Salmonella in Soils

Salmonella is a type of bacteria that lives in the large intestine of many types of warm-blooded animals. Exposure to Salmonella is one of the leading causes of food poisoning and some of the cases can be attributed to contamination of food by soil. Salmonella gets into the soil when manure is spread onto the soil and conditions exist that does not kill the Salmonella. The process of manure handling, storage, and spreading time all play important roles in the life cycle and survival of Salmonella in the soil.

Salmonella is considered to be an enteric or fecal organism because it is normally found in the intestine of birds and mammals and when an animal defecates, the Salmonella passes out of the body and if the raw or unprocessed manure is then spread onto fields, lawns, or gardens, the Salmonella can now be found in the soil. In order to survive, the Salmonella will need water, temperature, and a food source and studies have shown that overtime, the population of Salmonella in soil will decrease. By treating manure in certain ways, it is possible to reduce the Salmonella levels in the manure so that less is applied to the fields. The two (2) most common methods of treating manure would be through changing the pH of the manure or increasing the temperature.

Normal manure has a pH slightly above neutral and by making the manure either acidic or base (acid = pH < 7, base = pH > 7). It is possible to kill off the majority of the Salmonella. The second method of reducing Salmonella is to increase the temperature. The EPA Manual on biosolid recommends raising the temperature to about 135°F (55-57°C). In some forms of compost production and manure handling, the “pile” may reach this temperature without any heat applied—the heat is self generated. The second treatment is the pH adjustment by raising to > 12 S.U. for > 2 hours. The raising of the pH can be brought about by the addition of alkali or lime.

Once on the soil, the Salmonella count starts to decrease and eventually the count will be come very low or non detectable. Some research seems to indicate that Salmonella in soil will reach low levels over a period of thirty (30) days, so it is a good idea not to use produce, roots, tubes, or other garden materials if manure was spread less than 30 days. Even if manure was spread more than 30 days ago, it is still advisable to thoroughly wash any produce, especially below ground varieties that might contain soil, manure, and Salmonella.

It is possible to collect soil samples and send them to a laboratory for Salmonella testing. One type of test will indicate if Salmonella is present or not while another can provide a total count of Salmonella.

For more information, please contact Client Services or the Microbiology Department at Midwest Laboratories at 402-334-7770.