

การผลิตไบโอดีเซลจากน้ำมันที่ได้จากกราเอนโคไฟต์



นางสาวณัฐชา รัตนปัญญา

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

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BIODIESEL PRODUCTION FROM OIL OF ENDOPHYTIC FUNGUS

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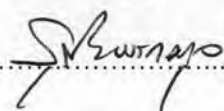
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อ.ที่ปรึกษา: รศ. ดร. สุรัชย์ พรภคกุล, 94 หน้า.

วัตถุประสงค์ของงานวิจัยนี้เพื่อผลิตไบโอดีเซลจากน้ำมันที่ได้จากราเอนโดไฟต์และศึกษาอิทธิพลของปัจจัยในการเพาะเลี้ยงที่มีต่อการสร้างน้ำมัน พบว่าเวลาในการเลี้ยง ปริมาณสารสกัดจากมอลต์ ชนิดของแหล่งคาร์บอนและไนโตรเจนในอาหารเลี้ยงเชื้อมีผลต่อการสร้างน้ำมันและร้อยละของความไม่อิ่มตัวของไตรกลีเซอไรด์ การสร้างน้ำมันสูงสุดอยู่ที่การเริ่มต้นของระยะการเจริญเติบโตครั้งที่ น้ำมันที่สร้างโดยราเอนโดไฟต์ในทุกภาวะการเพาะเลี้ยงเชื้อมีปริมาณกรดไขมันอิสระ(FFA) อยู่ประมาณ 12 เปอร์เซ็นต์ ขณะที่ส่วนประกอบกรดไขมันไม่อิ่มตัวของน้ำมันจะขึ้นกับภาวะในการเพาะเลี้ยงราที่เพาะเลี้ยงในอาหาร MEB ให้น้ำมันที่มีกรดไขมันไม่อิ่มตัว 53 เปอร์เซ็นต์ กระบวนการที่เหมาะสมที่สุดที่ใช้ในการผลิตไบโอดีเซล คือ การผลิตไบโอดีเซลแบบสองขั้นตอน ขั้นตอนแรกคือ การทำปฏิกิริยาด้วย 1% H_2SO_4 ซึ่งสามารถลดระดับกรดไขมันอิสระเหลือน้อยกว่า 1% ขั้นที่สองปฏิกิริยาทรานเอสเทอร์ฟิเคชันที่เร่งปฏิกิริยาด้วยเบสโดยใช้ 1% NaOH ได้เป็นเมธิลเอสเทอร์ 94.78 เปอร์เซ็นต์ และการเปลี่ยนไปเป็นเอสเทอร์ได้ 97.34 เปอร์เซ็นต์

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Aims of this research were to produce biodiesel from lipid of an endophytic fungus and to investigate the influence of cultivation parameters on lipid production. It was found that time, amount of malt extract, carbon source and nitrogen source affected the lipid production and %unsaturation of triglyceride. The maximum lipid production was at the beginning of stationary phase of the growth. The lipid, produced by the fungus from all cultivation conditions, comprised of about 12 % free fatty acid (FFA) while the unsaturated fatty acid component of the lipid depended on the cultivation conditions. The fungus, cultured in MEB, produced the lipid with 53% unsaturated fatty acid. The suitable method for biodiesel production was produced by a two-stage transesterification process. The first stage was acid pretreatment with 1% H_2SO_4 , which could reduce the FFA level of lipid of endophytic fungus to less than 1%. The second stage, alkali base catalyzed transesterification using 1% NaOH, gave 94.78% of methyl ester content and 97.34% of conversion.

Field of study...Petrochemistry and Polymer Science... Student's signature *Natta Rattanapanya*
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LIST OF ABBREVIATIONS

CO ₂	=	Carbon dioxide
No.	=	Number
°C	=	Degree Celsius
° F	=	Degree Fahrenheit
ASTM	=	American Society for Testing and Materials
		Methods of Analysis of AOAC
FAME	=	Fatty acid methyl ester
EN	=	European Standards
% wt	=	Percent by weight
wt	=	Weight
Btu/gal	=	Btu/gallon
NO _x	=	Nitrogen oxides
SO ₂	=	Sulphur dioxide
h	=	Hour
KOH	=	Potassium hydroxide
NaOH	=	Sodium hydroxide
FFAs	=	Free fatty acid
TLC	=	Thin Layer Chromatography
% yield	=	Percent yield
% conversion	=	Percent conversion
NMR	=	Nuclear Magnetic Resonance
α	=	Alpha