Electronic Supplementary Material

Determination of β2-Agonist Residues in Meat Samples by gas chromatography-mass spectrometry with N-doped Carbon Dots-in-Molecular sieves

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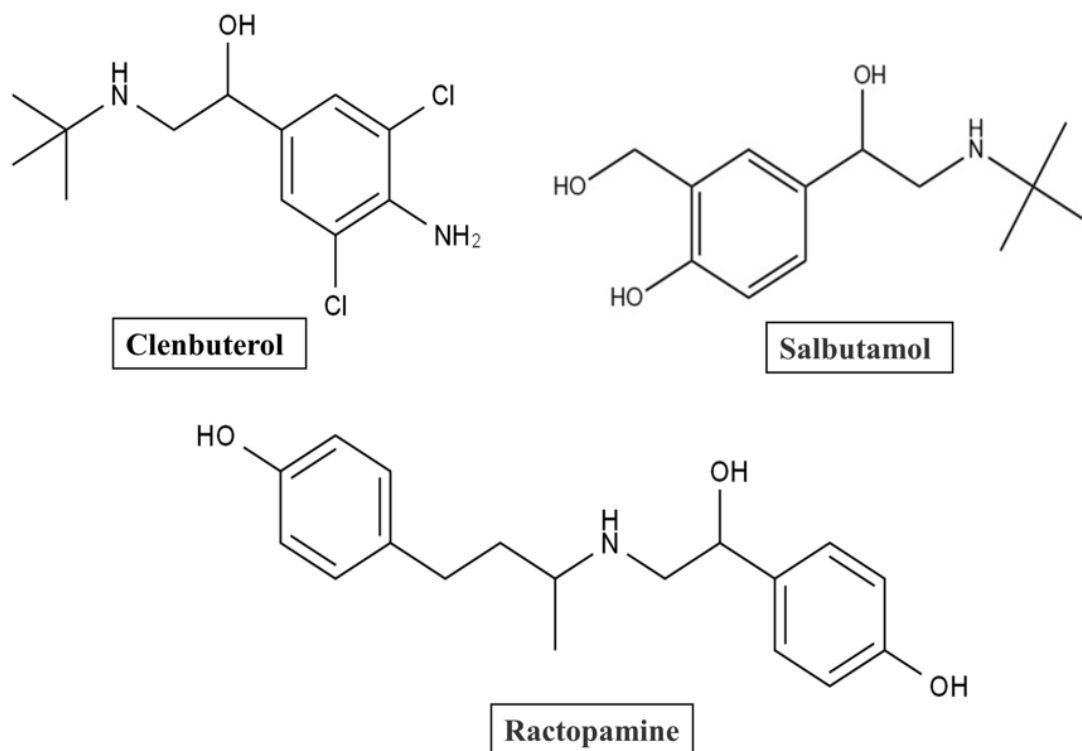
1. The schematic diagram of β₂-agonists structure

Figure S1. The schematic diagram of β₂-agonists structure (clenbuterol, salbutamol and ractopamine).

2. The setting parameters of GC-MS

Table S1. The retention times, qualitative ions, and quantitative ions for each β_2-agonist in the method.

No.	Compounds	t_R (min)	Confirmation ions ($m \cdot z^{-1}$)	Quantification ions ($m \cdot z^{-1}$)
1	Clenbuterol	14.568	86, 187, 212, 243, 264	86
2	Salbutamol	14.906	73, 147, 212, 262, 369	369
3	Ractopamine	22.751	58, 179, 193, 267, 301	301

3. Kinetic parameters for the adsorption

Table S2. Kinetic parameters for the adsorption of Clenbuterol on ZMS@N-CQDs.

$Q_e(\mu g \cdot mg^{-1})$	Pseudo-first-order			Pseudo-second-order		
	$Q_{e,1}(\mu g \cdot mg^{-1})$	$K_1(min^{-1})$	R^2	$Q_{e,2}(\mu g \cdot mg^{-1})$	$K_2(min^{-1})$	R^2
13.3	12.9	0.7884	0.9909	12.4	5.3900	0.9863

Q_e: Experimental equilibrium adsorption amount;

$Q_{e,1}$: Calculated equilibrium adsorption amount from the Pseudo-first order kinetics;

$Q_{e,2}$: Calculated equilibrium adsorption amount from the Pseudo-second order kinetics.

4. Isotherm parameters for the adsorption

Table S3. Adsorption isotherm parameters of Clenbuterol on ZMS@N-CQDs.

$Q_m(ng \cdot mg^{-1})$	Langmuir			Freundlich		
	$Q_{m,1}(ng \cdot mg^{-1})$	$K_L(mL \cdot ng^{-1})$	R^2	$KF(ng^{n-1/n}/mL^{1/n}/mg)$	n	R^2
30.00	29.83	0.0194	0.9999	3.1992	0.9976	0.9642

Q_m: Experimental maximum adsorption amount;

$Q_{m,1}$: Calculated maximum adsorption amount from Langmuir isothermal adsorption curves.

5. The mass spectra of β2-agonists
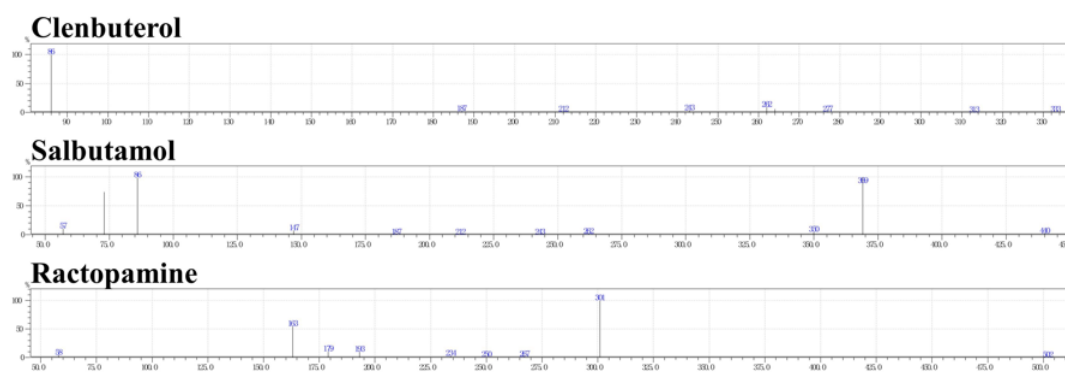
Figure S2. The mass spectra of each β2-agonist used in this method.