlorate inhibits the thyroid's uptake of iodine. This interference can disrupt thyroid function and lead to health problems such as hypothyroidism (underactive thyroid) or other thyroid disorders. Pregnant women, infants, and children are particularly vulnerable to the effects of perchlorate exposure on thyroid function. Perchlorate does not appear to be modified in the body, either by degradation or covalent binding.

BISPHENOL S (BPS)

Is generated as a result of exposure to bisphenol S. Bisphenol S (BPS) is metabolized in the body through phase II metabolism, specifically glucuronidation and sulfation. Bisphenols are synthetic compounds used in the production of plastics and resins, commonly found in various consumer products, including food and drink containers, water bottles, thermal receipt papers, dental sealants, toys, cosmetics, and the lining of canned goods. Along with being a known endocrine disruptor, BPA has raised concerns due to potential health impacts related to reproductive and developmental effects, increased risk of obesity, diabetes, cardiovascular disease, and certain cancers. In response to concerns, many companies now produce "BPA-Free" products, however, some BPA alternatives like BPS have also raised concerns about potential similar effects.

TOXDetect PROFILE

Dr LG Bates-Dubrow PhD CC(NRCC), Lab Director | CLIA 17D0919496
Mosaic Diagnostics | 9221 Quivira Road, Overland Park, KS 66215
MosaicDX.com

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