

ผลของเมทิลเอสเทอร์ของน้ำมันปาล์มต่อการปล่อยสารพอลิไซคลิกแอโรแมติก
ไฮโดรคาร์บอนของเครื่องยนต์ดีเซล

นางสาว อูมาพร พงษ์สัตยา



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**EFFECT OF PALM OIL METHYL ESTER ON POLYCYCLIC AROMATIC
HYDROCARBONS EMISSION OF DIESEL ENGINE**

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อุมาพร พงษ์สัตยา : ผลของเมทิลเอสเทอร์ของน้ำมันปาล์มต่อการปล่อยสารพอลิไซคลิกแอโรแมติกไฮโดรคาร์บอนของเครื่องยนต์ดีเซล (EFFECT OF PALM OIL METHYL ESTER ON POLYCYCLIC AROMATIC HYDROCARBONS EMISSION OF DIESEL ENGINE)

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ได้เตรียมเมทิลเอสเทอร์ของน้ำมันปาล์มจากกระบวนการทรานเอสเทอริฟิเคชัน ของน้ำมันปาล์มดิบกับเมทานอล โดยใช้กรดซัลฟูริกเป็นตัวเร่งปฏิกิริยา ที่อุณหภูมิ 65 องศาเซลเซียส เป็นเวลา 6 ชั่วโมง จากการศึกษาผลของการผสมเมทิลเอสเทอร์ของน้ำมันปาล์มกับน้ำมันดีเซลต่อการปล่อยสารพอลิไซคลิกแอโรแมติกไฮโดรคาร์บอนของเครื่องยนต์ดีเซล พบว่าเปอร์เซ็นต์การลดลงของสารพอลิไซคลิกแอโรแมติกไฮโดรคาร์บอนมีค่าใกล้เคียงกับเปอร์เซ็นต์ของเมทิลเอสเทอร์ของน้ำมันปาล์มที่เพิ่มขึ้น ดังนั้น เมทิลเอสเทอร์ของน้ำมันปาล์มสามารถลดปริมาณของสารพอลิไซคลิกแอโรแมติกไฮโดรคาร์บอนจากไอเสียของเครื่องยนต์ดีเซลลงได้ นอกจากนี้ การใช้น้ำมันดีเซลที่ผสมกับเมทิลเอสเทอร์ของน้ำมันปาล์มเป็นเชื้อเพลิง จะมีปริมาณสารพอลิไซคลิกแอโรแมติกไฮโดรคาร์บอนต่ำกว่าการใช้น้ำมันดีเซลที่ผสมกับน้ำมันปาล์มดิบและน้ำมันปาล์มบริสุทธิ์

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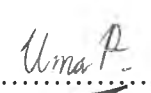
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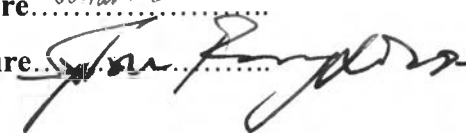
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Palm oil methyl ester was prepared from transesterification of crude palm oil with methanol in the presence of sulfuric acid at temperature of 65 °C for 6 hours. The effect of palm oil methyl ester added to base diesel fuels on the amount of PAHs in diesel exhaust was investigated. Results showed that a percentage decrease of the amount of PAHs in diesel exhaust was found to be approximately equal to a percentage increase of the amount of palm oil methyl ester in blended diesel fuel. This indicates that palm oil methyl ester can reduce PAHs in diesel exhaust. In addition, diesel fuel blended with palm oil methyl ester was found to give lower amount of PAHs than did diesel fuel blended with crude palm oil or refined palm oil.

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LIST OF ABBREVIATIONS

AIT	Auto-ignition temperature
ASTM	The American Society for Testing and Materials
°C	Degree Celsius
CI	Cetane index
cm ⁻¹	Unit of wavenumber
CN	Cetane number
CO	Carbon monoxide
cP	Centipoises
cSt	Centistoke
DNA	Deoxy Ribonucleic Acid
EPA	Environmental Protection Agency
°F	Degree Fahrenheit
FBP	Final boiling point
FCC	Fluid catalytic cracking
FFA	Free fatty acid
GC-FID	Gas Chromatograph-Flame Ionization Detector
GC-MS	Gas Chromatograph-Mass Spectrometer
GF	Glass-Microfibre filter
HP	Horse Power
HPLC	High-Performance Liquid Chromatograph
IBP	Initial boiling point
ID	Diameter
IR	Infrared spectroscopy
LCO	Light cycle oil
LD ₅₀	Median lethal dose

LIST OF ABBREVIATIONS (Continued)

MTBE	Methyl-tertiary-butyl ether
1-MN	1-methylnaphthalene
NIOSH	Occupational Safety and Health
NMR	Nuclear magnetic resonance spectroscopy
NOEL	No Observable Effect Level
NO _x	Oxide of nitrogen
PAC	Polycyclic aromatic compound
PAHs	Polycyclic aromatic hydrocarbons
PM	Diesel particulate matter
ppm	Parts per million
PUF	Polyurethane foam
rpm	round per minute
SOF	Solvent organic fraction
SRGO	Straight-run gas oils
St	Stoke
δ	Chemical shift