

Abstract

The burning rate of coconut oil droplets has been investigated experimentally by adding bioadditives of clove oil and eucalyptus oil. Tests were carried out with single droplets suspended on thermocouples at room atmospheric pressure, and room temperature and ignited with a hot wire. The addition of clove oil and eucalyptus oil as bio-additives into coconut oil was 100 ppm and 300 ppm, respectively. The droplet combustion method was chosen to increase the contact area between the air and fuel so that the reactivity of the fuel molecules increases. The results showed that the eugenol compounds contained in clove oil and cineol compounds in eucalyptus oil were both aromatic, and had an unsymmetrical carbon chain geometry structure. Furthermore, this factor can potentially accelerate the occurrence of effective collisions between fuel molecules. Therefore the fuel is combustible, as evidenced by the increased burning rate, where the results show that without bio-additives, the burning rate of crude coconut oil (CCO) is about 0.7 seconds. These results are 0.15 to 0.2 seconds slower than CCO with bio-additive, which is around 0.55 to 0.6 seconds. Moreover, from the observations, it was found that the highest burning rate was achieved in both bio-additives with a concentration of 300 ppm.

Keywords: Droplet combustion; Burning rate; Crude coconut oil; Eugenol; Cineol