Mycotoxin Testing with Aran Gas: Aflatoxin B_1 Mycotoxin Destruction using Allotropic Oxygen O_4, O_5, and O_6

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Aran gas is called several things. It goes by the names: Molecular Oxygen Plasma, Polyatomic Oxygen Polymer- "POP", Polyataomic oxygen, multimolecular oxygen, allotropic oxygen and even activated oxygen. Oxygen commonly exists as O_2. The aranizer and other machines like the Octozone produce allotropic forms of oxygen higher than Ozone- O_3. They produce O_4, O_5, O_6 and up. The molecules have 32 and up electrons to create a powerful oxidizer.

The theoretical value of the O_5 molecule to break down a molecule of Mycotoxin Aflatoxin B_1 is 5 O_5 molecules to 1 Aflatoxin B_1 molecule. Therefore, by creating more oxygen than Aflatoxin it is possible to break down the Aflatoxin B_1 molecule into CO_2 and water vapor.

On July 18th, 2005 I set up an AJ-1 water aranizer unit made by the now defunct Aran Aqua Pollution Control Systems. It is a unit that pushes the gas into a tubing system used for introduction into water or other solutions and systems. The output of the unit is 2525mg/hr of Aran gas. This gas was tested in previous machines to have a molecular average value of O_6 tested by Campbell and Associates. I also tested this unit on the Shimadzu 2401 UVProbe spectrophotometer. The analysis showed the peak forming below the 190 nm mark. O_4 peaks at 151nm. The limit of my equipment was 190nm.

The Aflatoxin B_1 I purchased was from Sigma Aldrich and is a standard used for the HPLC testing. It is therefore created more stable. Sigma Aldrich has this info on the Aflatoxin B_1:

"A number of mold species from the genus *Aspergillus* produce fungal metabolites called aflatoxins. Aflatoxins are an interesting example of DNA damaging agents from a natural source. The detrimental effects of aflatoxins are due to their ability to bind covalently to DNA. The DNA damage leads to mutagenesis followed by possible cellular dysfunction. These naturally occurring mycotoxins are highly toxic and exceedingly carcinogenic. Aflatoxins are among the most potent liver carcinogens known. 1-4 At least 13 different types of aflatoxins are produced in nature. Aflatoxins are a particular concern as food contaminates. Aflatoxins are found naturally in plant or animal derived food products with mold growth, particularly when foodstuffs are stockpiled. Their toxic derivatives can also occur as indirect contaminants in animal products. Human exposure is usually the result of food consumption, particularly peanuts.

Aflatoxin B_1 is one of several aflatoxins that can be isolated from the fermentation broth of the mold *Aspergillus flavus*. This mold is common and widespread in nature. The mold is found in soil and grows in any kind of decaying vegetation such as hay or grains stored under warm moist conditions. Although detection of this mold in foodstuffs indicates the potential of aflatoxins, the presence of this ubiquitous mold is not substantiation of aflatoxin contamination. Among the aflatoxins of natural origin, aflatoxin B_1 is the most potent hepatocarcinogen and considered to be the most toxic.4 Aflatoxin B_1 consists of a difurofuran ring system that is fused to a substituted coumarin moiety, with a methoxy group attached at the corresponding benzene ring. Of particular interest is the presence of derivatives of aflatoxin B_1 that can be found in edible animal products obtained from cattle that have consumed sublethal doses of aflatoxin B_1. Consumed aflatoxins are converted to aflatoxin derivatives in the liver. Aflatoxin B_1 is known to be oxidized by the mixed function oxygenases of the liver cytochrome P-450 system present in the microsomal fraction of liver extracts. This oxidation results in aflatoxin B1-8,-9-epoxide as the major product. This reactive epoxide seems to preferentially attack certain guanine residues in double-stranded DNA, giving rise to a large guanine adduct dihydro-guanyl-hydroxyaflatoxin B_1.2

Molecular Formula: $C_{17}H_{12}O_6$

Molecular Weight: 312.3

CAS Number: 1162-65-8

Melting Point: 268 - 269 °C

Extinction Coefficient (ethanol): EmM=25.6 (223nm), 13.4 (265nm), 21.8 (363nm)

Fluorescence Emission Maxima: 425nm (ethanol) Synonyms: AFB1, Aflatoxin B, Aflatoxin B1, 6-Methoxydifurocoumarone" (Figure 1 & 2).

https://www.sigmaaldrich.com/content/dam/sigma-aldrich/docs/Sigma/Product_Information_Sheet/a6636pis.pdf

Based on previous experimental quantities, an unknown portion of aflatoxin B_1 is placed in a sterile Class A 100mL volumetric flask. Distilled water is the matrix for carrying the aflatoxin powder in this experiment. Solvent or other carrier liquids from experimental experience would give unclear results and possibly be oxidized completely before the experiment was finished (Figure 3).

When I started this experiment, I thought the aflatoxin would dissolve in water easily. WRONG. To fix this problem, I placed the solution on a stir plate. There I withdrew the 2-10mL aliquots. These 2 samples are my initial start point samples. The remainder

80mL solution was placed in the glove box.

After 30 minutes of allotropic oxygen treatment, a 10mL aliquot was taken while stirred. After another 30 minutes of treatment another 10mL sample was taken. After an additional 11 hours of Allotropic oxygen treatment the last 10mL sample was taken. Two blanks were taken from the dilution water not treated. 1 Aliquot of water was aranized for comparison.

I timed this test to correlate with shipping. These details were thoroughly discussed with the veteran analyst PhD Kristine Kurtz at the PK laboratory. The shipping pick up time was 2:30 PM. You can see much to my delight, the 2 start point sample results were identical. The pink and the blue are the initial untreated samples (Figure 4). The test results on a scale (Figure 5):

Figure 1: Neat Powder before powder aranized. A6636 Neat Powder Sigma Aldrich catalog#.

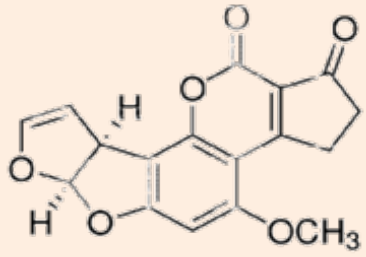

Figure 2: This is an aranized dry neat powder standar d Aflatoxin B1.

The final test results show a reduction of mycotoxin Aflatoxin B_1 using allotropic oxygen with an average molecular weight of O_6.

The starting Aflatoxin concentration was 26,000 ng/ml. The sample of deionized water and Aflatoxin B_1 neat powder standard from Sigma Aldrich were treated for thirty minutes of the 2525mg/hr allotropic molecular average weight of O_6 output into a 100 ml volumetric class A flask of 80 ml sample. After 30 minutes another sample was taken. This concentration of Aflatoxin B_1 is now 11,000ng/ml, 58% reduction. The treatment is started again with now 60 ml of Aflatoxin B_1 solution. After an additional 30 minutes of treatment with the 2525mg/hr average molecular weight of O6 into 60ml of sample the concentration is now 4,000 ng/ml Aflatoxin B_1, 85% reduction. The treatment is continued for an additional 11 hours to make the total treatment 12 hours. The final Aflatoxin B_1 concentration is 520ng/ml. This is a 98% Aflatoxin reduction in 720 minutes. Details of the experiment (Figure 6, 7 & 8):

Where does the Aflatoxin come from?

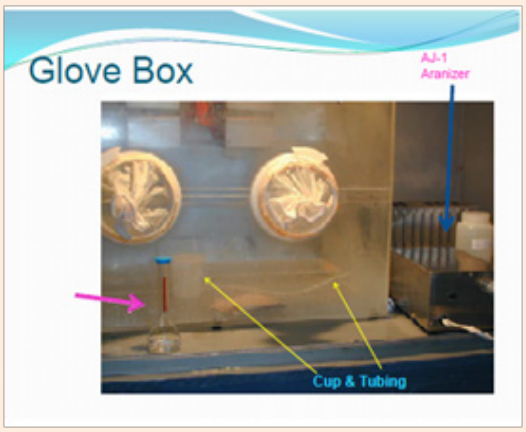

Figure 3

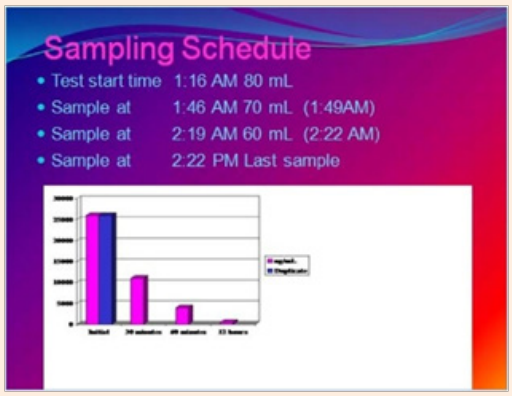

Figure 4

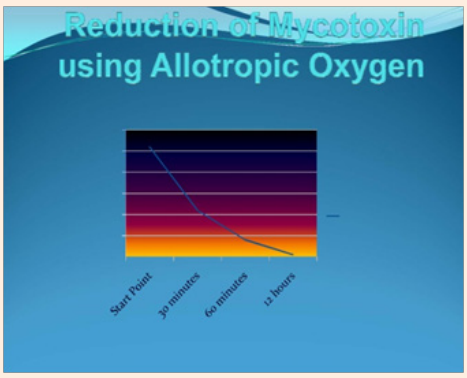

Figure 5

Citation: McPherson M (2015) Mycotoxin Testing with Aran Gas: Aflatoxin B_1 Mycotoxin Destruction using Allotropic Oxygen O_4, O_5, and O_6. J Microbiol Exp 2(6): 00067. DOI: 10.15406/jmen.2015.02.00068

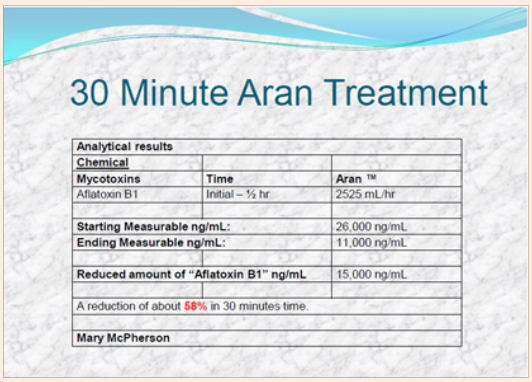

Figure 6

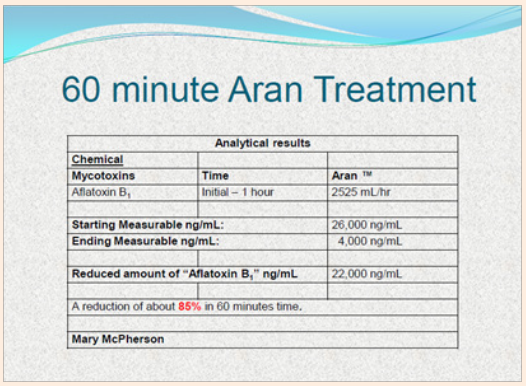

Figure 7

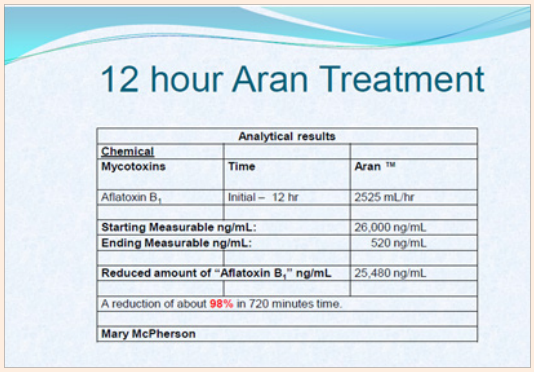

Figure 8

Liver Cancer and occurrence in foods: cereals, oilseeds, spices and tree nuts, maize, groundnuts (peanuts), pistachios, brazils, chilies, black pepper, dried fruit and figs, milk, nonfat dry milk, cheese, yogurt, peanut butter, eggs, meat, and just about any other food substance that is grown in warm moist climates.

Irradicating the mycotoxins in the natural environment near and around the farms will prevent introduction to the farms and in the farm fields. We then can prevent it in the storage areas and shipping containments. This will prevent disease worldwide.

Why is this information so important to the science world?

If we can break the benzene ring of this mycotoxin then we can break down many other benzene ring contaminants. The chemical formula is similar to other pollutants such as solvents, formaldehyde, biological agents even biowarfare constituents.

Table 1: *Aspergillus* species capable of producing aflatoxins.

Species	Mycotoxins produced			
	AFB	AFG	CPA	Major sources Geographical distribution
A. flavus	+	–	–	All kinds of foods Ubiquitous in warmer latitudes
A. parasiticus	+	+	–	Peanuts Specific areas
A. nomius	+	+	–	Bees USA, Thailand
A. pseudotamarii	+	–	+	Soil Japan
A. bombycis	+	+	–	Silkworm frass Japan, Indonesia
A. ochraceoroseus	+	–	–	Soil Africa
A. australis	+	+	+	Soil, peanuts Southern hemisphere

A little history of not so long ago… bit scarey… [1-21].

Just prior: Hats off to Khrushchev! Heads still on now!

Khrushchev in **1939** was faced with horses dying on farms all over the western parts of the Ukraine. Khrushchev wrote, "I can't believe that science is absolutely helpless here…" "We had won more than just a victory for our agriculture. It was a moral and political victory as well. But how many collective farm chairmen, cattle raisers, agronomists, animal husbandry specialists, and scientists had lost their heads as saboteurs before I stepped in and took charge of the situation".

Korneev (1948) fed white mice with oats infested with Stachybotrys alternans strains.

According to Gajdusek (1953) cases of human stachybotryotoxicosis have been found mainly in regions where the equine disease has also been reported.

Forgacs et al. (1958) studied the toxicity of 40 strains.

The Role of Stachybotrys in the Phenomenon Known as Sick Building Syndrome EEVA-LIISA HINTIKKA Finnish Institute of Occupational Health.

Uusimaa Regional Institute of Occupational Health Arinatie 3A, FIN-00370Helsinki, Finland.

England, early 1960's - 10,000 turkeys and ducks die due to Turkey X disease found to be *Aspergillus flavus* abbreviated A. fla and toxin hence aflatoxin. Cause- *Aspergillus flavus* contamination of peanut meal.

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