

Fig. 1. Experimental setup for emulsion tests.



**Fig. 2.** Ultrasonic bath and immersible transducer.

**Optimal Salinity**

**Fig. 3.** Solubilization parameters vs. salinity, % NaCl and 3% surfactant concentration under no ultrasonic stimulation (NUS)

**Optimal Salinity**

Fig. 4. Solubilization parameters vs. salinity, %NaCl and 3% surfactant concentration after 15 mins ultrasonic stimulation

**Optimal Salinity**

Fig. 5. Solubilization parameters vs. salinity, %NaCl and 3% surfactant concentration after 60 mins ultrasonic stimulation

**Fig. 6.**  Relative phase volume vs. salinity, % NaCl and 3% surfactant concentration using no ultrasonic waves (NUS)

**Fig. 7.** Relative phase volume vs. salinity, % NaCl and 3% surfactant concentration after 15 mins radiation of ultrasonic waves

**Fig. 8.** Relative phase volume vs. salinity, % NaCl and 3% surfactant concentration after 60 mins radiation of ultrasonic waves



**0.5 %**

**1**

**%**

**1.5**

**%**

**2**

**%**

**2.5 %**

**3 %**

**Fig. 9.** Phase behavior of oil and 3% AOS solution (salinity changes from 0.5 to 3 % from left to right).

**Fig. 10.** Comparison of microemulsion volumes for the mechanical agitation technique; without using ultrasonic waves (black), after 15 mins. radiation of ultrasonic waves (red), and after 60 mins. radiation of ultrasonic waves (blue)

**Fig. 11.** Comparison of the volume of oil solubilized in microemulsion for the mechanical agitation technique; without using ultrasonic waves (black), after 15 mins. radiation of ultrasonic waves (red), and after 60 mins. radiation of ultrasonic waves (blue)

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**Fig. 12.**Volume measurement of microemulsion, excess oil and water

Fig. 13. Water temperature changes under influence of ultrasonic waves (40 kHz and 500 W) in ultrasonic bath

**Fig. 14.** Comparison of microemulsion volumes for the mechanical agitation technique; 3 % AOS concentration and without using ultrasonic waves (black), 3 % AOS concentration and after 15 mins. radiation of ultrasonic waves (red), 1 % AOS concentration and after 15 mins. radiation of ultrasonic waves (green)

**Optimal Salinity**

**Optimal Salinity**

**32˚C**

**63˚C**

**Fig. 15.** The effect of temperature on interfacial tension for 15 and 60 mins ultrasonic stimulation using 3 % AOS concentration