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An analytical method for the determination of glyphosate and aminomethylphosphoric acid using an anionic polar pesticide column and the application in urine and serum from glyphosate poisoning patients

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Table S1 The detailed information on the chromatographic columns applied in this research

	Torus DEA Column	Anionic Polar Pesticide Column	ACQUITY UPLC BEH HILIC Column
Stationary phase:	Diethylamine	Diethylamine	HILIC
Particle size:	1.7 µm	5 µm	1.7 µm
Pore size:	130 Å	130 Å	130 Å
Internal diameter	2.1 mm	2.1 mm	2.1 mm
Column length	100 mm	100 mm	100 mm
Surface area:	185	185	185
Particle shape:	Spherical	Spherical	Spherical
Pore volume:	0.7 c/g	0.7 cc/g	-*

*- the information was not provided.

Case information

Case 1, a 51-year-old female took 400 mL GLY in a suicide attempt. Gastric lavage was performed before being sent to hospital for emergency treatment. When arriving at the emergency room, the blood pressure, pulse, respiration, and body temperature were 116/63 mmHg, 63 /min, 20 /min and 36.7 °C, respectively. The patient was conscious, and suffered sore throat, nausea, vomiting. No unique findings were made during the physical examination other than mild tenderness in the upper abdomen. He had a history of cholecystectomy and hysterectomy, and denied the history of chronic disease. The results of chest CT scan showed multiple exudation and fibrous foci in both lungs and multiple nodules in the right lung. Results of the arterial blood test performed immediately after the visit. The blood routine, coagulation routine and troponin test showed no obvious abnormalities, except certain infection (neutrophil (NEU) (%): 80.8). The first biological samples were collected 7 hours after the ingestion of GLY. The following urine samples were collected in routine examinations every day until the discharge from the hospital and the final blood sample was collected before the discharge. After the admission, the patient was treated with liver protection, stomach protection and electrolyte balance adjustment, and was discharged after 5 days.

Case 2, A 52-year-old male administered 10 mL of GLY in the suicide attempt. Gastric lavage was carried out before coming to the hospital as an emergency treatment. The patient in a critical condition. At the arrival of the emergency room, the blood pressure, pulse, respiration and were 132/95 mmHg, 120 /min, and 24 /min. The body temperature was 38 °C for 3 hours before the visit. The patient was conscious and suffered nausea, vomiting, abdominal pain, diarrhea, chest tightness and shortness of breath. He had a history of peripheral nerve, anxiety, and rib fracture. The results of chest CT scan showed that there were patchy, small nodules and strip-shaped high-density shadows in both lungs. Blood routine, C-reactive protein and PCT results showed the existence of infection with high inflammatory indexes (white blood cell (WBC) (* 10^9 /L): 15.08; NEU (* 10^9 /L): 13.91; NEU (%): 92.3%; lymphocyte (LYM) (* 10^9 /L): 0.35; LYM (%): 0.1%; high-sensitivity C-reactive

protein (HSCRP) (mg): 43.44; procalcitonin (PCT) (ng/mL): 1.82) and high blood glucose (glucose (GLU) (mmol/L): 7.70). Blood gas analysis indicated the metabolic alkalosis (pH: 7.42; HCO_3^- (mmol/L): 26.6), combined with hypokalemia and hypocalcemia (K (mmol/L): 3.30; Ca (mmol/L): 1.10). Biological samples were collected 14 hours after the patient took GLY. The following urine samples were collected in routine examinations every day until the discharge from the hospital and the final blood sample was collected before the discharge. After the admission, the patient was treated with acid inhibition and stomach protection, anti-infection, fluid replacement and diuresis, and electrolyte balance maintenance, and was discharged after 3 days.

Case 3, A 78-year-old female administered 250 mL of GLY in a suicide attempt. Gastric lavage was carried out before coming to the hospital as an emergency treatment. At the arrival of the emergency room, the blood pressure, pulse, respiration, and body temperature were 116/63 mmHg, 80 /min, 16 /min and 36.8 °C, respectively. The patient was unconscious and suffered vomiting, dyspnea, and sweating. He had a history of right lower limb trauma surgery and left walking dysfunction. Chest CT scan results showed that the upper lobe of the left lung had a small, slightly high-density shadow, and the lower lobe of the right lung was inflamed. The blood routine results showed that there existed certain infection (WBC (* 10^9 /L): 23.67; NEU (* 10^9 /L): 15.37; HSCRP (mg): 82.63) and high blood glucose (GLU (mmol/L): 17.30). Abnormal liver function was suggested (lactate dehydrogenase (LDH-e) (U/L): 340.0; amylase (AMYL) (U/L): 264.0). Blood gas analysis showed respiratory failure or dyspnea (PA-aO_2 (mmHg): 202.00; pO_2 (mmHg): 80; pCO_2 (mmHg): 13), metabolic acidosis (pH 7.38; HCO3-std (mmol/L): 14.0; lactic acid (LAC) (mmol/L): 3.10) and acalcicosis (Ca (mmol/L): 1.04). Biological samples were collected 2 hours after the patient took GLY. The following urine samples were collected in routine examinations every day until the discharge from the hospital and the final blood sample was collected before the discharge. After the admission, the patient was treated with rehydration, anti-infection, acid inhibition and stomach protection, catharsis and diuresis, and continuous blood purification. After 6 days, he was

discharged.

Case 4, A 97-year-old female administered 50 mL of GLY in a suicide attempt. Gastric lavage was carried out before coming to the hospital as an emergency treatment. At the arrival of the emergency room, the blood pressure, pulse, respiration, and body temperature were 160/80 mmHg, 86 /min, 20 /min and 37 °C, respectively. The patient suffered shortness of breath, cough, nausea and vomiting, cyanosis of lips, dry skin, and other symptoms. She had a previous history of hypertension and femoral neck fracture. The results of chest CT scan showed that there were spots, flakes, small nodules and strips of high-density shadows in both lungs. Blood routine showed that there existed certain infection (WBC (* 10^9 /L): 16.34; NEU (* 10^9 /L): 15.4; NEU (%): 92.1; LYM (* 10^9 /L): 0.72; LYM (%): 4.4%) and high blood glucose (GLU (mmol/L): 9.08) was observed. Blood gas analysis showed that respiratory acidosis was complicated with metabolic alkalosis (pH: 7.34; pO_2 (mmHg): 73; pCO_2 (mmHg): 43; HCO_3^-(mmol/L): 23.2), combined with hyponatremia and hypochloremia (Na (mmol/L): 135.7; Cl (mmol/L): 97.23). Biological samples were collected 3 hours after the patient took GLY and no other biological samples were collected during the treatment at the hospital. After the admission, the patient was treated with acid inhibition, stomach protection, anti-infection, and maintenance of water electrolyte balance, and was discharged after 3 days.

Case 5, A 25-year-old male administered 200 mL of GLY in suicide attempt. At the arrival of the emergency room, the blood pressure, pulse, respiration, and body temperature were 103/69mmHg, 86/min, 17/min and 37 °C, respectively. The patient was complicated with nausea, vomiting, dizziness, limb weakness, unstable walking, and cyanosis of lips. History of chronic disease and surgical history were denied. The results of chest CT scan showed that patchy, small nodules and strip-shaped high-density shadows were seen in both lungs. Blood routine showed that there existed an increase in neutrophils (NEU (%): 85.8%; LYM (%): 11.8%;). Routine coagulation test and troponin test showed no obvious abnormality. Blood gas analysis showed metabolic acidosis (pH: 7.36, $BE(B)^-$ (mmol/L): 5.5; TCO_2 (mmol/L): 20.2; HCO_3^- std (mmol/L): 20.7). Biological samples were collected 24 hours after the patient took

GLY and the following urine samples were collected in routine examinations every day until the discharge from the hospital. After the admission, the patient was treated with stomach protection, fluid replacement, anti-infection, and metabolism promotion, and was discharged after 4 days.