

Environmental fate and degradation of glyphosate in soil

ABSTRACT

Commercialisation of glyphosate [N-(phosphonomethyl)glycine] in the early 1970s has left a big leap in the agriculture sector. This is due to its effectiveness in controlling a wide range of weeds. Glyphosate translocates well in plants. In addition, with added surfactant in its formulae, it can also be used in wet conditions. Its ability to kill weeds by targeting the 5-enolpyruvyl-shikimate-3-phosphate synthase (EPSPS) makes no competing herbicide analogs in its class. Considering its cost effectiveness, only small amount is needed to cover a large sector in agricultural land. The most important aspect in the success of glyphosate is the introduction of transgenic, glyphosate-resistant crops in 1996. However, glyphosate is not an environmental friendly herbicide. This systematic herbicide has raised environmental concern due to its excessive use in agriculture. Studies have shown traces of glyphosate found in drinking water. Meanwhile, it's rapid binding on soil particles possesses adverse effect to soil organisms. Glyphosate degradation in soil usually carried out by microbial activity. Microbes capable utilising glyphosate mainly as phosphate source. However, the activity of C-P lyase in breaking down glyphosate have not clearly understood. This review presents a collective summary on the understanding on how glyphosate works and its environmental fate.

Keyword: Bioremediation; Glyphosate; GP-metabolism; Herbicides