SHIMADZU

LC-MS Application Data Sheet No. 019

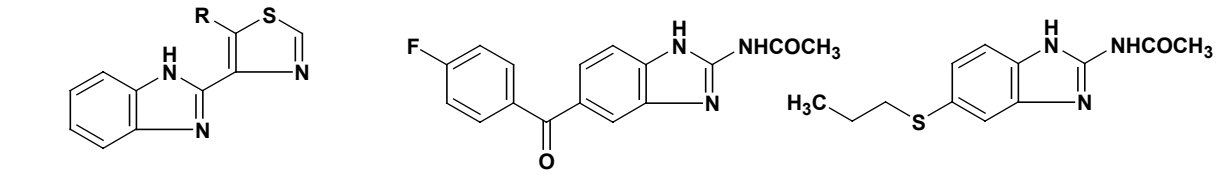
Analysis of antiparasitic agents using LC-MS

Veterinary pharmaceuticals including antibiotics and hormones are used to prevent disease in livestock, promote growth, and enhance the feed efficiency. Antiparasitic agents are also widely used to eliminate parasites from the alimentary canal. Residual standards are being established for antiparasitic agents as residual levels in meat present similar health problems to antibiotics and hormones.

The four components used for this test were 5-hydroxythiabendazole, thiabendazole, flubendazole, and albendazole. Their structures are shown in Fig. 1. A residual standard is set for each of these components in food. HPLC is prescribed for the analysis of these components but LC-MS permits analysis with extremely high selectivity and sensitivity.

Fig. 2 shows the LC-MS analysis results for the four antiparasitic agents. Each component could be positively identified using mass chromatography at the mass number of the protonated molecule of each component. Fig. 3 shows their mass spectra. Selected ion monitoring (SIM) permits highly sensitive analysis.

Fig. 4 shows the calibration curves in the range from 10 to 1000 ppb. Each curve shows good linearity.



5-hydorxythiabendazole (R = -OH, MW 217)
Thiabendazole (R = -H, MW 201)

Flubendazole (MW 313)

Albendazole (MW 265)

Fig. 1 Structures of antiparasitic agents

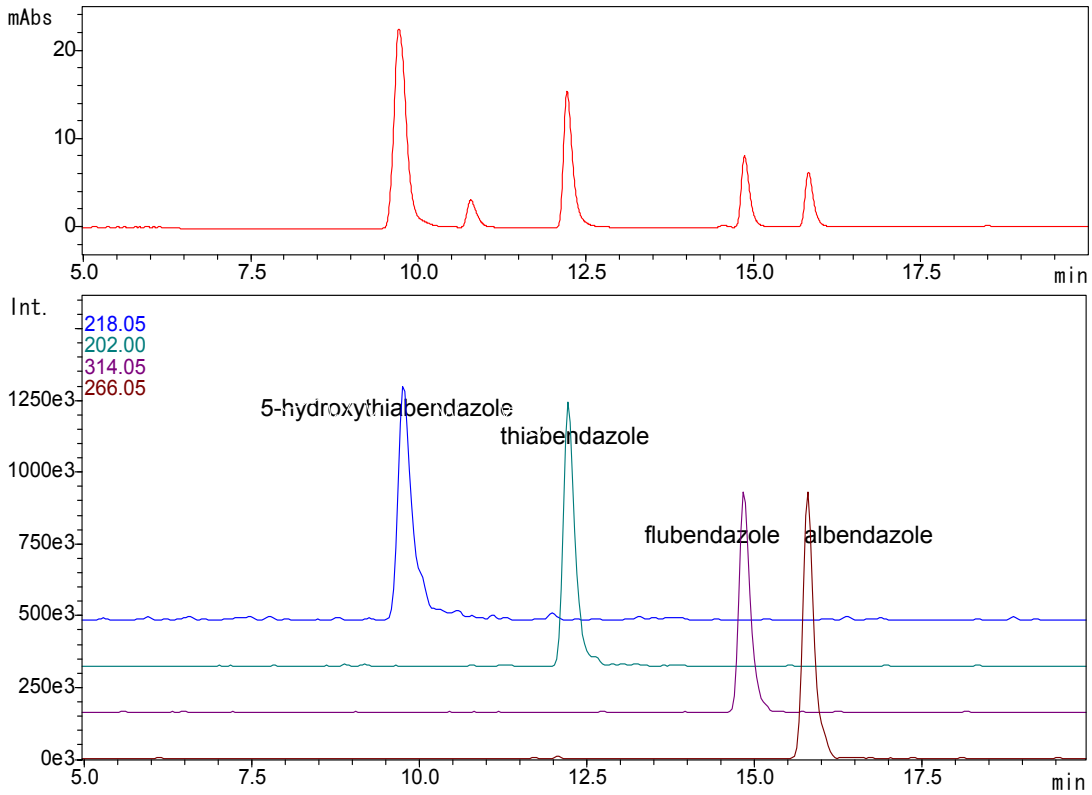
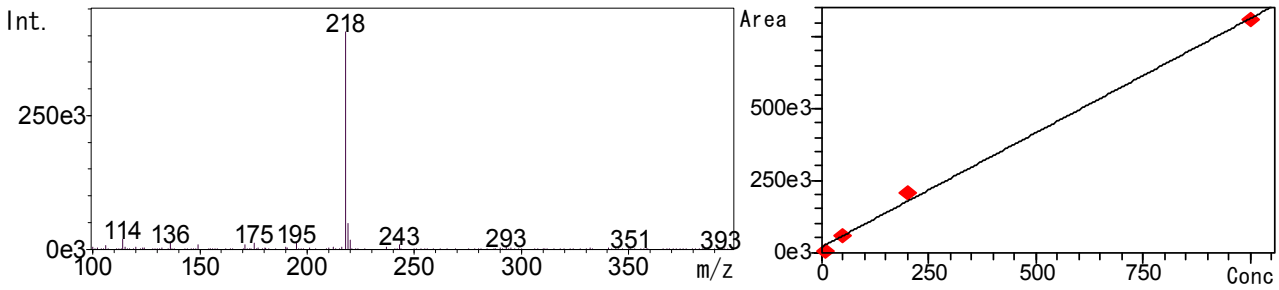
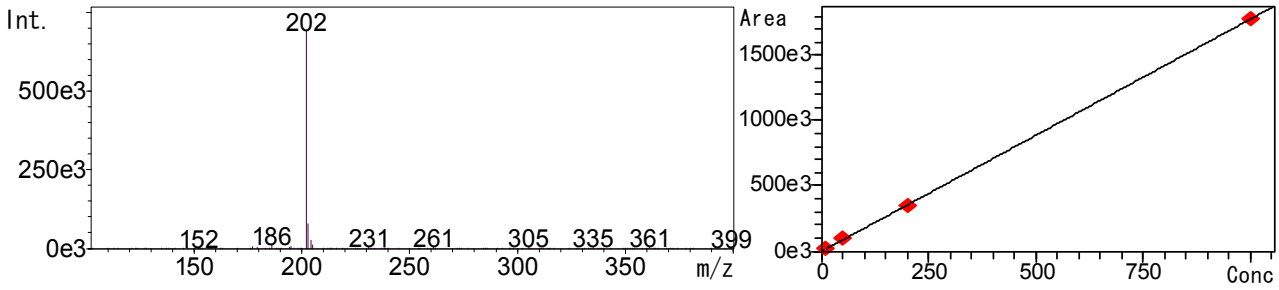


Fig. 2 UV absorption (305nm) and mass chromatograms of antiparasitic agents

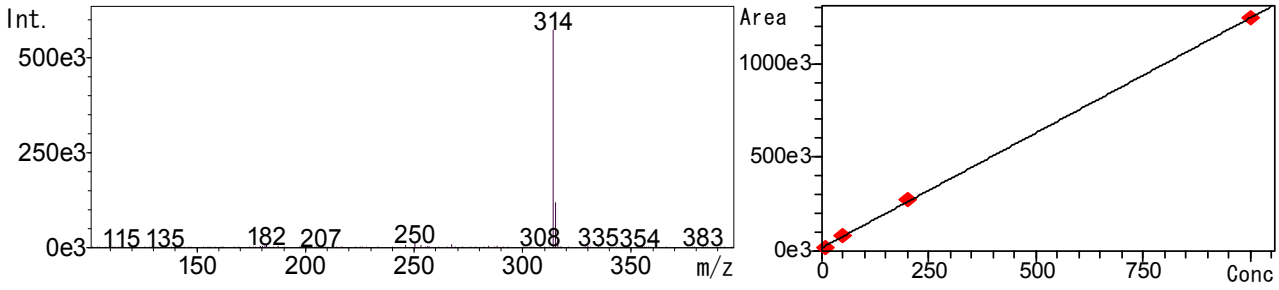
5-hydroxythiabendazole



Thiabendazole



Flubendazole



Albendazole

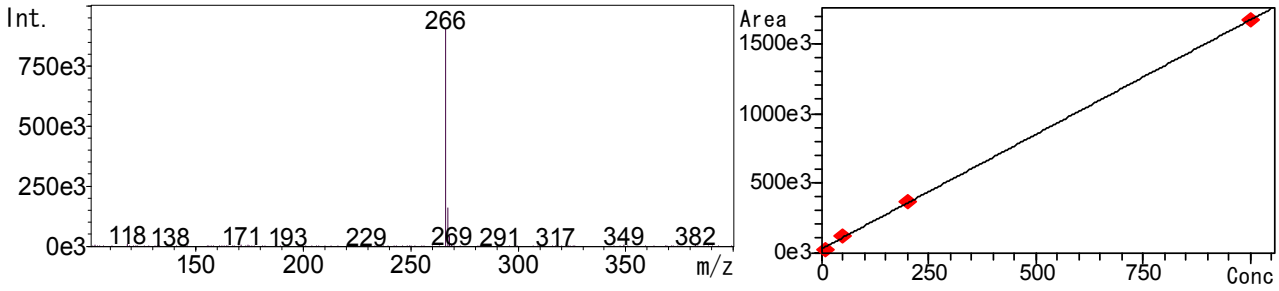


Fig. 3 Mass spectra of antiparasitic agents

Fig. 4 Calibration carves(10ppb-1000ppb)

Table 1 Analytical conditions for LC-MS

Column	: Inertsil ODS-2 (2.1 mmI.D. x 150 mm)
Mobile phase A	: 5mM acetic acid ammonium acetate buffer
Mobile phase B	: acetonitrile
Gradient program	: 0%B (0 min) - 100%B (20 min)
Flow rate	: 0.2 mL/min
Column temperature	: 40 °C
Probe voltage	: +4.5 kV (ESI-Positive mode)
Nebulizing gas flow	: 4.5 L/min
CDL voltage	: -40 V (0 - 14 min), -50 V (14.01 - 25 min)
DEFs voltage	:+40 V (0 - 14 min), +45 V (14.01 - 25 min)
Scan range	: m/z 100-400

SHIMADZU CORPORATION **International Marketing Division**
3. Kanda-Nishikicho 1-chome, Chiyoda-ku, Tokyo 101-8448, Japan
Phone: 81 (3) 3219-5641 Fax. 81 (3) 3219-5710
Cable Add. SHIMADZU TOKYO