

Technique for Identifying the Post-manufacture Insect Contamination of Products

(Received March 29, 2001)

(Accepted April 24, 2002)

Miyuki Ishibashi, Hisako Hori, Yoshihide Suwa, Tetsuya Sawaki,
Masahiro Masuda, Shuji Iwata, Takanori Mine
Quality Assurance Department, Suntory Ltd.

Keywords: insects, contamination, products, heated, circular dichroism (CD)

Abstract

Object : Until now, measurements of catalase activity or acetylcholinesterase activity were used to infer the time at which insects contaminated a product. However, these enzyme activities vary widely with the species of insect and these methods cannot be applied to products contaminating dead insects. To resolve these problems, we studied techniques for determining whether the insect contaminant had been heated during the heat-treat final manufacturing process.

Methods : Materials were the femurs of *Blattella germanica* (cockroach) and *Periplaneta americana* (cockroach) and the whole bodies of *Musca domestica* (fly). These insects were heated to 60 degrees C. for 10 minutes, 80 degrees C. for 5 minutes, and so on. Then, extract was prepared from each these heated and non-heated insects for analysis by the circular dichroism (CD) spectrum.

Results : The CD spectrum of heated insects indicated the collapse of peaks at 206nm and 222nm which are characteristic of the alpha-helix structure of protein. This finding indicates that the secondary structure of protein was denatured by heating. This change in the spectral pattern was similar for two kinds of cockroach and flies. Since the CD spectrum is adaptable to a small sample and some species of insects that frequently contaminate products, we concluded that the CD spectrum is a useful method of determining whether insect contaminant had been heated.

Corresponding author: Miyuki Ishibashi, Lab. of Safety & Alcohol Science, Quality Assurance Department, Suntory Ltd.

1-1-1, Wakayamadai, Shimamoto-cho, Mishima-gun, Osaka, 618-8503, Japan