



Organic Acids Test (OAT) – *Most Common Markers at a Glance*

(The percentages and trends listed are approximations recognized by Dr. Kurt Woeller over many years in clinical practice evaluating the OAT.)

Page 1 of the OAT – *Yeast/Fungal Section*

1. Look at the Arabinose marker first. This will be the most common marker indicating the presence of candida. It is present in approximately 90% of OATs. Second to that is Tartaric Acid which can be seen with candida too. It tends to show up about 10 to 15% of the time. The level of Arabinose can be deceiving in some clinical situations. A high level doesn't always mean that a patient presents more symptomatically with yeast, or that a low level means a person is less affected. However, approximately 85 to 90% of the time the number matches up with a person's symptoms. Either way, any elevation suggests some invasiveness of candida and warrants some treatment.
2. Next evaluate the clostridia markers, e.g. HPHPA, 4-cresol. The HPHPA is the most common marker for clostridia and appears elevated approximately 75% more frequently than 4-cresol. Both markers indicate the presence of clostridia bacteria. Next check the HVA, VMA, and HVA/VMA ratio to see if any of these are high. Usually with clostridia bacteria the HVA is high normal or high and/or the HVA/VMA is high. If so, the dopamine beta-hydroxylase enzyme is being affected and can indicate a more serious condition. If the levels of HVA and VMA are normal, but the HPHPA and/or 4-cresol are elevated this should still be viewed as a toxic problem and addressed with supplement or antibiotic remedies.

3. Before leaving page #1 of the OAT check the mold markers 5-Hydroxymethyl-2-Furoic, Furan-2,5-Dicarboxylic, and Furancarboxylglycine. These three are related to aspergillus mold. The most common exposure source seems to be moldy food, e.g. fruits, grains, cheese. Often upon retesting, and after addressing dietary changes, these markers normalize. At times environmental exposure is the source, e.g. mold damage in the home. The Tricarballic Acid is from a fusarium mold found in corn and corn products. It too often normalizes as dietary changes are addressed.

Page 2 of the OAT – *Oxalate Metabolites*

1. High Oxalate appears approximately 80% of the time in many chronic health conditions. About 90% of the time the elevation is linked to dietary intake of high oxalate foods and/or high candida levels. Periodically, you will see high Glyceric and/or Glycolic. If these are elevated, it does suggest more of an endogenous production of Oxalate and the potential need for additional vitamin B6 supplementation.
2. Take a look at the Vitamin B6 marker found on page #3 under the 'Nutritional Markers' section. This is low to low normal in approximately 75 to 80% of OATs.
3. Like the Arabinose marker, a high number doesn't *always* mean a person is more symptomatic or a low number less so, however 85% to 90% of the time it does correlate.

Page 2 – Glycolytic, Krebs and Amino Acid Mitochondrial Metabolites

1. Succinic, Fumaric, and/or Acetic are often high when Arabinose is high. At times you will see Citric Acid high too with yeast. Overall, a combination of these being mildly to moderately elevated is seen about 25% to 30% of the time in association with yeast.

2. A common marker that shows up low in these three categories is Acotinic which is clinically insignificant according to the interpretive guide related to the OAT.
3. The #1 marker that shows up high is Citric Acid, and the second most common marker is Succinic.
4. All of these markers indicate some stress at the cellular level with regards to glycolysis and mitochondrial function. Succinic seems to be strongly linked to environmental chemical and/or heavy metal exposure.
5. Approximately 80% of the time, their values improve with effectively treating yeast and bacteria, dietary changes and reduction in oxalate.
6. Elevated Lactic Acid is seen about 10% to 15% of the time when Oxalate is high. Lactic can also be elevated from mycotoxin exposure.

Page 2 of the OAT – *Neurotransmitter Metabolites*

1. Always look at the HVA, VMA, and HVA/VMA ratio levels in correlation with the clostridia markers 4-Cresol and HPPHA because HVA or the ratio may also be high with the other bacterial markers too.
2. 90% of the time, the 5-HIAA marker will be low to low normal suggesting inefficient serotonin metabolism. This will often translate into a high normal or high 5-HIAA/Quinolinic Acid (QA) ratio.
3. About 5 to 10% of the time, the Quinolinic Acid marker will be elevated. Any elevation of the QA indicates an overproduction and can be addressed at a minimum with a supplement such as Niacinamide (ex: 500mg to 1000mg daily).
4. Kynurenic Acid is only found to be elevated in less than 10% of OATs.

Page 3 of the OAT – *Pyrimidine Metabolites*

1. Uracil will show up elevated much more commonly than Thymine. Elevation of Uracil indicates either a deficiency of folate or a conversion problem to active folate. This marker appears approximately 10% to 15% of the time on OATs.

Page 3 of the OAT – *Ketone and Fatty Acid Oxidation*

1. The most common marker seen elevated is Suberic Acid which is often associated with an overnight fast.
2. 3-Hydroxybutyric and Acetoacetic Acid appear elevated about 25% to 30% of the time, usually in association with yeast and/or bacterial toxins. High oxalate seems to correlate too.
3. High Adipic Acid alone seems to correlate with gelatin consumption.
4. The higher the levels of fatty acid markers the more indicative of oxidative stress in the cell. If this is the case check the mitochondrial markers to see if some of those are high also. Elevated mitochondrial markers are further confirmation of oxidative stress.
5. In many cases, high levels of fatty acid markers in this section are correlated to yeast, oxalates and/or bacterial toxins.
6. The use of L-carnitine supplementation is useful to support these metabolites along with addressing other issues, e.g. candida.

Page 3 of the OAT – *Nutritional Markers*

1. All of the asterisked markers (Methylmalonic, Glutaric, 3-Hydroxy-3-Methylglutaric and Methylcitric), indicate a *deficiency* of that nutrient when *elevated*.
2. Approximately 90% of the time, Vitamin C will appear low.
3. Glutaric Acid appears elevated approximately 80% of the time when yeast is high.
4. Vitamin B6 is commonly low to low normal

Page 4 of the OAT - *Indicators of Detoxification*

1. The marker most commonly seen elevated in this section is 2-Hydroxyhippuric. When elevated, it is normally just mildly high at 1.4 to 1.8. This often correlates with elevated bacteria markers. It can be high with certain foods, e.g. phenols, Nutrasweet consumption.

2. Orotic Acid is most commonly seen with bacteria markers being elevated. It only shows up high on less than 5% of OATs.
3. Pyroglutamic most often shows up high compared to 2-Hydroxybutyric. The pyroglutamic appears high in approximately 15% to 20% of OATs. This marker is linked to glutathione production and when high indicates a glutathione deficiency.

Page 4 of the OAT – *Amino Acid Metabolites*

1. The most common findings on the Amino Acid Metabolites section are low values, which overall are clinically insignificant.
2. At times certain markers will appear mildly elevated. These slight elevations are most commonly linked to yeast and/or bacterial overgrowth.
3. Significant elevations are rare, but if present can indicate a more serious metabolic disease. Refer to OAT Interpretation Guide (*Clinical Significance of OAT*) for more information.
4. There may be environmental chemical exposures that can affect these numbers too. However, clinically focusing attention on addressing yeast, bacterial, nutrient deficiencies, and high oxalates will often address these high markers.

Page 4 of the OAT – *Mineral Metabolism*

1. Phosphoric Acid will often be low to low normal in approximately 75% of OATs. Consider testing for or supplementing for Vitamin D3 when you see this pattern.
2. High Phosphoric Acid is often seen with soda consumption. About 10% to 15% of the time it can be high when oxalates are high.

