

THE SYNERGISM OF MIXED AMPHIPHILIC
AGGREGATES IN AQUEOUS
SYSTEM

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A study is conducted to examine the stability and synergism of the surfactant mixtures of Sodium dodecyl sulphate (SDS) and Tetramethyl trimethylammonium bromide (TTAB), SDS and Tween 20 (T20) and Tween 80 (T80) and Span 20 (S20). These mixed surfactants were carried out at 70:30 and 30:70 ratio in water and benzyl alcohol system by constructing phase diagrams. In this work, the phase diagram, the micelle-to-vesicle transition, Critical Micelle Concentration (CMC) as well as ideality and interaction of surfactants molecules were determined. From the six phase diagrams constructed, three series of formulation are produced by way of dropping 10 drops of *Beackea frutescens* oil into the system. After the stability test which was conducted in room temperature all the three series of formulation is found to be stabilized as there were no physical change during the testing period of twelve weeks. Using the fluorescence technique, the experimental CMC values for pure and mixed surfactants of aqueous systems were observed below the theoretical values, which indicate the non-ideal behavior. The interaction parameter, β for the SDS-TTAB, SDS-T20 and T80-S20 system were -3.75, -1.5 and -0.5 respectively. The negative value of β indicated an attractive force (synergism) in the mixed state. However, the T80-S20 system does not met the second criteria which $\ln(C_{M1}/C_{M2}) < \beta$, therefore giving an opposite result. Results indicated the attractive force in the SDS-TTAB system is greater than SDS-T20 and T80-S20 systems. Based on rheological test results, all samples are obeyed Non-Newtonian law as their viscosity and shear thinning behavior

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SYNERGISMA CAMPURAN AMPIFILIK DALAM SISTEM AKUEUS
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Satu kajian telah dijalankan untuk menentukan kestabilan dan sinergisma antara campuran surfaktan SDS dan TTAB, SDS dan Tween 20 dan Tween 80 dan Span 20. Dengan membina gambarajah fasa, kesemua campuran surfaktan dihasilkan pada nisbah 70:30 dan 30:70 di dalam sistem air dan benzil alkohol. Dalam kajian ini, gambarajah fasa, transisi misel ke vesikel, Kepekatan Kritikal Misel (CMC) serta idealiti dan interaksi antara molekul-molekul surfaktan dikaji. Daripada enam gambarajah fasa, tiga siri formulasi telah dihasilkan dengan menambahkan 10 titik minyak pati Cucur Atap (*Beackea Frutescens*) ke dalam sistem. Berdasarkan ujian kestabilan yang telah dijalankan selama dua belas minggu, kesemua siri formulasi adalah stabil kerana tidak menunjukkan sebarang perubahan fizikal. Dengan menggunakan kaedah fluoresen, nilai eksperimen CMC bagi sistem akueus campuran dan tulen adalah di bawah nilai CMC teori, yang menunjukkan sifat tidak unggul. Parameter interaksi, β bagi campuran surfaktan SDS-TTAB, SDS-T20 dan T80-S20 adalah -3.75, -1.5 dan -0.5. Nilai negatif β menunjukkan daya tarikan (sinergisma) dalam keadaan campuran. Walaubagaimanapun, sistem T80-S20 tidak memenuhi kriteria kedua iaitu $\ln C_{M1}/C_{M2} < \beta$ lalu memberikan keputusan sebaliknya. Keputusan menunjukkan daya penarikan bagi sistem SDS-TTAB adalah lebih besar daripada sistem yang lain. Berdasarkan keputusan ujian reologi yang dijalankan, kesemua formulasi mematuhi hukum non-Newtonian apabila kelikatan serta penyusutan ricih bagi setiap sampel menghasilkan graf yang mematuhi hukum tersebut. Seterusnya keputusan akhir menunjukkan sistem campuran surfaktan SDS-TTAB

