

Hydrogenation of Rapeseed Oil

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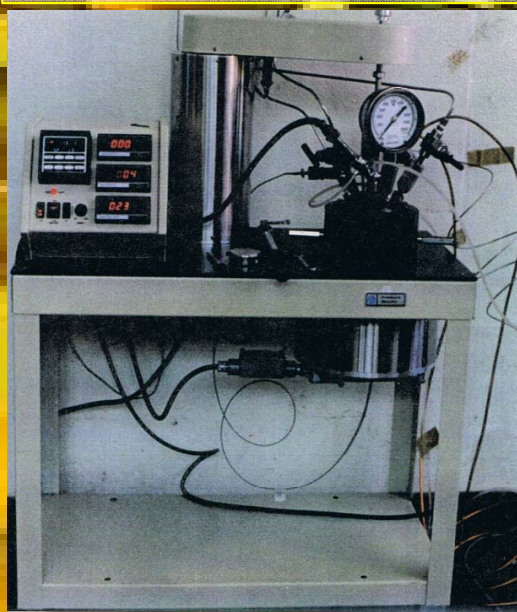
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Abstract

Rapeseed oil was hydrogenated using a hydrogen pressure of 160 psi, over a temperature range from 200 °C to 400 °C. Residence time was varied from 6 to 120 min. The reaction was performed in the absence and in the presence of a specific inorganic catalyst. The gaseous, liquid and solid yields were determined. The liquid phase was characterized using elemental analysis, FT-IR, GC-FID (boiling point profile) and GC-MS (chemical families profile). At a temperature of 400 °C and a residence time of 120 min the yield of hydrocarbon products is 90% in the presence of the catalyst and 83% in the absence of the catalyst.

Experimental Equipment - 1 L Reactor



Operational conditions

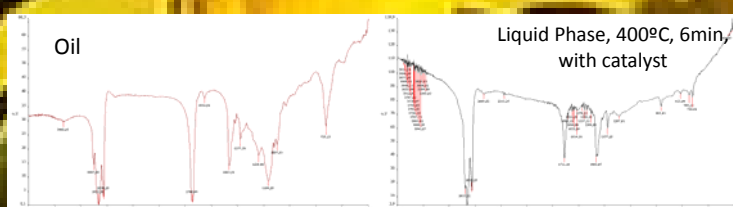
Temperature (°C):

200, 300, 350, 400

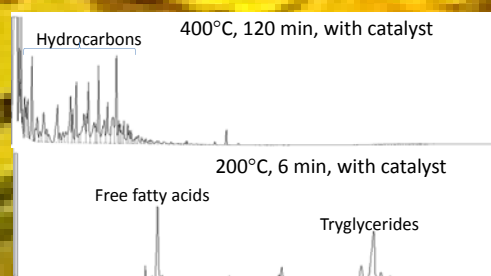
Reaction time (min):

6, 25, 120 min

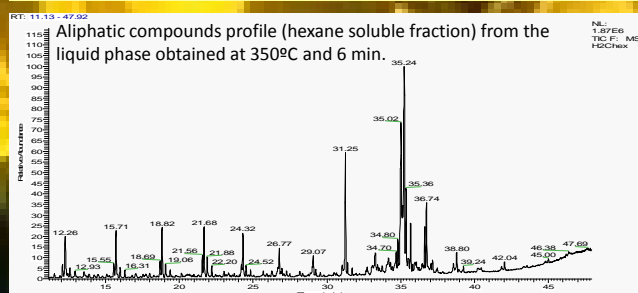
FT-IR analysis



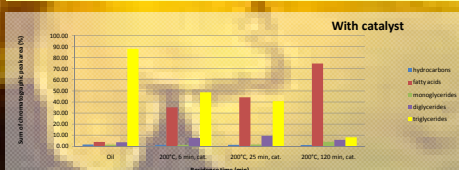
GC-FID analysis



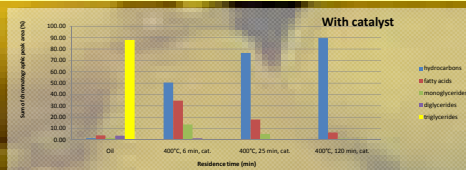
GC-MS analysis



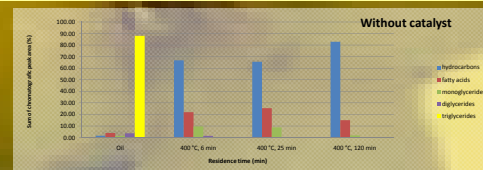
Effect of residence time



Effect of residence time (with catalyst and T=200 °C) in hydrogenation process.

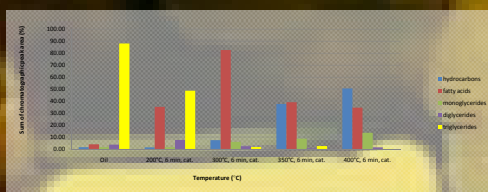


Effect of residence time (with catalyst and T=400 °C) in hydrogenation process.

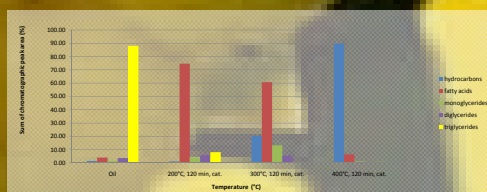


Effect of residence time (without catalyst and T=400 °C) in hydrogenation process.

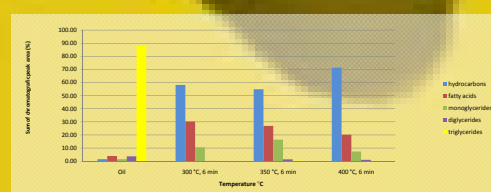
Effect of temperature



Effect of temperature (with catalyst residence time = 6 min) in hydrogenation process.



Effect of temperature (with catalyst and residence time = 120 min) in hydrogenation process.



Effect of temperature (without catalyst and residence time = 6 min) in hydrogenation process.

Main Conclusions

- Residence time favors the conversion of triglycerides to hydrocarbons, decreasing the concentration of fatty acids at all temperatures experimented.
- The increase of temperature favored the production of hydrocarbons.
- The best operating conditions for rapeseed oil hydrogenation are the use of a catalyst, a residence time of 120 minutes and a temperature of 400 °C.