

It's the Pits

Pathogen Risks and Control Methods in Manure

Pathogenic microorganisms that thrive in manure can pose a very serious contamination risk to waterways, food supplies, and human health. While most pathogens found in manure are host specific, meaning they only infect a specific type of animal, some are highly adaptable and pose a risk to humans in the form of mild to severe illness.

Pathogen Types

Raw manure has an array of different pathogen types including bacteria, viruses, protozoan, and parasites. The most common manure pathogen is a harmful strain of bacteria known as *E. coli* 0157. This particular strain of bacteria has been found on numerous occasions in our food and water supplies across the country and has caused countless cases of human illness. The table below, from the EPA's Literature Review of Livestock and Poultry Manure, July 2013, will give a better understanding of the risks associated with some common manure pathogens.

Occurrence, infective doses, and diseases caused by some of the pathogens present in manure and manure slurries from cattle, poultry, and swine.					
Pathogen	Occurrence (% of positive manure samples)*			Infective Doses	Human Diseases and Symptoms
	Cattle	Poultry	Swine		
Bacteria					
<i>Salmonella</i> spp.	0.5 - 18	0 - 95	7.2 - 100	100 - 1,000 cells	Salmonella enteritis, Typhoid Fever, Paratyphoid fever (diarrhea, dysentery, systemic infections that spread from the intestinal tract to other parts of the body, abdominal pain, vomiting, dehydration, septicemia arthritis and other rheumatological syndromes)
<i>E. coli</i> 0157:H7	3.3 - 28	0	0.1 - 70	5 -10 cells	Enteric colibacillosis (diarrhea with or without bleeding), abdominal pain, fever, dysentery, renal failure, hemolytic-uremic syndrome , arthritis and other rheumatological syndromes
<i>Campylobacter</i> spp.	5 - 38	57 - 69	14 - 98	< 500 cells	Campylobacter enteritis (diarrhea, dysentery, abdominal pain, malaise, fever, nausea, vomiting, septicemia, meningitis,, Guillain-Barré syndrome (neuromuscular paralysis), arthritis and other rheumatological syndromes
<i>Yersinia enterocolitica</i>	-	-	0 - 65	10,000,000 cells	Yersiniosis (Intestinal infection mimicking appendicitis, diarrhea, fever, headache, anorexia, vomiting, pharyngitis, arthritis and other rheumatological syndromes)
<i>Listeria</i> spp.	0-100	8**	5.9 - 20	<10,000 cells	Listeriosis (diarrhea, systemic infections, meningitis headache, stiff neck, confusion, loss of balance convulsions miscarriage or stillbirth)
Protozoa					
<i>Cryptosporidium</i> spp.	0.6 - 23	6 - 27	0 - 45	10 -1,000 oocysts	Cryptosporidiosis (infection that can be asymptomatic, cause acute but short-lived diarrheal illness, cause chronic diarrheal illness, or be quite severe and cholera-like, with cramping, abdominal pain, weight loss, nausea, vomiting, fever, pneumonia, biliary system obstruction and pain)
<i>Giardia</i>	0.2 - 46	-	3.3 - 18	10-25 cysts	Giardiasis (diarrhea, abdominal cramps, bloating, fatigue, hypothyroidism, lactose intolerance, chronic joint pain)
<p>References: Rogers and Haines 2005, Pachepsky et al. 2006, Bowman 2009, USEPA 2010a, Ziemer et al. 2010, and USDA 2007a, 2007b, 2009b, and 2010a. , Ho et al. 2007, Weber et al. 1995, Mohammed et al. 2009.</p> <p>* Percentage of manure samples testing positive for the pathogen. Range of minimum and maximum percentage as reported in the literature. ** Based on a single study.</p>					

Reducing Your Risk

Testing manure for specific pathogens is both difficult and costly. Therefore, labs and regulatory organizations test for Fecal Indicator Bacteria (FIB). FIB'S are non-pathogenic strains of bacteria used to indicate the presence of harmful pathogens. This method, while more practical, is not exact. Non-pathogenic *E. coli* bacteria are an example of FIB's which are extremely common in all types of manure.

Reducing contamination risk and pathogen presence in manure requires a proactive management approach and is best handled before the harmful pathogen population is out of control. There are several methods to reduce pathogen populations in manure including sterilization by using chemicals, anaerobically digesting, or aerating for aerobic breakdown. However, treating with products that include beneficial microorganisms is by far the simplest and most cost effective way to reduce manure pathogen presence. There are plenty of beneficial, non-pathogenic, anaerobic bacteria that will successfully breakdown manure. By flooding the manure ecosystem with large quantities of 'good' bacteria, the pathogens become outnumbered or even completely removed from the environment, thus reducing the pathogen contamination.

Proper manure management and understanding the risks involved with pathogen contaminations is crucial to overall success of any livestock operation. By managing manure with biologicals and reducing harmful manure pathogens, any livestock operation will be able to grow and prosper.

Microbial Manure Master™

A blend of 17 different strains of bacteria that break down and liquefy manure, remove bottom solids, reduce odors, and remove pathogens. Product includes live active bacteria that start working immediately, a 'super food' to stimulate bacterial growth, and minerals to increase bacterial performance.

Microbial Manure Master is used in ProfitPro's self-treatment program.



Before & After Treatment Pictures of the Same Dairy Lagoon in 2011 using Microbial Manure Master

