US BioTek LABORATORIES · PATIENT REPORT
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Clinical Laboratory Improvements Amendments

26134-0705

*** US BioTek** US BioTek. 16020 Linden Av N, Shoreline WA 98133

**Lab ID**
**Patient ID** P000060
**Ext ID** 26134-0705

## Test Patient

Sex: Female • 56yrs • 01-Jan-70

RECEIVED
14-May-26

# ENVIRONMENTAL TOXINS PANEL

Specimen type - Urine, Spot

Collected
04-Jun-26 01:42pm

## CYSTEINE DERIVATIVES

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| N-Acetyl (3,4-Dihydroxybutyl) cysteine (NADB) | 172.88 | | (<250.00) | ug/gCR |
| N-Acetyl (carbomoylethyl) cysteine | 20.05 | | (<190.00) | ug/gCR |
| N-Acetyl phenyl cysteine (SPMA) | 0.55 | | (<5.00) | ug/gCR |
| N-Acetyl (propyl) cysteine (NAPR) | 1.00 | | (<25.00) | ug/gCR |

## ENVIRONMENTAL PHENOLS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| 4-Nonylphenol | <DL | | (<3.00) | ug/gCR |
| Bisphenol A (BPA) | 0.78 | | (<4.00) | ug/gCR |
| Bisphenol S (BPS) | 0.10 | | (<0.80) | ug/gCR |
| Triclosan (TCS) | 5.24 | | (<50.00) | ug/gCR |

## HERBICIDES (Synthetic Auxins)

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| 2,4-Dichlorophenoxyacetic acid (2,4-D) | <DL | | (<1.00) | ug/gCR |

## HERBICIDES (Photosynthetic Inhibitors)

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Atrazine | 0.08 | | (<0.50) | ug/gCR |
| Atrazine mercapturate | <DL | | (<0.50) | ug/gCR |

## HERBICIDES (EPSP Inhibitors)

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Aminomethylphosphonic Acid (AMPA) | 0.23 | | (<2.00) | ug/gCR |
| Glyphosate | 0.2 | | (<1.0) | ppb |

## METHYLTERT-BUTYL ETHER (MTBE) EXPOSURE

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| 2-Hydroxylsobutyric Acid | 1.26 | | (<6.90) | mmol/molCR |

## MITOCHONDRIAL MARKERS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Tiglylglycine | 1.28 | | (<10.00) | ug/gCR |



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### PARABENS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Benzylparaben | 0.09 | | (<2.00) | ug/gCR |
| Butylparaben | <DL | | (<1.00) | ug/gCR |
| Ethylparaben | 0.46 | | (<7.00) | ug/gCR |
| Methylparaben | 118.17 | | (<120.00) | ug/gCR |
| 4-Hydroxybenzoic Acid (4-HBA) | 0.11 | | (<0.57) | mmol/molCR |
| Propylparaben | 2.57 | | (<35.00) | ug/gCR |

### PESTICIDES

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| 3-Phenoxybenzoic Acid (3PBA) | 0.07 | | (<3.00) | ug/gCR |
| Diethyl Phosphate (DEP) | 0.24 | | (<9.00) | ug/gCR |
| Diethyldithiophosphate (DEDTP) | 0.01 | | (<0.20) | ug/gCR |
| Diphenyl phosphate (DPP) | 0.60 | | (<2.50) | ug/gCR |
| Diethylthiophosphate (DETP) | <DL | | (<1.00) | ug/gCR |

### PFA's

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Perfluorobutanoic acid (PFBA) | <DL | | (<1.20) | ug/gCR |
| Perfluorooctanoic Acid (PFOA) | 0.01 | | (<0.10) | ug/gCR |
| Perfluorooctane Sulphonic Acid (PFOS) | <DL | | (<0.60) | ug/gCR |

### PHTHALATES

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Butyl Benzyl phthalate (BBP) | 0.16 | | (<1.00) | ug/gCR |
| Mono-Benzyl phthalate (mBzP) | <DL | | (<3.00) | ug/gCR |
| Mono-n-Butyl phthalate (mBP) | 21.76 | | (<55.00) | ug/gCR |
| Mono (3-carboxypropyl) phthalate (mCPP) | <DL | | (<31.00) | ug/gCR |
| Mono-ethyl phthalate (MEtP) | 9.19 | | (<100.00) | ug/gCR |
| Mono-2-ethylhexyl phthalate (MEHP) | 7.18 | | (<11.00) | ug/gCR |
| Mono-(2-ethy-5-hydroxyhexyl) phthalate (MEHHP) | 2.00 | | (<12.00) | ug/gCR |
| Mono-(2-ethy-5-oxohexyl) phthalate (MEOHP) | 3.44 | | (<27.00) | ug/gCR |
| Mono-n-octyl phthalate (mOP) | <DL | | (<2.00) | ug/gCR |
| Phthalic Acid | 10.98 | | (<170.00) | ug/gCR |
| Quinolinic Acid | 1.46 | | (<9.10) | mmol/molCR |



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### VOLATILE ORGANIC COMPOUNDS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| 2-hydroxyethyl-mercapturic acid (HEMA) | <DL | | (<5.00) | ug/gCR |
| Mandelic Acid | 1312.8 | H | (<340.0) | ug/gCR |
| Phenylglyoxylic Acid | 622.4 | H | (<300.0) | ug/gCR |
| Mandelic Acid + Phenylglyoxylic Acid | 1935.2 | H | (<610.0) | ug/gCR |

### BENZENES EXPOSURE

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| t,t-Muconic Acid | 0.04 | | (<0.12) | mmol/molCR |
| 3,4-Dimethylhippuric Acid | 0.01 | H | (<0.01) | mmol/molCR |

### TOLUENES EXPOSURE

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Benzoic Acid | 6.89 | | (<9.30) | mmol/molCR |
| Hippuric Acid | 499.7 | | (<603.0) | mmol/molCR |

### XYLENES EXPOSURE

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| 2-Methylhippuric Acid | 0.50 | H | (<0.04) | mmol/molCR |
| 3-Methylhippuric Acid | 0.50 | H | (<0.11) | mmol/molCR |

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Creatinine, Urine | 18.20 | | (3.45-22.90) | mmol/L |

### Environmental Toxins Comment

ENVIRONMENTAL POLLUTANTS PROFILE:

The reported markers in the Environmental Pollutants Profile commonly originate from industrial/manufacturing products or their associated byproducts. Exposures are often occupationally-related and typically through either inhalation or topical exposure.

Metabolism of these products occurs via the liver detoxification pathways leading to excretion into the urine. Chronic exposures may also lead to build up of these products in fatty tissue deposits.

MANDELIC ACID – ELEVATED (URINE):

Elevated urinary mandelic acid suggests increased exposure to styrene or ethylbenzene, as mandelic acid is a primary urinary metabolite of these aromatic hydrocarbons.

Clinically, elevated mandelic acid may be associated with headaches, dizziness, fatigue, mucosal irritation, or neurocognitive symptoms, depending on the level and duration of exposure.

From an organic acid pattern perspective, elevated mandelic acid is often observed alongside phenylglyoxylic acid and other aromatic solvent metabolites, reflecting increased aromatic hydrocarbon metabolism and detoxification demand.

From a functional medicine perspective, this finding should be interpreted in the context of occupational or environmental exposure (e.g. plastics manufacturing, resins, fuels, solvents), indoor air quality, and overall hepatic detoxification capacity, with emphasis on identifying



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and reducing exposure sources.

Treatment: Removal of sources of exposure.

PHENYLGLYOXYLIC ACID (PGO) ELEVATED (URINE):

Elevated urinary phenylglyoxylic acid (PGO) similarly suggests increased exposure to styrene or ethylbenzene, reflecting downstream oxidation of aromatic hydrocarbons.

Clinically, elevated phenylglyoxylic acid may be associated with fatigue, headaches, dizziness, or cognitive symptoms, although findings may be non-specific at lower exposure levels.

From an organic acid pattern perspective, elevation commonly occurs alongside mandelic acid, supporting a shared exposure source and increased aromatic solvent burden.

From a functional medicine perspective, elevated phenylglyoxylic acid should be interpreted in conjunction with mandelic acid levels, exposure history, and environmental risk factors, with primary focus on exposure mitigation rather than treatment of the metabolite itself.

Treatment considerations: Improve indoor air quality, avoid plastic and solvent fumes, and consider air purifiers with activated carbon. Support detox pathways using Phase I/II cofactors (B vitamins, glutathione, NAC). Antioxidants and mitochondrial support (CoQ10, PQQ) may help mitigate oxidative damage. Evaluate occupational risk if relevant.

MANDELATE + PHENYLGLYOXYLATE ELEVATED (URINE):

Concurrent elevation of urinary mandelate and phenylglyoxylate suggests increased exposure to styrene and/or ethylbenzene, as these metabolites represent complementary and well-established biomarkers of aromatic hydrocarbon metabolism. Mandelate reflects primary metabolic conversion, while phenylglyoxylate represents downstream oxidative metabolism.

Clinically, elevation of both metabolites strengthens the likelihood of a true exposure signal and may be associated with non-specific symptoms such as fatigue, headaches, dizziness, mucosal irritation, or neurocognitive complaints, depending on exposure magnitude and duration.

From an organic acid pattern perspective, the combined elevation of mandelate and phenylglyoxylate supports increased aromatic solvent burden and hepatic detoxification demand, particularly through oxidative and conjugative pathways.

From a functional medicine perspective, this pattern should be interpreted in the context of occupational, environmental, or household exposure sources (e.g. fuels, solvents, plastics, resins, indoor air quality), with emphasis on exposure identification and reduction, alongside support of endogenous detoxification capacity rather than treatment of the metabolites themselves.

2-METHYLHIPPURIC ACID ELEVATED (URINE):

2-Methylhippuric acid is a urinary metabolite associated with xylene exposure (commonly from solvents, paints, fuels, and some occupational settings). Elevation indicates increased recent exposure and clearance.

Clinically, elevations may be associated with headaches, dizziness, fatigue, and mucosal irritation (non-specific). Interpretation should consider recent exposure timing, hydration status, and overall detoxification capacity.

From a functional medicine perspective, management focuses on reducing solvent/fume exposure, improving ventilation/PPE where relevant, and supporting antioxidant and detoxification capacity.

Treatment: Treatment options include limiting exposure to xylenes and can also include sauna use, niacin, glycine, or glutathione/N-acetyl cysteine supplementation to accelerate elimination.

3-METHYLHIPPURIC ACID ELEVATED (URINE):

Elevated urinary 3-methylhippuric acid suggests increased exposure to xylene, as this metabolite represents glycine conjugation of xylene-derived methylbenzoic acids. Urinary methylhippuric acids are well-established biomarkers of xylene exposure.

Clinically, elevated 3-methylhippuric acid may be associated with headaches, dizziness, fatigue, mucosal irritation, or central nervous system symptoms, depending on exposure magnitude and duration.

From an organic acid pattern perspective, elevated 3-methylhippuric acid may be observed alongside increased hippuric acid or other aromatic conjugates, reflecting increased aromatic solvent burden and glycine-dependent detoxification demand.



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From a functional medicine perspective, this finding should be interpreted in the context of occupational, environmental, or household solvent exposure (e.g. paints, fuels, adhesives), alongside assessment of hepatic conjugation capacity and glycine availability, with emphasis on exposure identification and reduction.

Treatment: Treatment options include limiting exposure to xylenes and supportive supplements such as glycine and N-acetyl cysteine can support natural detoxification.

3,4-DIMETHYLHIPPURATE ELEVATED:

Whilst metabolised by the liver, the substance is lipophilic and may accumulate in fat/fatty tissues

Effects:

| | |
|---|---|
| Central Nervous System | Neurotoxic, Carcinogenic, anxiety, nervousness. cognitive and motor impairment, Low frustration tolerance, lack of initiative, apathy, depression, irritability (painter's syndrome) Cyanosis, apnea, bursts of perspiration, cardiac arrest. |
| Irritations | mucous membranes, dermatitis, dizziness, "drunkenness", fatigue, headache, |
| Gut symptoms | Diarrhea, abdominal pains, nausea, blurred vision. |
| Lowers blood parameters | Decreased erythrocyte, leukocyte and platelet counts. |
| Renal symptoms | Glomerulonephritis, renal dysfunction. |

## Methodology

Liquid Chromatography-Mass Spectrometry (LC-MS/MS/MS), Automated Chemistry/Immunochemistry



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