

Investigation of phase behavior of *Cucurbita pepo* oil microemulsion system by conductometry method

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Background and Aims: *Cucurbita pepo* has been used locally in Eritrea to treat tapeworm and has also been used in other regions of the world to treat the early stages of prostate disorders. Its use in this prostate condition is due to its high zinc content. The purpose of this research was investigation phase behavior of microemulsion region of the ternary phase diagram for a system consisting of *Cucurbita pepo* oil, surfactant Tween 80 and water using conductometry method.

Methods: An electrical conductivity was used to study the properties of the *Cucurbita pepo* oil + nonionic surfactant + water system. Conductivity measurements were performed at $25 \pm 0.5^\circ\text{C}$ on samples the compositions of which lie along the one phase channel, using conductivity meter. The electrode was dipped in the microemulsion sample until equilibrium was reached and reading becomes stable. Electric conductivity was measured as a function of water content Φ (wt %) for the oil, surfactant mixture.

Results: The results showed that the conductivity is initially low in oil-surfactant mixture but increases with increase in aqueous phase. The low conductivity in initial suggests that the reverse droplets are discrete (forming w/o microemulsion) and have little interaction. When the water content is raised, the value of electrical conductivity increases linearly. The interaction between the aqueous domains becomes increasingly important and forms a network of conductive channel (bicontinuous microemulsion). With further increase in water content the electrical conductivity shows a sharp decrease and oil in water microemulsion is formed.

Conclusions: These findings show that phase behavior of microemulsions in this system begins of water in oil microemulsion and reaches the bicontinuous region and in the end zone to be oil in water microemulsion. These areas can be varied in pharmaceutical applications (capsules or ointment or solution) was used.

Keywords: Phase behavior; Electrical conductivity; *Cucurbita pepo* Oil; Microemulsion