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LIST OF ABBREVIATIONS AND SYMBOLS

A	Pre-exponential factor or frequency factor
A	The initial reactant
ACE	The acid-catalyzed esterification
AL	Alcohol
ASTM	American standard test method
[AL]	The molar concentration of alcohol
[A]	The molar concentration of alcohol
[A]	The molar concentration of reagent A
a	Order of free fatty acid in reaction sequence
a	Order of reagent A
a	The coefficient of reagent A
[a, b]	Interval
B	The initial reactant
BCM	The base-catalyzed methanolysis
[B]	The molar concentration of reagent B
b	Order of alcohol in reaction sequence
b	Order of reagent B
b	The coefficient of reagent B
C	The product
$C_{12}H_{24}O_2$	Lauric
$C_{14}H_{28}O_2$	Myristic
$C_{16}H_{32}O_2$	Palmitic
$C_{18}H_{30}O_2$	Linolenic
$C_{18}H_{32}O_2$	Linoleic
$C_{18}H_{34}O_2$	Oleic
$C_{18}H_{36}O_2$	Stearic

LIST OF ABBREVIATIONS AND SYMBOLS (Cont')

$C_{20}H_{40}O_2$	Arachidic
$C_{22}H_{42}O_2$	Erucic
$C_{22}H_{44}O_2$	Behenic
$C_{24}H_{48}O_2$	Lignoceric
CPOME	Mixed crude palm oil methyl Ester
[C]	The molar concentration of product C
c	Order of ester in reaction sequence
c	Order of product C
c	The coefficient of product C
cal	Calorie
cm^3	Cubic millimeter
cSt	Centistokes
D	The product
DG	Diglyceride
[D]	The molar concentration of product D
[DG]	The molar concentration of diglyceride
d	Order of product D
d	Order of water in reaction sequence
d	The coefficient of product D
E	Activation energy, J/mol or cal/mol
E	Ester
E_a	Activation Energies
EN	European test method
[E]	The molar concentration of ester
FAME	Fatty acid methyl ester
FFA	Free fatty acid

LIST OF ABBREVIATIONS AND SYMBOLS (Cont')

[FFA]	The molar concentration of free fatty acid
f(x,y)	Function (x,y)
GC/FID	Gas chromatography/ flame ionization detector
GL	Glycerol
[GL]	The molar concentration of glycerol
g	Gram
H_2SO_4	Sulfuric acid
h	Width
I.V.P.	The initial value problem
i	Order
J	Joule
K	Kelvin
KOH	Potassium hydroxide
k_A	The rate coefficient
k_a	The rate coefficient of the forward reaction
k_{-a}	The rate coefficient of the reverse reaction
k_1	The rate coefficient of free fatty acid (forward reaction)
k_2	The rate coefficient of free fatty acid (reverse reaction)
k_3	The rate coefficient of TG (forward reaction)
k_4	The rate coefficient of TG (reverse reaction)
k_5	The rate coefficient of DG (forward reaction)
k_6	The rate coefficient of DG (reverse reaction)
k_7	The rate coefficient of MG (forward reaction)
k_8	The rate coefficient of MG (reverse reaction)
kg/m^3	Kilogram/ cubic metre
k1	The first step of the Runge-Kutta Method calculation

LIST OF ABBREVIATIONS AND SYMBOLS (Cont')

k2	The second step of the Runge-Kutta Method calculation
k3	The third step of the Runge-Kutta Method calculation
k4	The fourth step of the Runge-Kutta Method calculation
L	Liter
ln	Natural logarithm
M	Subinterval
MCPO	Mixed crude palm oil
ME	Methyl ester
ME1	Methyl ester from the first-stage process
MeOH	Methanol
MG	Monoglycerides
[MG]	The concentration of monoglyceride
m	The number of categories
mg/kg	Milligram/ kilogram
mg KOH/g	Milligram potassium hydroxide/ gram
min	Minute
ml.	Milliliter
NaOH	Sodium hydroxide
N_{RE}	Reynolds Number
n	Number of population
n_i	Sizes of categories
O.D.E	Ordinary Differential Equation
ode23	Runge-Kutta Method order 2-3
ode45	Runge-Kutta Method order4-5
prEN	European test method
R	Alkyl group

LIST OF ABBREVIATIONS AND SYMBOLS (Cont')

R	Gas constant = 8.314 J/mol K or 1.987 cal/mol K
R	Short chain alkyl groups
RK4	The fourth-order Runge-Kutta Method
RPO	Refined palm oil
R^2	The determination coefficient
R'	Alkyl group
R'	Long chain alkyl groups
R''	Alkyl group
R''	Long chain alkyl groups
$R''O$	Hydrocarbon group
R'''	Long chain alkyl groups
rpm	Revolutions per minute
T	Absolute temperature, K
T	Temperature
TLC/FID	Thin layer chromatography/ flame ionization detector
TG	Triglycerides
TSO	Tobacco seed oil
[TG]	The molar concentration of triglyceride
t	Time
WT	Water
[WT]	The molar concentration of water
xi	Population x
$x_{i,j}$	Data measurements
(x_i, y_i)	The discrete approximations
yi	Population y
$^\circ C$	Degree Celsius

LIST OF ABBREVIATIONS AND SYMBOLS (Cont')

μ	Mean
μ_i	Mean
σ	The standard deviation
σ_i	Standard deviation
%v	%volume by volume
%v/v	%volume by volume
%vol	%volume by volume
%wt	%weight by weight
%wt/v	%weight by volume
%wt/wt	%weight by weight