

Comparative Biodiesel Synthesis using Biowaste-based Catalysts

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Natural and Applied Sciences, Lead City University, Ibadan, Oyo State, Nigeria**

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Industrial Chemistry**

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Certification Page

This is to certify that Isaac Sewanu **BANKOLE** with matriculation number **LCU/PG/1779** carried out this research work titled “Comparative Biodiesel Synthesis using Biowaste-based Catalysts in Southwest Nigeria” in the Department of Chemical Sciences, Faculty of Natural and Applied Sciences, Lead City University, Ibadan, Oyo state, for the award of Master Degree (MSc) in Industrial Chemistry and that this has not been previously submitted.

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Dedication

This research work is dedicated to God Almighty and to all Chemistry Educators

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Abstract

Over the last three decades, effort of chemists has been geared towards the search for an ecofriendly fuel as an alternative to fossil fuel. The search light has been beamed at plant seed oil and waste. This study compared the biodiesel synthesis from *Chrysophyllum albidum* using biowaste -based catalysts of African star apple shell and cow bone. The seeds were collected, washed, dried and cracked. The mesocarp (cotyledon) was separated from the shells, cut into pieces, sundried and was mechanically powered. The powder was Soxhlet extracted for oil using mixture of methanol and n-hexane in ratio 50:50mL as solvent. Four catalysts used were pristine African star apple (ASA) seed shell, carbonized waste Cow bone, sulphonated ASA shell and sulphonated cow bone characterized with XRD and FTIR while GC-MS was used for characterization of the biodiesel. The result shows that the percentage oil extracted from the African star apple seeds with the mixture of n-hexane and chloroform in a ratio 50:50mL was 28.88%. The percentage biodiesel yield using pristine African star apple shell catalyst was 72.90 % while using carbonized cow bone catalyst was 74.60% as the highest catalyst dose of 1g. The biodiesel yield with 1g catalyst dose of sulphonated African star apple shell catalyst was 75.50% while using sulphonated cow bone catalyst was 78.40%. The study concluded that the sulphonated Cow bone catalyst was more effective for the production of biodiesel and that the African star apple seed oil yield is not sufficient for the feedstock of commercial production of biodiesel but can be used for other industrial purposes.

Keywords: African Star Apple, Biowaste, Cow bone, African Star Apple Shell, Biodiesel

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List of Acronyms

Abbreviation		Meaning
ASA	-	African Star Apple
ASASC	-	African Star Apple-Shell Sulphonated Catalyst
ASASO	-	African Star Apple Seed Oil
CBSC	-	Cow Bone Sulphonated Catalyst
CASAS	-	Carbonized Africa Star Apple Shell
CCB (Pristine)	-	Carbonized Animal Bone

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