



DEGRADATION KINETIC PARAMETERS OF ACRYLAMIDE BY *BACILLUS WEIHENSTHEPHANENSIS*

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Introduction. Acrylamide (AM) is an important monomer used as a conjugated reactive molecule in polyacrylamide production as well as a binding, thickening, or flocculating agent in industrial applications (1). Human exposure to acrylamide could cause cancer or neurotoxic damages. Several microorganisms are known to degrade an array of aliphatic and aromatic amides (2). AM is readily biodegraded in soil and water systems under aerobics conditions by microorganisms capable of producing amidase wich deaminates AM to acrylic acid and ammonia (1).

This study reported the kinetic parameters of degradation of acrylamide utilizing *B. weihenstephanensis* from digestive tract *Eisenia foetida* capable of degrading acrylamide.

Methods. *B. weihenstephanensis* was obtained from digestive tract of *Eisenia foetida* using acrylamide in solid minimal medium, then for an acrylamide-degrading bacterium was by direct inoculation into 100 mL of minimal medium, containing contaminant as sole carbon and nitrogen source with continuous shaking at 130 rpm using different concentrations acrylamide. Acrylamide concentrations was estimated with a High Performance Liquid Chromatograph equipped a UV detector fixed 242 nm, ammonium release was determined by the method of Black (1995) (3).

Results. Acrylamide is readily biodegraded by *B. weihenstephanensis*. Ammonium is the major product of the degradation of acrylamide, in figures is observed his behavior (Fig. 1). shows the kinetics parameters at different acrylamide concentrations (table 1).

The kinetic parameters of μ_{max} , $q_{S/X}$ and $Y_{P/S}$ of strain *B. weihenstephanensis* were 0.012 to 0.018 h^{-1} , 0.016 g Acrylamide g cell $^{-1} h^{-1}$ and 170 g ammonium g acrylamide $^{-1}$.

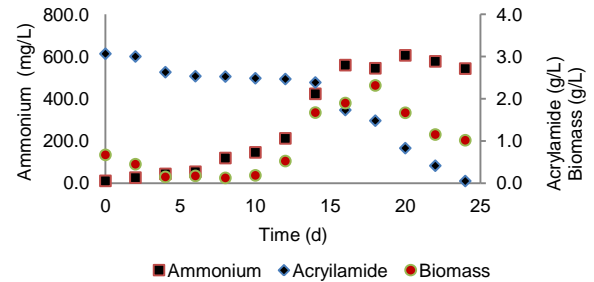


Fig.1 *B. weihenstephanensis* growth in a minimal medium with acrylamide 3 g/L. Released ammonium and remaining acrylamide.

Table 1. Kinetic parameters obtained under various acrylamide concentrations by *B. weihenstephanensis*.

Liquid media with acrylamide	μ (h^{-1})	$Y_{P/S}$	q_P	q_S
Acrylamide: 3.0 g/L	0.012	219.6	2.70	0.018
Acrylamide: 2.6 g/L	0.018	162.2	3.00	0.021
Acrylamide: 2.0 g/l	0.013	191.2	2.50	0.011
Acrylamide: 1.5 g/L	0.018	168.8	3.10	0.013
Acrylamide: 1.0 g/L	0.011	138.9	1.60	0.016

Conclusions. *B. weihenstephanensis* has a high potential for acrylamide biodegradation. The strain grew well in 3 g/L acrylamide, at pH 7.0 to 9.0 at room temperature. *B. weihenstephanensis* degraded acrylamide at all concentrations tested; 1.0 g/L, 1.5 g/L, 2 g/L (graphics not shown) and 3 g/L. At concentration of 3 g/L ammonium was detected after 2 days and its maximum release was 604 mg/L.

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