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Citrinin is commonly associated with poorly stored grains, but can be present in water-damaged buildings. It's often found along with Ochratoxin, another nephrotoxic mycotoxin. It was previously used as an antibiotic and investigated as a hypolipidemic, but discontinued due to nephrotoxicity.

It has a very broad spectrum of bioactivities, but kidneys are the main target organs. Chief among its negative impacts is mitochondrial dysfunction, displaying symptoms most prominently in organ systems under high demand, such as the heart, digestion, and reproduction. Both the kidney and liver are involved in its detoxification. Its secondary metabolite is mutagenic. Citrinin can impede fertility and prevent successful pregnancy.

HEALTH IMPACTS

Cytotoxic, genotoxic, hepatotoxic, nephrotoxic, teratogenic, embryotoxic, carcinogenic.

Mitochondrial dysfunction. Permeates into the mitochondria, alters Ca²⁺ homeostasis, and interferes with the electron transport system.

Liver. Citrinin is not a mutagen; however, if it is transformed by hepatocyte decarboxylation, it becomes potentially mutagenic. Decreases liver glycogen content and may increase serum glucose. Inhibits cholesterol and ergosterol synthesis.

Kidney. Adversely affects the function and ultrastructure of the kidney. Inhibit vasopressin receptor.

Intestines. Significantly decreases the number of viable enterocytes and induces apoptotic events, in part due to ER stress.

Heart. Cardiotoxicity.

Reproductive. Teratogenic, toxic to developing embryos, fetal heart malformities.

TREATMENT OPTIONS

*Note: the doses listed are intended for when each item is used as a standalone therapy. When multiple items are combined, they often work synergistically, meaning lower doses can typically achieve similar effectiveness due to their complementary effects.

Therapeutic Diet ~

Grain-free

Radishes plus vegetables/fruits in the deep red color band for pelargonidin* (*Citrinin-specific Nrf2 restorative hepatoprotection)

Butyrate-rich foods - butter, cabbage, radicchio, white part of spring onion, broccoli, Brussels sprouts

2 Tbsp ground organic seeds as insoluble fiber binder and to nourish reproductive organs

Green tea - particularly if skeletal muscle fatigue*

(*Citrinin-specific effect)

Binder. Aloe glucomannan (promotes intestinal stem cell-mediated epithelial regeneration.)

MOLD SOURCES

Aspergillus niger, A. awentil, A. ostianus, A. fumigatus, A. niveus, A. awamori and A. parasiticus, Penicillium citrinum, P. expansum, Monascus

COLOR

Typically lemon-yellow, but can change color depending on substrate

FAVORITE BUILDING MATERIAL

Wallpaper, wood, drywall, linoleum, insulation paper

SYMPTOMS

Fatigue, commonly with muscle pain
Reactive blood sugar
Polyuria, Dysuria
Edema
Nephrogenic diabetes insipidus
GERD, ulcers, hematochezia
Nausea, vomiting, diarrhea
Food sensitivities
Chemical sensitivities
Heart palpitations
Dyspnea
Angina
Menstrual changes
Miscarriage
Infertility

Homeopathic Vasopressin. Follow dosing document.

Kidney glandular. Trophorestorative.

Glutathione. Up to 450mg liposomal daily. Start very low if still exposed or sensitive.

Or use glutathione inducers if not tolerated - ALA, NAC, Selenium.

Alpha-lipoic acid as the R-Lipoic acid isomer. 300mg up to twice daily.

Attenuates kidney injury, especially in the presence of lipopolysaccharides.

Resveratrol. Hepatoprotection seen when coadministered with ROS scavengers NAC & tocotrienols*

Minimum therapeutic dose: 1 gram transresveratrol daily. (*Citrinin-specific effect)

Grape seed extract. Nephroprotective.

100mg twice to three times daily.

Vitamin E as Tocotrienols. Genoprotective against Citrinin in hepatocytes.

200IU daily.

Melatonin. Nephroprotective dose: start 1mg nightly and titrate to 20mg as tolerated.

Dose at dinnertime to avoid morning grogginess.

CoQ10. 200mg twice daily for mitochondrial support, reduce to maintenance 100mg daily as fatigue, heart discomfort improves.

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