

**MOTOR OIL REMOVAL FROM WASTEWATER  
BY CONTINUOUS FROTH FLOTATION**

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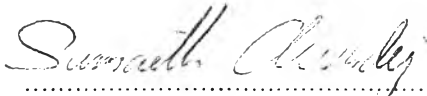
**Thesis Title:** Motor Oil Removal from Wastewater by Continuous Froth Flotation  
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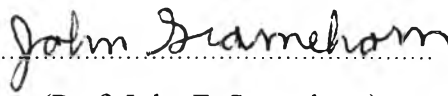
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## ABSTRACT

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Weerawat Kongkowitz: Motor Oil Removal from Wastewater by Continuous Froth Flotation.

Thesis Advisors: Assoc. Prof. Sumaeth Chavadej, Prof. John F. Scamehorn, and Assoc. Prof. Promoch Rirksomboon 95 pp.

Keywords: Froth flotation/ Motor oil removal/ Microemulsion diagram/ Ultra-low interfacial tension/ Foam stability/ Bubble size distribution

Froth flotation is a surfactant-based separation process which is suitable for treating a dilute oily wastewater. The objective of this study was to investigate the effects of certain operational parameters on the separation performance of continuous froth flotation to remove motor oil from water. A branched alcohol propoxylate sulphate, sodium salt (Alfoterra 145-5PO), was used in both the phase behavior and froth flotation studies. The effects of surfactant concentration and NaCl concentration, where the minimum surfactant concentration can form the middle phase in microemulsion systems, or critical microemulsion concentration, were studied. From the microemulsion diagram, the critical microemulsion concentration (C<sub>μC</sub>) was found to be 0.5 wt.% Alfoterra. After that, the continuous froth flotation experiments were performed to investigate the efficiency of motor oil removal from water using Alfoterra 145-5PO. The effects of surfactant concentration, hydraulic retention time and air bubble size distribution on foam characteristic and froth flotation performance were also investigated. The results showed that the system with 0.5 wt.% Alfoterra, 5 wt.% NaCl, and 30 min HRT gave the maximum oil removal (61.5 %).

## บทคัดย่อ

วิระวัฒน์ ก้องโกวิท : กระบวนการแยกน้ำมันเครื่องออกจากน้ำเสียโดยระบบทำให้ลอยแบบต่อเนื่อง (Motor Oil Removal from Wastewater by Continuous Froth Flotation) อ. ที่ปรึกษา : รศ. ดร. สุเมธ ชวเดช ศ. จอห์น เอฟ สเต็มมีฮอร์น และ รศ. ดร. ปราโมช รังสรรค์วิจิตร 95 หน้า

กระบวนการทำให้ลอย (froth flotation) เป็นหนึ่งในกระบวนการแยกสารโดยสารลดแรงตึงผิวซึ่งเหมาะสำหรับบำบัดน้ำเสียที่มีการปนเปื้อนของน้ำมันที่เจือจาง งานวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาตัวแปรที่มีผลต่อประสิทธิภาพของการกำจัดน้ำมันเครื่องออกจากน้ำโดยวิธีกระบวนการทำให้ลอยแบบต่อเนื่อง สารลดแรงตึงผิวแบบ บรานซ์ อัลกฮอล์ โพรพรอกซีเลต ซัลเฟต โซเดียม ซอลท์ (Alfoterra 145-5PO) ถูกนำมาใช้ในการศึกษาทดลองการเกิดไมโครอิมัลชันและกระบวนการทำให้ลอย ปัจจัยของความเข้มข้นสารลดแรงตึงผิว และความเข้มข้นเกลือได้ถูกนำมาศึกษาเพื่อหาความเข้มข้นสารลดแรงตึงผิวน้อยที่สุดซึ่งสามารถเกิดไมโครอิมัลชันจากแผนภาพของไมโครอิมัลชัน ความเข้มข้นสารลดแรงตึงผิวน้อยที่สุดถูกพบที่ความเข้มข้นของ บรานซ์ อัลกฮอล์ โพรพรอกซีเลต ซัลเฟต โซเดียม ซอลท์ 0.5 เปอร์เซ็นต์ ในกระบวนการทำให้ลอยได้ทำการศึกษาปัจจัยของความเข้มข้นสารลดแรงตึงผิว เวลาเก็บกัก และการกระจายตัวของขนาดฟองอากาศต่อความเสถียรของฟอง และประสิทธิภาพของการกำจัดน้ำมัน จากผลการทดลองพบว่า ระบบที่ความเข้มข้นของ บรานซ์ อัลกฮอล์ โพรพรอกซีเลต ซัลเฟต โซเดียม ซอลท์ 0.5 เปอร์เซ็นต์, ความเข้มข้นของเกลือ 5 เปอร์เซ็นต์ และเวลากักเก็บ 30 นาที ให้ประสิทธิภาพการกำจัดน้ำมันที่สูงที่สุดเท่ากับ 61.5 เปอร์เซ็นต์

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