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FOAMABILITY AND FOAM STABILITY OF LICORICE ROOT EXTRACT: DYNAMIC SURFACE PROPERTIES EFFECTS

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The root extract of Licorice (*Glycyrrhiza glabra*) is rich in saponins. So it can be considered a great source of natural surfactant. The Licorice root has been used traditionally for decades for foaming agents in the food industry. It is well determined that the dynamic surface properties at liquid interfaces affect the foamability and stability of colloidal systems [Santini, 2019]. This research focuses on dynamic surface properties of Licorice Root Extract (LRE) solutions and their effects on foam behavior. In this study, the dynamic surface tension and surface dilational viscoelasticity, at the air-water interface were measured by using pendant drop tensiometry [Berry, 2015]. The transient surface tension was measured over 6000 seconds, then, drop sinusoidal oscillations with 10% volume amplitude were started to measure the surface dilation parameters. For foamability examinations, the air was injected through a porous disc at the bottom of a graduated column containing 20 ml of solution. The foam stability was determined by measuring the height of foam as a function of time and the half-life of foam was considered as the output. Figure 1 shows the foam properties along with the surface properties results for LRE at different concentrations. As the LRE concentration increases, the surface tension decreases, which is expected due to the free available surfactant molecules in the solution and adsorption at the drop surface. The surface tension reduction continues up to the CMC value of LRE. Moreover, with increasing LRE concentration before the CMC, a sharp increase in foamability is observed. For LRE concentration above the CMC, the foamability reaches a constant value. These two results show well a significant relationship between surface tension reduction and foamability. Also, Figure 1 indicates maximum foam half-life values can be obtained for high surface elasticities, which illustrates the significant role of the elastic part in foam stability due to the dynamic adsorbed layers. Therefore, the results demonstrate a good correlation between changes in surface elasticity and the stability of LRE foams.

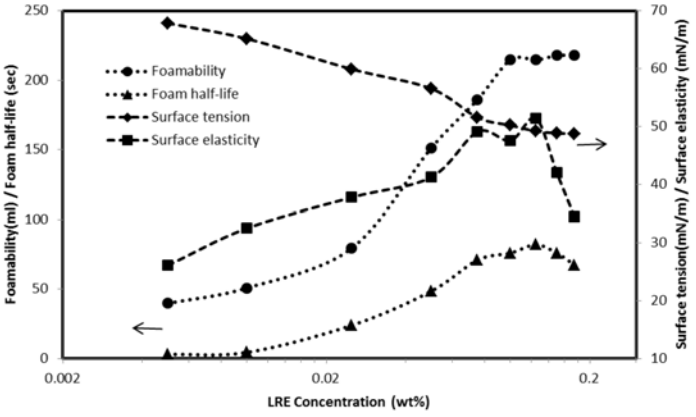

Figure 1: Foamability, foam half-life, surface tension and surface elasticity (0.01Hz) vs. LRE concentration.

References

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