

Toxi-Scrub

A new processing line to remove aflatoxin and mycotoxins

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Mycotoxins and fumonisins - what are they? A mycotoxin (from Greek mykes, “fungus” and toxikon, “poison”) is a toxic secondary metabolite produced by organisms of the fungus kingdom. They are capable of causing disease and death in both humans and animals. The term ‘mycotoxin’ is usually reserved for the toxic chemical products produced by fungi that readily colonise crops, beans, etc. One mould species may produce many different mycotoxins, fumonisins and several species may produce the same mycotoxin.

Mycotoxins like Aflatoxins present an increasing problem in the food and feed supply chain. Toxins are carcinogenic and create various other health problems. Thus, consumers are at risk, and losses are increasing; both farmers and industry are affected by the increasing problem.

So far, the only method of reducing the problem has been to dilute contaminated grain/food/feedstuff with uncontaminated material to reduce the toxic concentration. To date, an effective solution to cleanse grain and feed stuff (especially corn, wheat and oil seed meal) for mycotoxins, fumonisins and other contaminants has been missing.

The Toxi-Scrub processing line and what it does

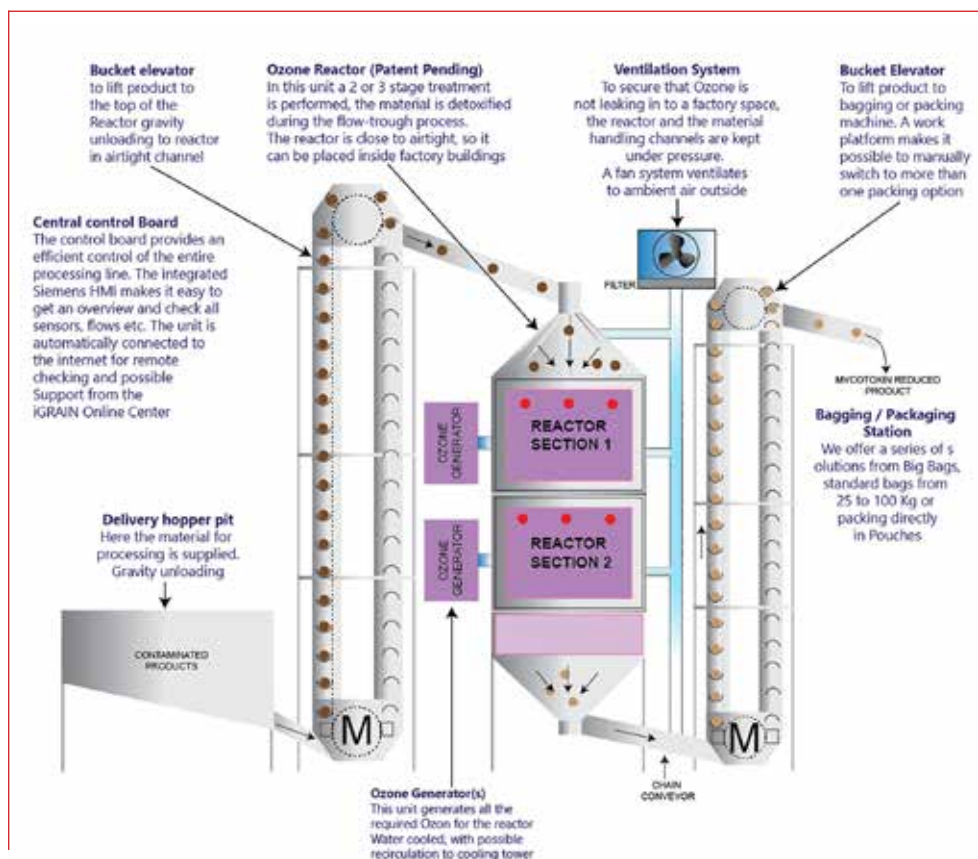
The Toxi-Scrub processing line is a complete processing system, including: intake, pre-processing, the scrubbing-reactor, buffer bins, control system, and the complete material handling. This makes it easy and convenient for users to simply dump the contaminated material in the inlet and receive decontaminated material in the outlet buffer bin.

Packing solutions are optional and include truck delivery bin, big bag solution, bagging solution (25 -100 Kg bags), or consumer pouch packing, especially designed for nuts, beans etc.

The principle of the Toxi-Scrub processing line is that ozone is used in a patented reactor to detoxify the commodity (grain, oil seed, beans etc.). The most important step is the process where the material is exposed to ozone; this is done in a special and efficient way. Ozone is a strong oxidizer and eliminates almost all mycotoxins, as validated by more than 25 scientific papers published over the last two decades.

The effect of ozone has been known for many years, and ozone plays a major role in many applications in other industries, of which the most important is wastewater treatment to reduce biologic oxygen demand (BOD). Ozone is also used for sanitisation in food processing, especially in meat processing industries, and as a means to eliminate bad flavours and odours in feed milling and in other contexts.

However, to make the detoxification process efficient, it is



important that the pre-reactor step is done correctly. That is determined by testing in the iGRAIN laboratory. Here samples are tested to design the process steps correctly. An overview of the reactor step can be seen in Figure 1.

Detoxification - eliminating mycotoxins and fumonisins

When a material has been infested with fungus it will inevitably be contaminated with mycotoxins and fumonisins. The type of mycotoxin depends on which type of fungus the material has been infested with. In any case, almost all mycotoxins have a chemical structure that can be attacked by ozone, whereby mycotoxins can be eliminated. The proportion of reduction is dependent on various factors. The Toxi-Scrub has different treatment programs and can be adjusted to make the necessary treatment to bring the contamination well below allowed levels. It is a big advantage that the Toxi-Scrub can eliminate not only mycotoxins, but also other biological contaminants in the commodity, such as bacteria, mites and insects.

The reaction mechanism

Basically, ozone works by oxidising double bonds, thereby breaking the molecular structure and creating new non-toxic molecules.

Scientific validation

Many scientific studies have demonstrated that mycotoxins can be eliminated by ozone.

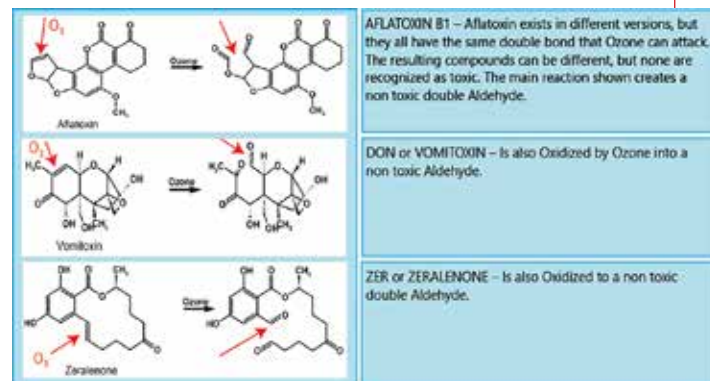
Benefits for the food and feed producing industries:

The Toxi-Scrub processing line is a revolutionising innovation, as it turns contaminated grain or feed stuff, regarded as waste, into decontaminated, clean and usable food and feed stuff. This means that a valuable food or feed resource that would otherwise have been lost can be used for the benefit of everybody.

A further advantage is that the Toxi-Scrub also eliminates all forms of biologic activity in the treated material: fungus (preventing further contamination with toxins), insects, bacteria, mites etc.

The Toxi-Scrub processing line can be tailored to any product in the agro, feed/meal, cereal supply chain, and basically the Toxi-Scrub can significantly reduce all mycotoxins (aflatoxin, ochratoxin, DON, citrinin), and fumonisins (zearalenone), and even some pesticides. Solutions are developed to detoxify all types of grain, nuts, beans and meal (cake) from the oil seed industry, flour mills etc.

This technology is a highly profitable investment with a very short payback time of, normally, only months.



First full scale line to be started shortly

The first Toxi-Scrub processing line is in the process of being installed with the ability to detoxify aflatoxin etc. in oil seed cake for later use in chicken feed.