

The Emulsion's Morphology: an Experimental Study of Interfacial Area and Apparent Viscosity

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In this work we explore the relation of the morphology and the apparent viscosity related to standard workflows of emulsions. Different cuts of distilled water 7 to 30 % were mixed with 10000 cSt silicone oil to produce steady emulsions at room temperature. The apparent viscosity was measured with rheometer G2 ARES. The morphology of the emulsions was obtained from the analysis of acquired microscopy digital images. The results were compared with a simple model of probability distribution function where is taking into account the values of water concentration. A human number realistic of water droplets were counted. Also with home-made software the counting of droplets was done. Both methodologies were evaluated for this study. The distribution was re-scaled until the water droplet number that should have in 1 ml of emulsion. The viscosity was obtained through the expression of interfacial area where the physical meaning is the ratio of emulsion's apparent viscosity and the silicone oil apparent viscosity. In a second experiment, for one silicone oil emulsion mixed with one cut of water, a test of viscosity was running for 5 hours and the morpholog was monitored when the viscosity changes. The results of both experiments were compared with the statistical approximation with good agreement.