



## Plant Health Care Inc.

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# Technical Bulletin

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### BREAKDOWN OF TERRA-SORB® IN SOIL

Terra-Sorb® is a polymer known as polyacrylamide (pronounced polly-ah-krill-ah-mide). This means that it is composed of many molecules of acrylamide attached together in a very long chain. While polyacrylamide hydrogels are nontoxic to plants, animals and man, the acrylamide ingredient used to make them is a known neurotoxin and a possible carcinogen. A recent web page has stimulated considerable discussion lately about the breakdown of polyacrylamide hydrogels (like Terra-Sorb®) in the soil environment. While Terra-Sorb® and related polyacrylamides last a long time, they eventually do break down or “degrade” through the action of microbes (biodegradation) or by other physical or chemical means (e.g., sunlight, temperature). The relevant question is whether these polyacrylamides break down again into the original toxic acrylamide, and does that material accumulate in the soil.

In response, an extensive literature search was performed to examine these and other relevant questions. Specifically:

1. Do polyacrylamides break down into acrylamide?
2. Does acrylamide build up in the soil and groundwater?
3. Do plants absorb and accumulate acrylamide?

Numerous articles were collected including a report from the US EPA and citations from refereed scientific journals. Results indicate that:

- As the polymer hydrogel degrades, the polymer backbone (chain) appears to remain largely intact. It is the molecule’s side attachments that are attacked first.
- There are conflicting reports regarding the release of acrylamide during polymer degradation. Most reports indicate little or no release of acrylamide, while a few do report it, purportedly from sunlight or heat degradation. The degree of acrylamide release, if any, may depend upon local conditions.
- Release of acrylamide requires breaking of the polymer backbone without touching the nutritionally valuable nitrogen in the amide side chain. So acrylamide release would not be expected to occur in efficient quantities during biodegradation.
- Acrylamide, has a very short life in the soil, because it is soluble and readily broken down by soil microbes.
- Tests show that acrylamide does not accumulate in the soil or ground water.
- Tests show that acrylamide is not detected in plants (tomato) and mushrooms (*Agaricus bisporus*, the commercial edible mushroom) that are grown in polyacrylamide hydrogel.

**Conclusion:** We can maintain confidence in our earlier claim that horticultural use of our polyacrylamide gel, Terra-Sorb®, is harmless to plants and animals, including man.

#### References (12)

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