



Deutscher Tropentag, October 11-13, 2005, Hohenheim

“The Global Food & Product Chain—  
Dynamics, Innovations, Conflicts, Strategies”

## Laboratory Examination of Biofilms Produced by *Clostridium perfringens* and *C. botulinum*

SRI HARIKRISHNA VELLANKI, HELGE BÖHNEL

*Georg-August-University Göttingen, Institute of Tropical Animal Health, Germany*

### Abstract

*Clostridium perfringens* and *C. botulinum* cause food poisoning both in human and animal. Botulinum toxin is the most poisonous substance known so far. One gram of evenly dispersed crystalline toxin in the atmosphere would kill more than one million people. They are found in canned and uncanned foods. If *Clostridium* species forms biofilms in nature it may be potential problem to human and animal health but there is no single event reported so far.

Biofilms comprises the “slime” or biological contaminations found on surfaces in contact with flowing fluids, which contain bacteria, fungi, microbial corrosion products and entrapped clay and soil particles. Bacterial biofilms are difficult to detect in routine diagnostics and are inherently tolerant to host defences and antibiotic therapies. They form biofilms on wide range of materials like synthetic polymers, silicon tubes, medical devices, infected tissues.

A special set up was designed and the microscopic slide was placed in glass chamber and connected the set up to the fermentor. After 48 hours slide was removed stained with Alcian blue and counter stained with gram staining. Biofilm like structures were formed by *C. perfringes*. Further experiments were continued with *C. botulinum* which is perceived to be the more dangerous pathogen in the genus *Clostridia*. Glass slides were placed in conical flask and straw in test tubes inoculated with *C. botulinum*. Slides were removed after 15 and 20 hours and straw after over night incubation followed by staining with Alcian blue, Congo red detects biofilm like structures on microscopic slides and straw.

Though above mentioned results are done in laboratory condition and it is not know till now whether *Clostridia* species could form biofilms or not in nature. It could be a potential problem particular in developing countries if these bacteria form biofilms on food as food standard safety levels are low. Further investigation on this aspect could be good to shed the fears of public.

**Keywords:** Biofilms, *Clostridium botulinum*, *Clostridium perfringens*