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NOTES

Study of the Viscosities of Complex Alcohol/Oil Emulsions Stabilised by Different Surfactants

I. P. PANDEY

Department of Chemistry D.A.V. (P.G.) College
Deharadun-248 001, India

In the present work complex emulsions of different types e.g. turpentine oil/ethylene-glycol, kerosene oil/ethylene-glycol and turpentine oil-kerosene oil ethylene-glycol have been prepared by employing ambupon per., cetyl alcohol and super-N-Denenol as different surfactants and the viscosities at different conditions have been studied.

Oil/water emulsions of various types have been prepared by number of authors, using surface active agents[1], finely divided solids[2], naturally occurring substances[3], gums[4], etc. as emulsifiers. The investigations include study of number of properties of these emulsions i.e. surface-tension[5], interfacial tension[6], viscosity[5], particle size, stability, phase-inversion, creaming, dielectric constant etc. The aim of above studies is to obtain information regarding the efficiency of surfactants and conditions of stability for emulsions.

The oil/oil emulsions[7], have been prepared by taking two or more immiscible liquids as internal and external phases using anionic, cationic and non-ionic surfactants as emulsifiers.

A search through the literature reveals that oil/oil emulsions stabilised by different emulsifiers have attracted limited attention. In the present work complex emulsions of different types *e.g.* turpentine oil/ethylene-glycol kerosene oil/ethylene-glycol and turpentine oil-kerosene oil/ethylene-glycol have been prepared by employing ambupon per. cetyl alcohol and super-N-Denenol as different surfactants and the viscosities at different conditions have been studied. As viscosity measurements play a very remarkable role, in the preparation and stabilisation of different types of emulsions. Neogy and Ghosh[8], pointed out that higher viscosity sides emulsification by decreasing mobility of the droplets constituting the dispersed phase thereby retarding their approach to coalescence.

Ambupon pdr., cetyl alcohol and super-N-dedenol surfactants (HICO Products, Bombay) and ethylene glycol of BDH grade were used. In all these investigations double distilled kerosene oil (sp. gravity 0.7948) and double distilled turpentine oil (sp. gravity 0.8743) have been used.

The following emulsions have been prepared by agent in oil method, under following conditions:

(a) Different concentrations of surfactants and fixed ratio of oils/ethylene glycol were used;
(b) Different concentrations of oils and ethylene glycol and different concentrations of surfactants have been used.

TABLE 1

Ethylene Glycol=5 ml. Kerosene Oil and Turpentine Oil=5 ml. Temp. 20°C

Surfactant concentration in gm.	Viscosity in millipoise		
	Ambupan pdr.	Cetyl alcohol	Super-N-dedenol
0.05	260.045	222.069	280.759
0.10	261.134	226.094	282.821
0.20	262.316	227.928	283.858
0.40	263.480	229.825	285.012
0.80	264.748	230.113	286.242
1.00	265.919	231.859	287.858

TABLE 2

Ethylene glycol=5 ml, Kerosene and Turpentine Oils=10 ml. Temp.=20°C

Surfactant concentration in gm.	Viscosity in millipose		
	Ambupon pdr.	Cetyl alcohol	Super-N-dedenol
0.05	255.101	222.202	275.802
0.10	256.501	223.505	276.950
0.20	257.851	224.850	279.101
0.40	258.242	226.101	280.202
0.80	259.343	227.807	281.504
1.00	260.859	229.011	282.800

To the solution of surfactant in kerosene oil the turpentine oil were added slowly with constant stirring. The emulsions thus obtained were homogenized by considerable agitation with the help of Braun emulsifier (Made in Germany). Viscosity measurements of the above emulsions were carried out by Ostwald's viscometer at 20°C and the results are summarised in the Tables 1 and 2.

The viscosity of different oil/oil emulsions prepared by different concentrations of surfactants are shown in the Tables 1 and 2. The results indicate as the surfactant concentrations increase, the emulsions become more viscous and tend to acquire maximum stability by using the same volume of kerosene, turpentine oil and ethylene glycol. Thus surfactant concentrations favour emulsification no matter what type of oil has been used.

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