Monographs of endophyte toxins

[Summary of endophytes]

Endophyte is a compound word of endo (=within) and phyte (=plant), and indicates microbes in general that inhabit the plant body. This term is usually used to mean those that live symbiotically without harming the plant.

It has recently been known that endophytes receive nutrients etc. from the plant while they produce various biologically active substances and give the host plant resistance to diseases, insects and low temperature, etc. *Neotyphodium* (formerly *Acremonium*), endophyte symbiont in the grass body, was discovered about 100 years ago, and feed crop and lawn grass are artificially infected with *Neotyphodium* endophytes to give them resistance to diseases and insects in the United States and Australia. However, it has been found that some of those biologically active substances cause livestock poisoning and become a problem. In Japan, livestock poisoning has also occurred due to highly toxic biologically active substances produced by endophyte symbionts of perennial ryegrass imported from the United States.

The endophyte that infects tall fesque produces an ergot alkaloid ergovaline etc. and causes poisoning called fesque toxicosis. The endophyte that infects perennial ryegrass produces a lolitrem alkaloid lolitrem B etc. and causes poisoning called ryegrass staggers. The risk levels of these substances in tall fesque straw and perennial ryegrass straw have been said to be over 500 µg/kg for ergovaline and 1,800 µg/kg for lolitrem B in the United States; however, it has been known that Japanese Black cattle are sensitive to lolitrem B, and the NOAEL is designated as 12 µg/kg bw/day.

This section includes the analysis methods for ergovaline and lolitrem B that are listed in the Feed Analysis Standards as well as the method for staining of endophytic hyphae.