

Supporting information

Rapid Analysis of Anionic and Cationic Surfactants in Water by Paper Spray

Mass Spectrometry

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1. Supporting experimental section

Preparation of paper matrix

The chromatography papers purchased were first made into amounts of triangle papers (an angle of 38°, width 9 mm, height 13.2 mm, and an area of ~60 mm²) by using a CUTOK DC craft cutting plotter (Hefei CNC Equipment Co. Hefei, China).

1.1 Hydrophobic paper:

The cut well chromatographic papers were first immersed in an octadecyltrichlorosilane n-hexane solution (0.1%, v/v) in an acoustic wave bath for 10 min. Then the modified triangle papers were washed in n-hexane, ethanol, and methanol, according to priority in an acoustic wave to remove excess salinization reagent on the surface. After being naturally dried at room temperature, put it into the sealing pocket to prepare for PS-MS use.

1.1 Sodium salt paper (NaCl-impregnated) and Potassium salt paper (KCl-impregnated):

The corresponding salt standard was weighed by the electronic balance, and 0.01 mol L⁻¹ of the salt solution was prepared with ultrapure water in a clear beaker. Taking prepared chromatographic paper into the salt solution and ultrasonic for 10 min in order for these triangle papers were uniformly modified. After being naturally dried at room temperature, put it into the sealing pocket to prepare for PS-MS use.

2. Supporting Figures

Fig. S1. Images of water contact angle determination of hydrophobic triangular paper.

Fig. S2. The working image of PS-MS.

Fig. S3. The schematic diagram of sample preparation.

Fig. S4. Scheme of workflow for surfactants semi-quantitative analysis by PS-MS.

Fig. S5. Effect of spray solvent on response of PS-MS for cationic (a) and anionic (b) surfactants. Data based on an average of three tests for each solvent. Standard deviation did not exceed 6%.

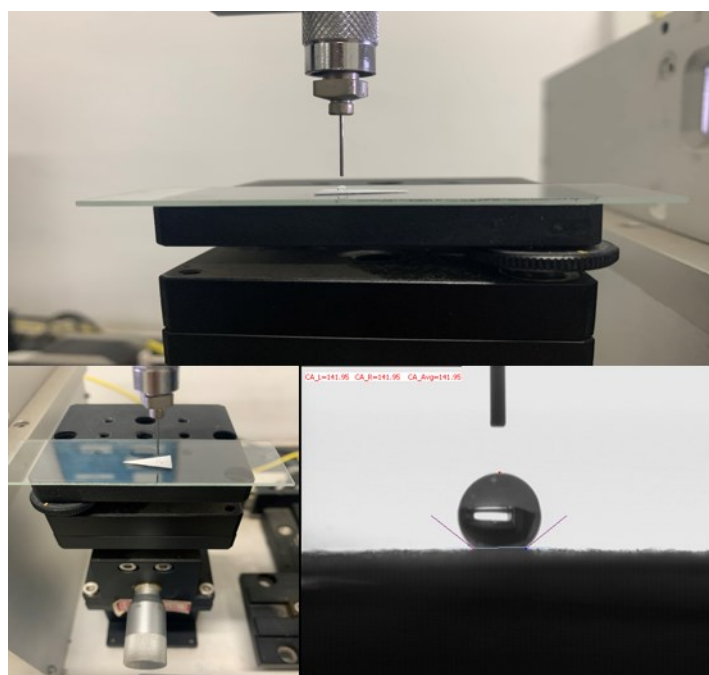


Fig. S1. Images of water contact angle determination of hydrophobic triangular paper. After being naturally dried at room temperature, the hydrophobic triangular paper had a water contact angle of 141.95°.

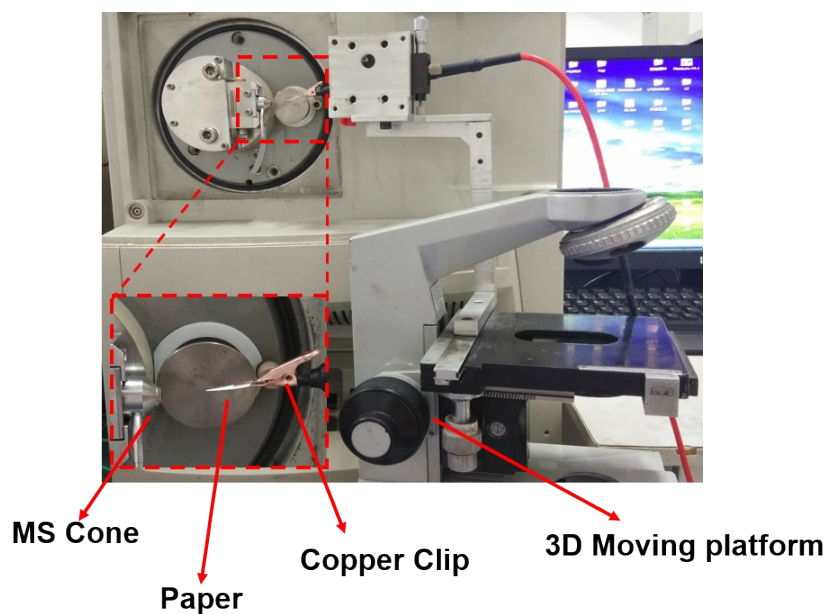


Fig. S2. The working image of PS-MS. **(The lower left section)** Enlarged view of PS-MS operation, after the sample was loaded onto the center of paper, high spray voltage was applied to the paper through copper clip, electrospray is generated, and ionized compounds were transferred to the MS inlet for analysis. **(Right section)** A three dimensional (3D) moving platform was constructed in-house and used for adjusting and fixing position of triangle tip and the MS cone.

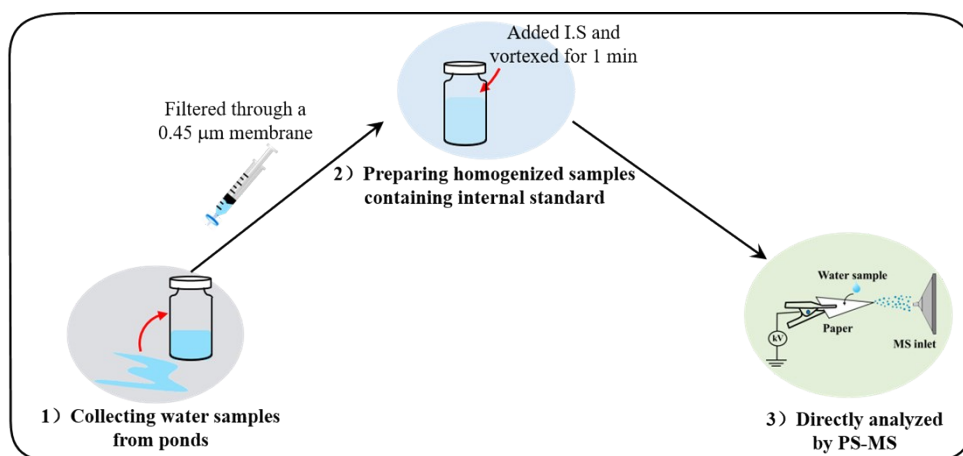


Fig. S3. The schematic diagram of sample preparation. To put it simply, the water sample is first collected from the pond, then filtered 0.45μm membrane and added internal standard, and the homogenized mixture is last directly analyzed by PS-MS.

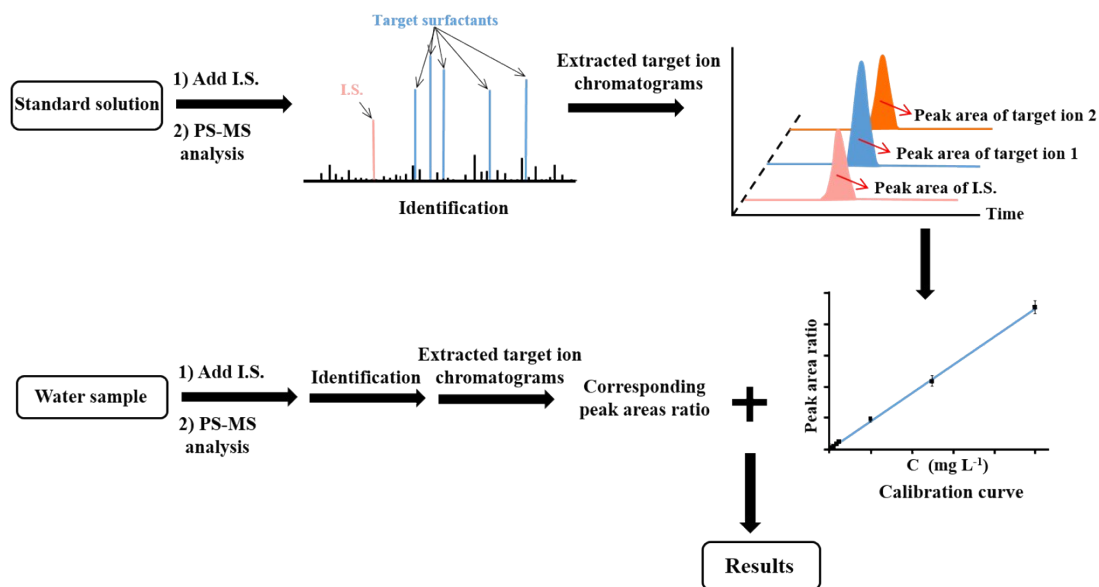


Fig. S4. Scheme of workflow for surfactants semi-quantitative analysis by PS-MS. I.S. = internal standard.

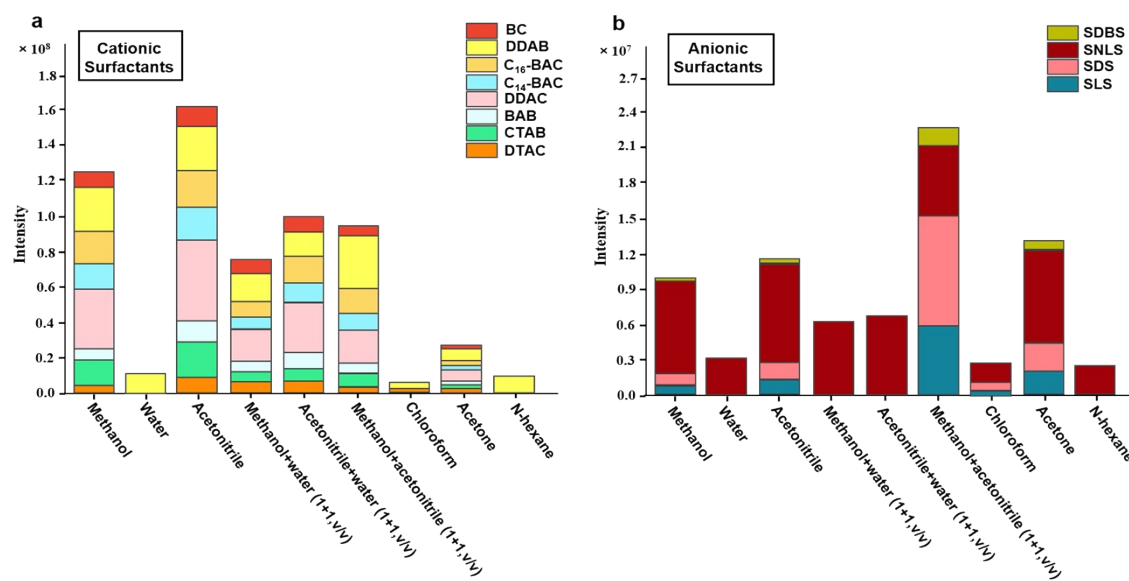


Fig. S5. Effect of spray solvent on response of PS-MS for cationic (a) and anionic (b) surfactants. Data based on an average of three tests for each solvent. Standard deviation did not exceed 6%.