

A Powerful Solution for Feed Hygiene

OrganiGuard is an organically-based antimicrobial solution that improves feed ingredient and finished feed hygiene. It is not an antibiotic, so it can be used in antibiotic-free programs or in combination with any medication regimen. Also, because OrganiGuard's pH is neutral, it does not have the corrosive properties of acids. It offers superior protection against molds, such as *Aspergillus*, and bacterial contaminants, such as *Salmonella*. The results of independent laboratory testing demonstrate OrganiGuard's shield of antimicrobial effectiveness is more powerful than competitive products.

Mold and mycotoxin contamination

Aspergillus molds draw more attention than other molds found in feedstuffs because their mycotoxins, called aflatoxins, are substantially more poisonous than those produced by other molds such as *Fusarium*, and *Penicillium*.

To help protect feed hygiene, FDA established maximum allowable mycotoxin levels. These limits vary depending on the specific mycotoxin present. FDA calls them "guidance levels" for fumonisin, and "advisory levels" for vomitoxin. The more strict term "action level" is reserved for the more hazardous aflatoxins. Guidance levels for fumonisin and advisory levels for vomitoxin (both produced by less toxic *Fusarium* molds) range from 5 to 50 ppm. However aflatoxin, because of its higher toxicity and status as a potent carcinogen, is limited to a range that is a thousand times lower, down to 20 ppb. Because aflatoxin is extraordinarily potent, controlling *Aspergillus* growth is critical for optimum livestock feed and pet food safety. This remains true even though *Aspergillus* may be present in fewer numbers than other mold species.

Bacterial contamination

Similarly, FDA has highlighted *Salmonella* as an important hazard that threatens feed hygiene and animal and human health. In 21 CFR 500.35, FDA specifically named *Salmonella* as an adulterant in animal feeds and ingredients. Controlling *Salmonella* has become an integral part of many HACCP programs, and FDA has included *Salmonella* contamination limits in the draft framework of their "modernized" Animal Feed Safety System (AFSS).

Antimicrobial comparisons by independent laboratory

Procedure: Tryptic soy broth (TSB) tubes were inoculated with 24-72 hour old *Aspergillus*, *Penicillium* or *Salmonella* cultures. Culture plates (150 mm diameter, 4 mm thick, pH 7.2-7.4) were inoculated by dipping a sterile cotton swab firmly against the side of the TSB tube, and streaking the swab evenly over the entire surface of the plate. Test antimicrobial samples were impregnated in 1/2 inch diameter sterile blank discs, and then placed in the organism-inoculated agar

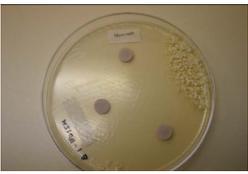
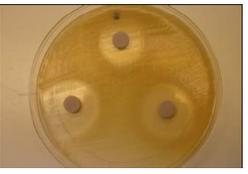
within 15 minutes. The inoculated plates were inverted and incubated at 33-35°C (91-95 °F) for 2-5 days. All test samples and controls were run in triplicate.

Interpretation: In this type of comparison, effective antimicrobials prevent the organisms from growing on the culture plates in an area around the impregnated disc. The most effective antimicrobials produce large clear zones with no organism growth around the sample (the zone of inhibition). The diameter of the zone of inhibition indicates how powerful the antimicrobial product is. Zones are measured from the underside of the plate, using a standardized angle and illumination.

Results: OrganiGuard and the competitive products all exhibited antimicrobial activity. The larger sterile inhibition zones surrounding the discs impregnated with OrganiGuard (see figure) indicate more powerful protection against the contaminating organisms. OrganiGuard's average zone of inhibition against *Aspergillus* ranged from 25 to 91% greater than the competitors. Similarly, OrganiGuard provided greater hygiene when faced with *Penicillium* mold (up to 222% more coverage) and *Salmonella* bacteria (34-67% more inhibition).

OrganiGuard's powerful feed hygiene translates into more protection against mycotoxins and bacterial adulteration. More importantly it offers ingredient and feed manufacturers a better tool for HACCP and AFSS compliance, meaning more responsible and safer food products for livestock and pets.

Laboratory photographs of the culture plates with inhibition zones.

	<i>Aspergillus</i> Inhibition	<i>Penicillium</i> Inhibition	<i>Salmonella</i> Inhibition
OrganiGuard Liquid	 69 mm (25-91% larger than competitors)	 >100 mm (up to 222% larger than competitors)	 47 mm (34-67% larger than competitors)
Myco Curb Liquid	 55 mm	 >100 mm	 35 mm
Punch Liquid	 36 mm	 45 mm	 28 mm