Ethyl Transesterification from Canola Oil

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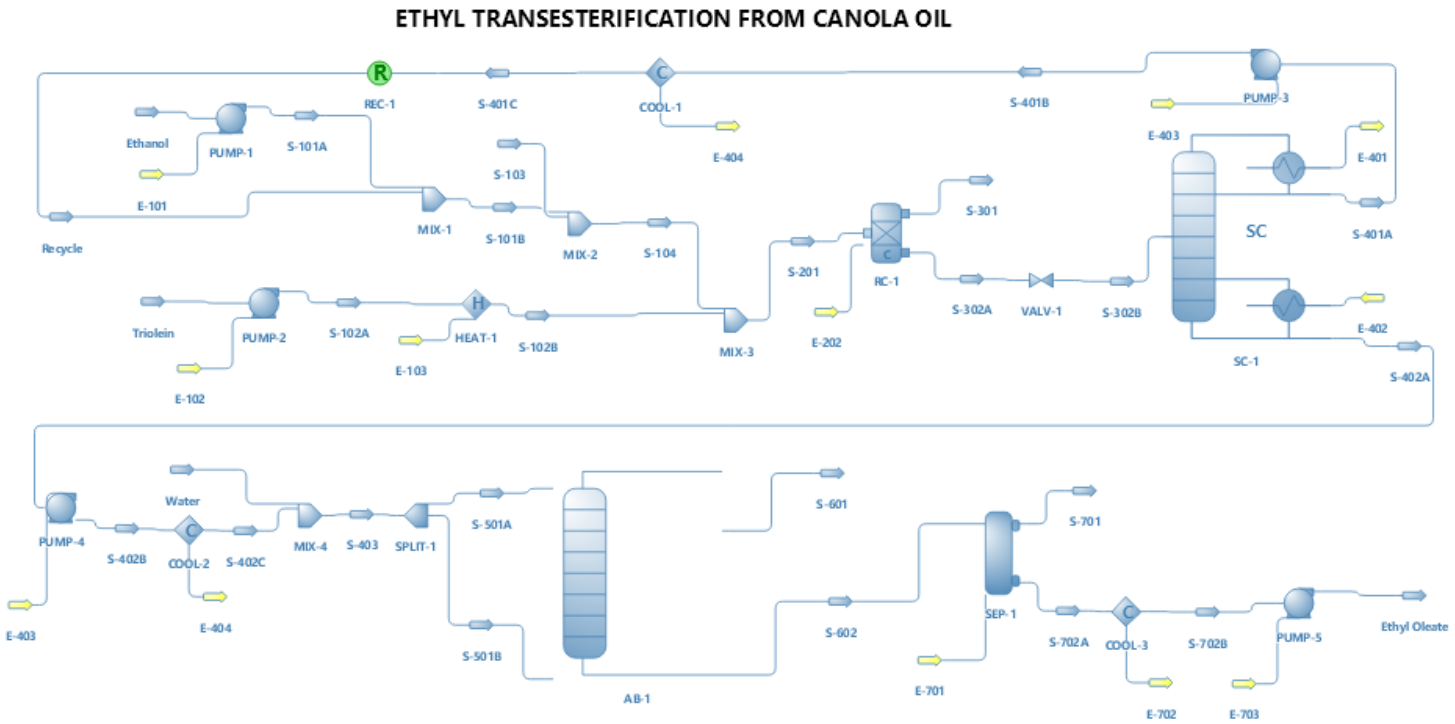
Background & Description:

Transesterification is the most used process for the production of ethyl oleate (Biodiesel), in this flowchart the production scheme of ethyl biodiesel from canola oil is presented, which is represented by the triglyceride triolein, in which it has greater consistency in the composition of the oil. Consequently, the presence of polar compounds such as ethanol and glycerol, the NRTL thermodynamic package was added and the Peng-Robinson package was used for liquid-liquid extraction. In the process, some important parameters were considered as individual: fixed conversion of 95% triolein to ethyl oleate, vacuum distillation, liquid-liquid extraction with water as a solvent and simple distillation column adopting a 99% ethanol recovery rate for the recycling line. At the outlet of the conversion reactor, the mass flow rate of ethyl oleate is 0.249 kg / s, then the current is sent to a liquid-liquid extraction column in order to purify the biodiesel with water at 60ºC and at the end of the process the flowchart presents a final current with 97.7% ethyl biodiesel in its composition.

Flowsheet:



Results:

Material Stream						
Object	Water	Triolein	NaOH	Ethyl Oleate	Ethanol	
Temperature	298,15	298,15	298,15	303,177	298,15	K
Pressure	101325	101325	101325	101325	101325	Pa
Mixture Molar Weight	18,0153	885,445	39,997	318,898	46,0684	kg/kmol
Mixture Specific Enthalpy	-2630,81	-277,207	-6799,69	-310,572	-955,267	kJ/kg
Mixture Specific Entropy	-7,09726	-0,428679	-8,26208	-0,569977	-2,74323	kJ/[kg.K]

Reactor		
Object	RC-1	
Pressure Drop	0	Pa
Calculation Mode	Isothermic	
Biodiesel: Extent	95	%
TriOlein (OOO): Conversion	95	%
Ethanol: Conversion	42,3955	%

Shortcut Column		
Object	SC-1	
Reflux Ratio	2	
Heavy Key Molar Fraction	0,01	
Light Key Molar Fraction	0,01	
Condenser Pressure	30000	Pa
Reboiler Pressure	30000	Pa

Liquid-Liquid Extractor		
Object	AB-1	
Top Stage Pressure	101325	Pa
Bottom Stage Pressure	101325	Pa
Number of Stages	10	