

BACKGROUND

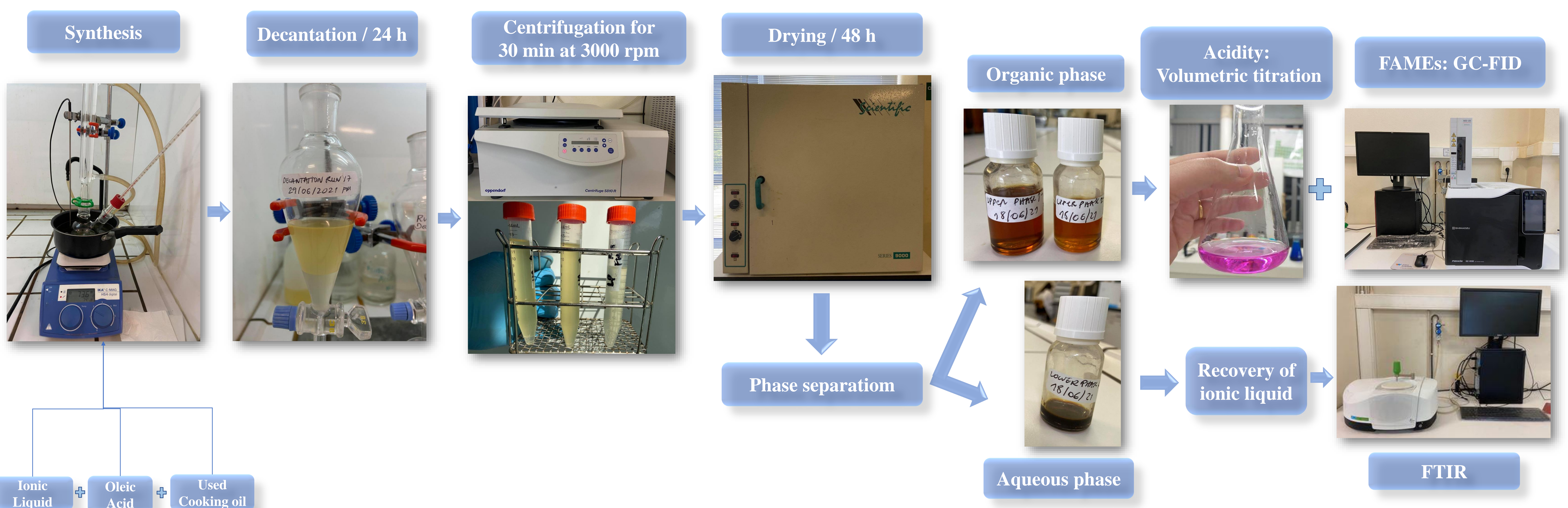
• BIODIESEL

Biodiesel is defined as a natural and renewable substitute for fossil fuels and can be produced through the transesterification or by the esterification reaction of free fatty acids of a vegetable oil, animal fat or waste cooking oils, with an alcohol, usually methanol or ethanol, in the presence of homogeneous, heterogeneous or enzymatic catalysts [1].

• IONIC LIQUIDS

Ionic liquids (IL's) are salts, commonly known as "green solvents", composed exclusively of ions (cations and anions) with low melting temperatures, negligible vapor pressure and exceptional thermal and chemical stability being liquids at room temperature and can be melted through different combinations of cations and anions [2].

SYNTHESIS AND CHARACTERIZATION METHODOLOGY



EXPERIMENTAL RESULTS

Table 1 – Reaction Conditions and FAME's Content.

Run	Reaction time (h)	Catalyst Dosage (wt %)	Oil: Metanol molar ratio	Oleic Acid incorporation (wt %)	Acidity conversion (%)	FAMES conversion (%)
1	2	10	1:15	40	55.12	30.83
2	2	10	1:10	60	29.26	17.70
3	4	15	1:10	20	79.94	30.46
4	4	10	1:15	60	62.79	35.29
5	6	10	1:5	40	27.90	13.57
6	6	10	1:10	20	63.44	17.24

- Run 4 shows a higher conversion in terms of FAME's and run 3 better results in terms of acidity reduction.
- Oleic Acid Methyl Ester represents 61% of the total FAME's, due to the incorporation of 60% of oleic acid in the simulated oil.

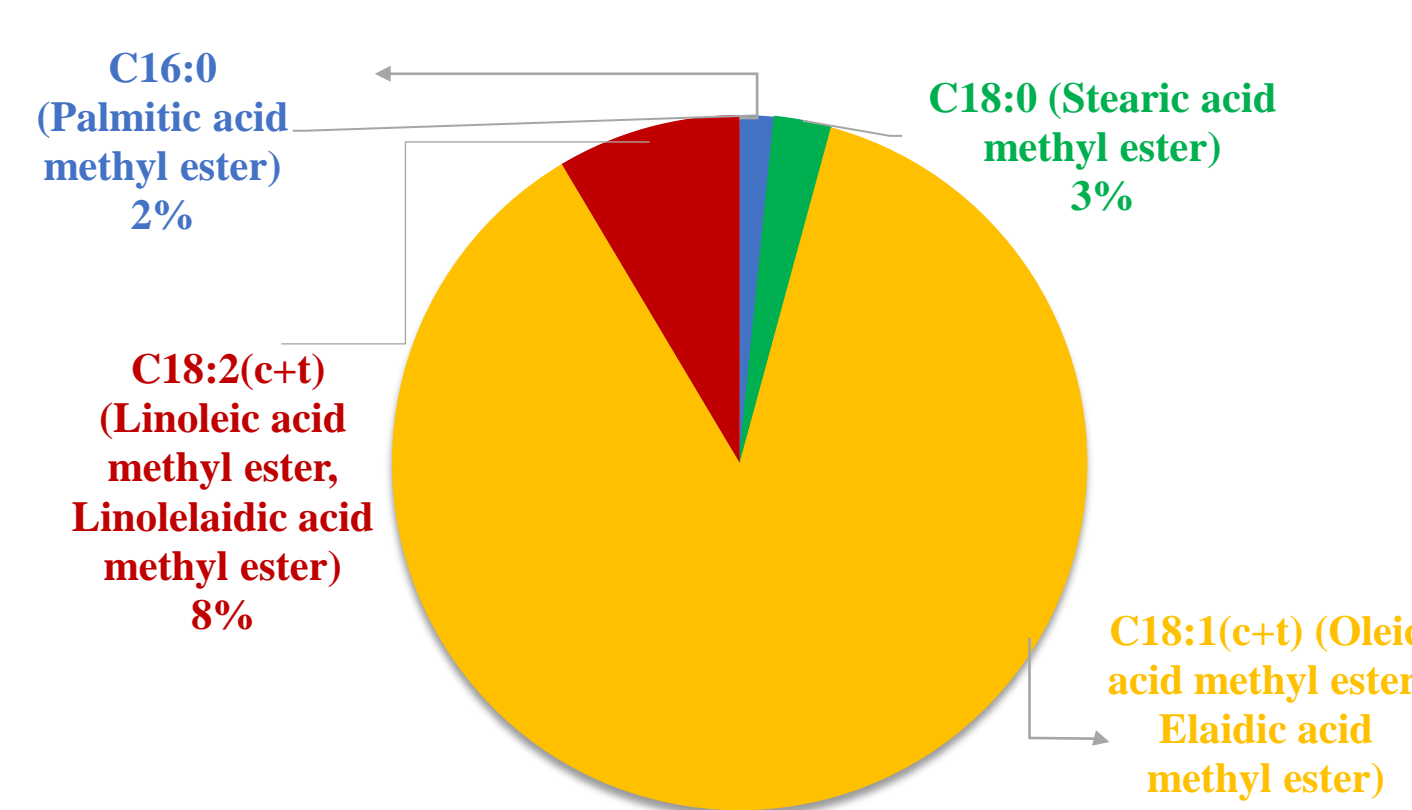


Figure 1 – FAME Analysis of run 4 using GC-FID.

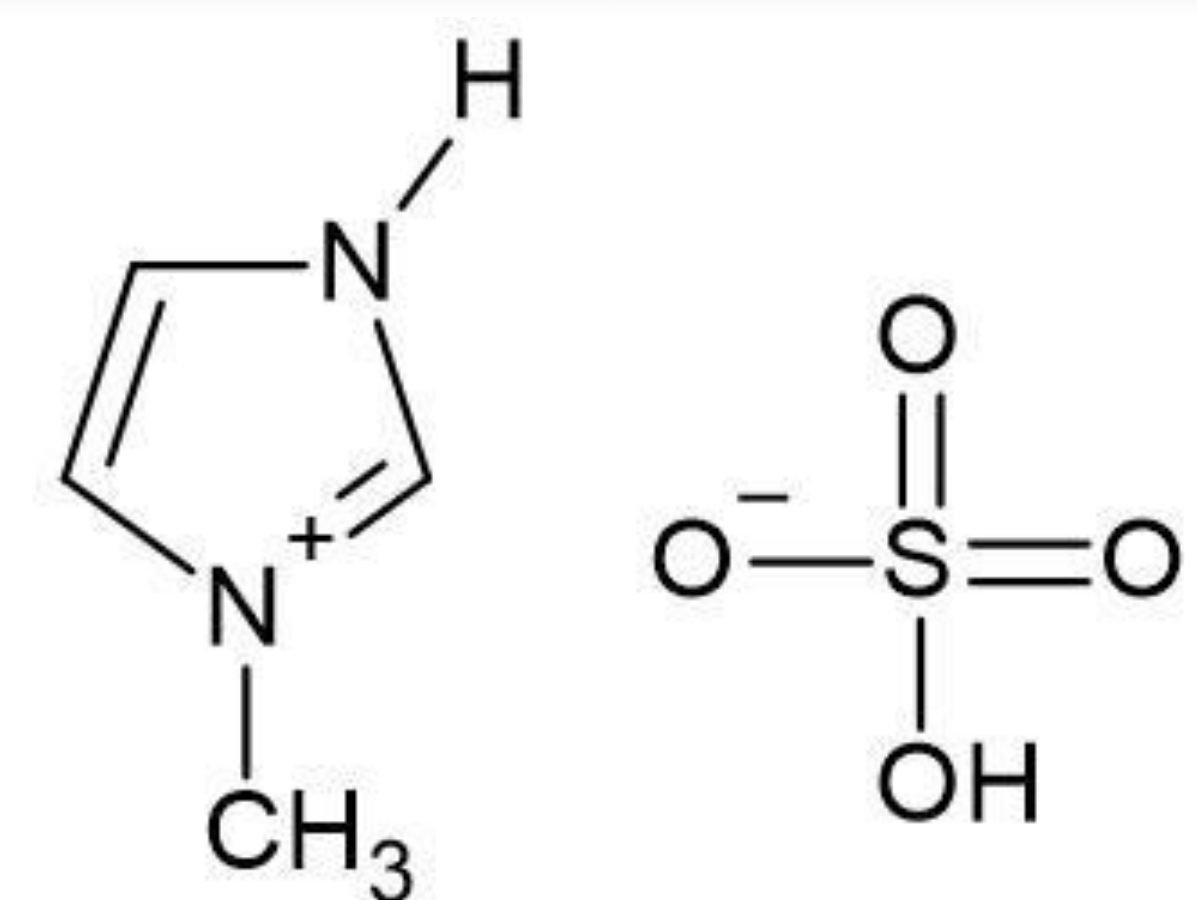


Figure 2 – [HMIM][HSO₄] structure.

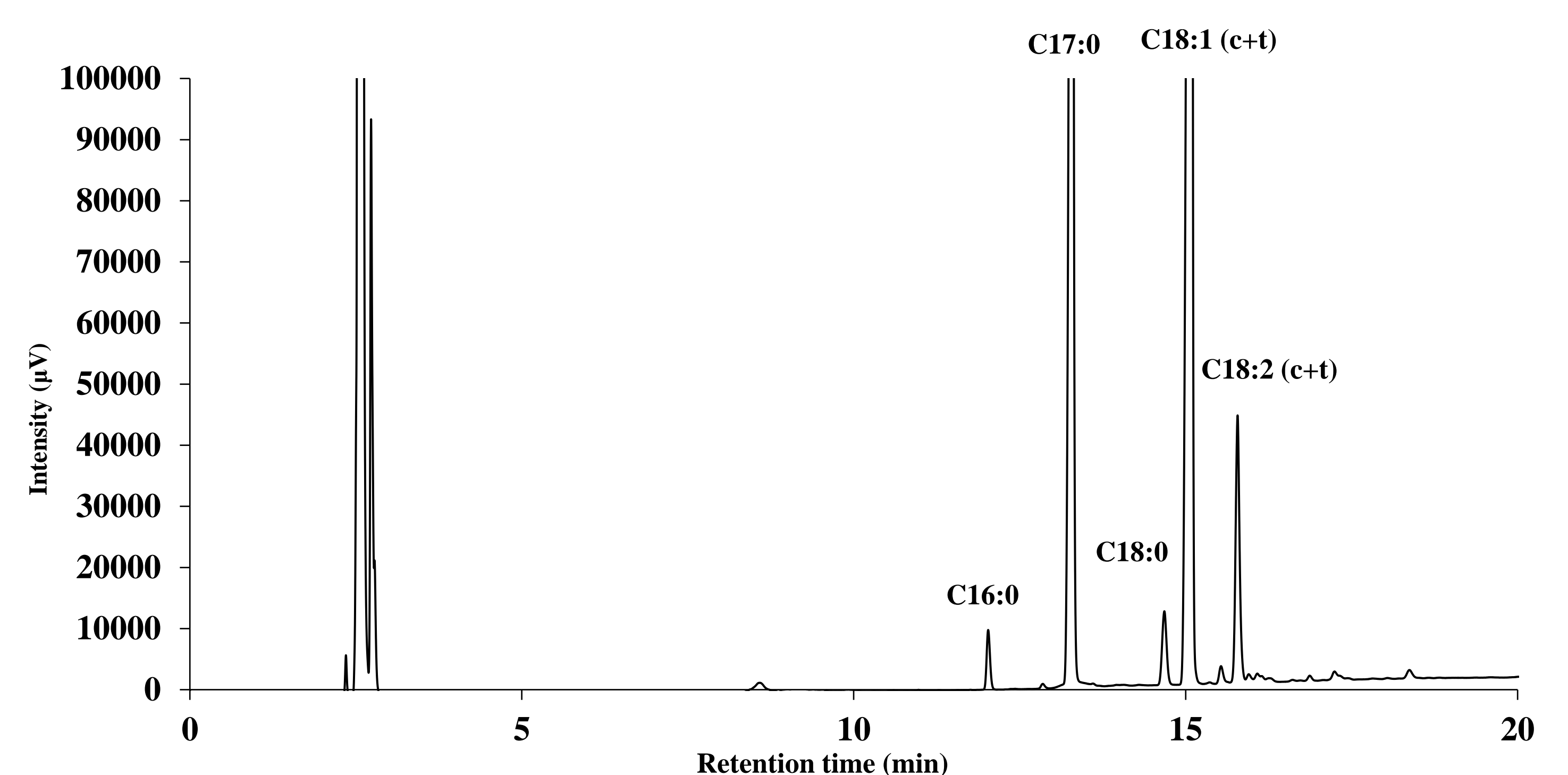


Figure 3 – Chromatogram obtained for run 4.

CONCLUSIONS AND FUTURE WORK

- The best result in terms of FAME's was obtained with the following conditions: reaction time of 4 hours, catalyst dosage 10% wt, oil:methanol molar ratio of 1:15 and incorporation of 60% oleic acid in the WCO (Waste Cooking Oil).

FUTURE WORK

- Study the IL recovery for many cycles as possible.

REFERENCES

- [1] Ramos L. P., Silva F. R., Mangrich A. S. & Cordeiro C. S., Tecnologias de Produção de Biodiesel, Revista Virtual de Química 3, 2011, 385-405.
[2] Fauzi A. H. M. & Amin N. A. S., An overview of ionic liquids as solvents in biodiesel synthesis, Renewable and Sustainable Energy Reviews 16, 2012, 5770-5786.

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