



## **Physico-chemical and thermophysical properties of ethyl biodiesel and biodiesel-diesel blend formulated from seed oil of *Afzelia africana* (L.) acclimated in Benin**

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**Abstract** : Biodiesel is a credible substitute for diesel fuel. It is attracting more and more interest, especially its obtaining from unconventional seeds oils. The physical properties of seed oils of *Afzelia africana*, harvested in Benin, have been determined and its conversion to ethyl esters have been done. Thermophysical properties such as density, kinematic viscosity and isothermal compressibility of extracted seed oil, derivated biodiesel and biodiesel mixtures obtained with pure diesel were studied under wide ranges of pressure [0.1-40MPa] and temperature [293.15-353.15 K]. Experimental values of density were correlated using the TAIT-Like equation. The results revealed that *Afzelia africana* seeds have good lipid potential [33.33% (m/m)]. Similarly, the seed oil of *Afzelia africana* from Benin has a chemical composition in fatty acids that is different from that generally known. Its main fatty acid are palmitic (C16:0) (7.95%), stearic (C18: 0) (18.81%), oleic (C18:1) (19.08%), linoleic (18:2) (7.86%) and linolenic (C18:3) (29.99%) acids. Estimates of density and kinematic viscosity have identified pure biodiesel-diesel blends that meet ASTM D6751 and EN 14214 standards for their use in diesel engines as substitutes for fossil fuels.

**Keywords** : *Afzelia africana*, non edible oils, biodiesel-diesel blends, fatty acids and thermophysical properties.