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MICROEXTRACTION OF THE PHENOL AND SOME DERIVATIVES

IN WATER

Miss Kittima Chatrewongwan

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science

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กิตติมา ฉัตรวงศ์วาน : การสกัดระบบจุลภาคของฟีนอลและอนุพันธ์บางชนิดในน้ำ
(MICROEXTRACTION OF THE PHENOL AND SOME DERIVATIVES IN WATER
อ.ที่ปรึกษา ดร.สิทธิชัย สิทธิพัฒน์โพบูลย์, 201 หน้า.

การพัฒนาการสกัดระบบจุลภาค เพื่อใช้ในการสกัดสารประกอบฟีนอล เช่น ฟีนอล 2-ไนโตรฟีนอล 2,4-ไดคลอโรฟีนอล 2,4,6-ไตรคลอโรฟีนอล 4-คลอโร-3-ครีซอล จากตัวอย่างน้ำ ก่อนที่จะนำไปวิเคราะห์หาปริมาณโดยใช้เครื่องแก๊สโครมาโทกราฟี ซึ่งใช้เฟลมไอออไนเซชันดีเทคเตอร์ (FID) โดยศึกษาปัจจัยต่าง ๆ ที่มีอิทธิพลต่อประสิทธิภาพของการสกัด ได้แก่ ความเป็นกรด ระยะเวลาที่เหมาะสมในการสกัด ชนิดของตัวทำละลายอินทรีย์ในการสกัดซึ่งรวมถึง เมธิลีน คลอไรด์ คาร์บอน ไตซัลไฟด์ และเฮกเซน อัตราส่วนของสารตัวอย่างต่อตัวทำละลายนั้นคือ 9:1 5:5 และ 2:8 และผลจากการเติม เกลือโซเดียมคลอไรด์ เกลือโซเดียมซัลเฟต สภาวะที่เหมาะสมที่สุดสำหรับการสกัดระบบจุลภาคของสารประกอบฟีนอลและอนุพันธ์บางชนิดของฟีนอลในตัวอย่างน้ำ คือการสกัดที่ pH 2 ด้วยเมธิลีน คลอไรด์ อัตราส่วนสารละลาย ตัวอย่างต่อตัวทำละลาย 9:1 และใช้เกลือโซเดียมซัลเฟตปริมาณ 2.0 กรัม โดยทำการสกัดเป็นเวลา 20 นาที ประสิทธิภาพของการสกัดซึ่งได้จากการศึกษาอยู่ในช่วง 17.74-106.30% และมีค่าเบี่ยงเบนมาตรฐานระหว่าง 0.08-9.95% ชีตจำกัดต่ำสุดของสารประกอบฟีนอลสามารถวัดปริมาณในสารตัวอย่างน้ำได้อยู่ในช่วง 0.45-1.70 ppm นอกจากนี้ยังได้ศึกษาความถูกต้องของเทคนิคการวิเคราะห์ในสภาวะที่เหมาะสมที่สุด ผลปรากฏว่าเปอร์เซ็นต์ความผิดพลาดอยู่ในช่วง 0.53-4.97%

ภาควิชาเคมี
สาขาวิชาเคมี
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ลายมือชื่อนิสิต
ลายมือชื่ออาจารย์ที่ปรึกษา



KITTIMA CHATREWONGWAN : MICROEXTRACTION OF THE PHENOL AND SOME DERIVATIVES IN WATER. THESIS ADVISOR : DR. SITTICHAJ LEEPIPATPIBOON, 201 PP.

Microextraction technique has been developed for the determination of trace phenolic compounds, i.e., phenol ; 2-nitrophenol, 2,4-dinitrophenol, 2,4,6-trichlorophenol, and 4-chloro-3-cresol from water samples prior to analyze by gas chromatograph equipped with flame ionization detector (FID). The various effects on percent recovery ,i.e., the pHs, the shaking times, the salting out with sodium chloride and anhydrous sodium sulfate, the sample-to-solvent ratios, i.e., 9:1, 5:5, 2:8, and the extracting organic solvents including methylene chloride, carbon disulfide, and hexane were investigated and evaluated. The suitable condition for the microextraction of phenolic compounds from water samples is the pH of 2, the equilibration time of 20 minute, the methylene chloride, the sample-to-solvent ratio of 9:1 and salting out with 2.00 g anhydrous sodium sulfate. The percent recoveries are in the range of 17.74-106.30% with the percent RSD of 0.08-9.95%. The accuracy of these techniques was studied and the percent error was in the range of 0.53-4.97%. The aqueous samples contained as low as 0.45-1,70 ppm of these phenolic compounds could be easily detected,

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ลายมือชื่อนิสิต สิตติฉา เลอพิพัฑฒ
ลายมือชื่ออาจารย์ที่ปรึกษา ดร. สิตติฉา เลอพิพัฑฒ



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