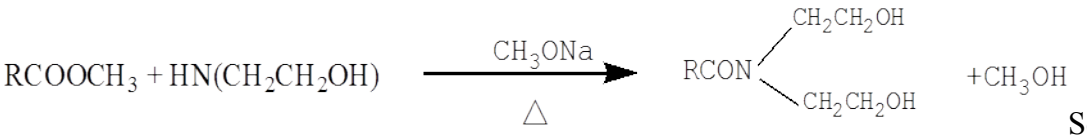
Electronic Supplementary Material (ESI) for RSC Advances.

1. Synthesis and purification of Laurel alkanolamide

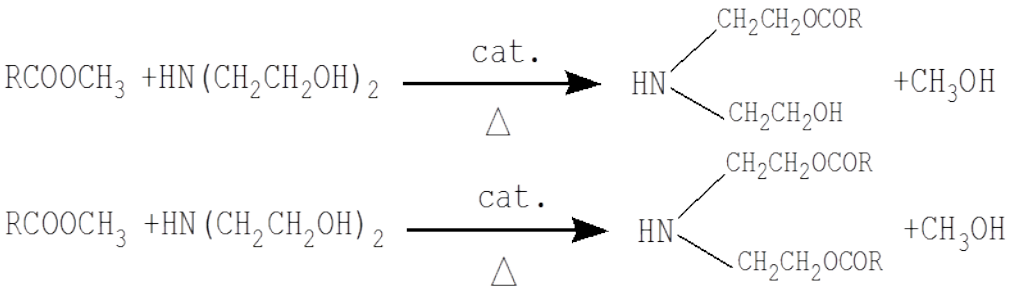
Methyl laurate and diethanol amine were added into round-bottom flask with specific molar ratio 1:1.1, kept stirring and heated the mixed solution, sodium methylate was used as catalyst and was added into the system at specific temperature of 100℃，then the temperature was kept at 125~135℃ for 3 hours, before the reaction was over . The by-product CH_3OH was distilled with the reaction processing. The solution was placed to room temperature and “a: LAA-crude” was gotten. The equation of primary reaction and several secondary reactions are list as following.

Primary reaction:



Se

condary reaction:



$R=CH_3(CH_2)_9$—

The LAA was purified following the below procedure and several samples with different purity degree and compositions were gotten: 10g “a:LAA-crude”was extracted by 100g petroleum ether, stirred under room temperature for 6 hours, then was suction filtrated and the solid was marked as “b: LAA-one step purified”. The “b” was solubilized in hot water and got concentrated through evaporation, then was

crystallized at room temperature, the procedure was repeated twice, and the precipitated white crystal was marked as “c: LAA-pure”.

2. IR or ^{1}HNMR spectra of different sample

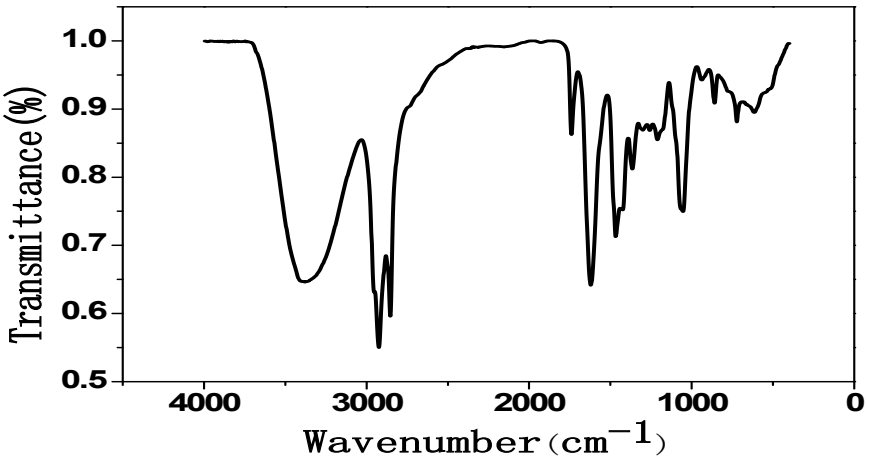


Figure S1: IR spectroscopy of “a: LAA-crude”

From the IR spectra: 3378 cm^{-1}is the absorption peak of-OH,1740 cm^{-1} is the absorption peak of C=O in ester group, 1625 cm^{-1} is the absorption peak of C-N in amide. The clear infrared absorption peak of ester was found in the IR spectra, combined with the literature of spectra of the alkanolamide, it belonged to methyl laurate, ((2-hydroxyethyl) amino) methyl dodecanoate or Azanediylbis(methylene) didodecanoate, so we can conclude that some by-product exist in the crude product.

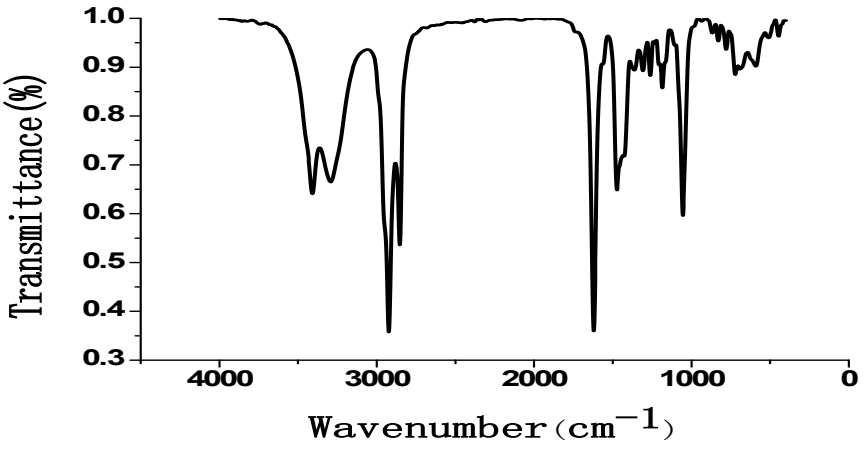


Figure S2: IR spectroscopy of "b: LAA-one step purified"

The absorption peak of C=O in ester group at 1740 $cm^{-1}$was not found, compared with figure1. Combined figure1, figure2 and the spectra in references that have been published, it could be confirmed that all the substrates and byproducts coexist in "a", while the esters (I, II, III) were removed in "b".

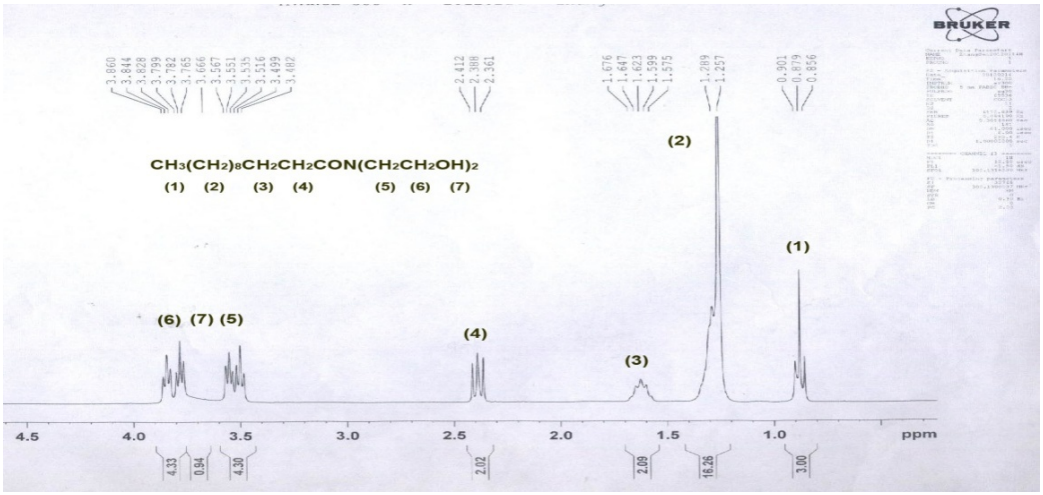


Figure S3: ^{1}HNMRspectra of "c: LAA-pure" (300Hz; $CDCl_3$; Me_4Si)

δ =0.856-0.901(3H, t, Me), δ =1.257-1.289(16H,m,-CH_2)

δ =1.575-1.676(2H, t, CH_2-CON), δ =2.361-2.412(2H, m, CH_2-C-CON),

δ =3.482-3.567(4H, t, CH_2-C-O-), δ =3.66(1H, s, -OH),

δ =3.765-3.860(4H, t, C-CH_2-O-)

From Figure S3, there is no signal belong to impurity and byproducts, "c" is pure enough and was used in the measurements.