

**MOLECULAR DESIGN OF BENZOXAZINES:  
AN APPROACH FOR INCLUSION COMPOUNDS**



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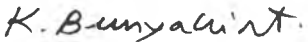
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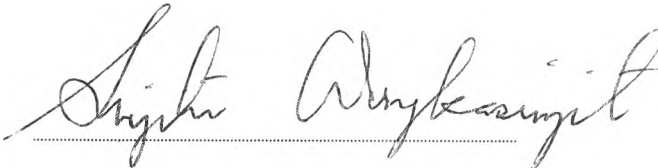
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## บทคัดย่อ

นางสาวรติรัตน์ พ็ชรประทีติ: การออกแบบเบนซอกซาซีนในระดับโมเลกุล: การไปสู่สารประกอบอินคลูชัน (Molecular Design of Benzoxazines: an Approach for Inclusion Compounds) อ. ที่ปรึกษา: ผศ. ดร. สุวบุญ จิรชาญชัย และ ศ. ดร. ฮัทสึโอะ อิชิดะ (Prof. Hatsuo Ishida), 42 หน้า ISBN 974-13-0724-1

อนุพันธ์ของเบนซอกซาซีนไดเมอร์ ไดเมอร์ที่มีหมู่เอสเทอร์ และสารประกอบวงแหวนออลิโกเบนซอกซาซีนที่มีความแตกต่างในโครงสร้างที่หมู่วงฟีนอล และหมู่ที่ให้อิเล็กตรอนได้ถูกออกแบบและสังเคราะห์ได้สำเร็จดังที่ได้ตรวจสอบผลวิเคราะห์โครงสร้างด้วยเทคนิค FTIR,  $^1\text{H-NMR}$ , EA และ MS ปรากฏการณ์อินคลูชันศึกษาโดยการจำแนกไอออนด้วยเทคนิคปีเดอร์สัน (Pedersen's technique) ที่ความเข้มข้นของไดเมอร์และโลหะโพแทสเซียมคือ โซเดียมและโพแทสเซียมเท่ากับ  $5.6 \times 10^{-2}$  และ  $7 \times 10^{-5}$  โมลาร์ (Molar) ตามลำดับ การทดลองให้ผลว่าเบนซอกซาซีนไดเมอร์และไดเมอร์ที่มีหมู่เอสเทอร์สามารถจับไอออนโลหะได้ 43-62% และ 75-94% ตามลำดับ การที่ความสามารถในการจับไอออนแตกต่างกันตามประเภทของเบนซอกซาซีนแสดงให้เห็นถึงอิทธิพลของโครงสร้างร่างแหพันธะไฮโดรเจน และความมีบริเวณที่มีอิเล็กตรอนหนาแน่นในโครงสร้างของเบนซอกซาซีนแต่ละชนิด ในกรณีของสารประกอบวงแหวนออลิโกเบนซอกซาซีนพบว่าไม่มีการจับไอออนโลหะ ซึ่งบ่งถึงขนาดช่องว่างที่ไม่เหมาะสมกับขนาดของไอออนโซเดียมและโพแทสเซียม

## ABSTRACT

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Keywords: Benzoxazine Monomer/ Benzoxazine Dimer/ Esterified Dimer/ Cyclic Oligobenzoxazine/ Metal Picrate/ Inclusion Phenomena

A series of benzoxazine dimer, esterified dimer, and cyclic oligobenzoxazine derivatives having different phenol rings and electron donor groups were designed and successfully prepared as structural characterized by FTIR,  $^1\text{H-NMR}$ , EA, and MS. The inclusion phenomena with metal ions were studied by Pedersen's technique using metal (sodium, and potassium) picrate salts, and the prepared dimers at the concentrations of  $5.6 \times 10^{-2}$  and  $7 \times 10^{-5}$  M, respectively. Benzoxazine dimers showed ion extraction ability at 43-62% while that of esterified dimers at 75-94%. The ion extraction ability depended on the type of benzoxazine dimer implies the effect of hydrogen bonding network and the electron rich area in each benzoxazine dimer structure. For cyclic oligobenzoxazine, unexpectedly, the ion interaction could not be observed which implies that the cavity size was not proper for the sodium and potassium metal ions.

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