

Research Title	The Effects of Micronized Zinc Oxide to improve the effective of Fire Extinguisher from Para rubber seeds Protein Extracted for Class B Fire Fighting
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This research aimed to investigate the production of fire extinguishing agents from para rubber seeds protein extracted by adding micronized zinc oxide for fire fighting caused by oil and gas (class B). In this experiment a sodium hydroxide solution of about 0.02 molar used to separate protein with centrifuge of 5,000 rounds/min for 30 min at 4 °c. The protein solution was adjusted to equal the concentration of 4 mg/ml. Then, produce fire extinguishing agent by mixed para rubber seeds protein solution with alkaline catalyst solution and micronized zinc oxide. In this study fire extinguishing agent were produced in three formulas. Each formula has a ratio of protein solution to alkaline catalyst solution to water to micronized zinc oxide 80:5:10:5, 80:5:5:10 and 80:5:0:15 respectively.

Testing efficiency of fire extinguishing agent in each formulas and analysis of CO and NO_x from fire Extinguished. Comparing the performance of fire extinguishing agent from para rubber seed which did not add micronized zinc oxide and commercial fire extinguishing agent. The results showed that the formula 1 was the best formula for fire extinguished when compared with another formulas. This formula could extinguish fire in 16.43 ± 4.75 seconds. While the fire extinguishing agent without micronized zinc oxide was lowest efficiency in extinguishing the fire. This agent could extinguish fire in 53.58 ± 6.16 seconds. In addition, the concentrations of CO and NO_x from fire extinguished in each formulas were analyzed and we found that the formula 2 gave the minimum concentration of CO at 0.16 ± 0.07 ppm. While, the formula 1 represent the minimum concentration of NO_x at 16.82 ± 2.83 ppm. Moreover, this research analyzed cost benefit by economic calculation and we found that fire extinguishing agent from para rubber seeds protein with micronized zinc oxide had the profit higher than commercial fire extinguishing agent approximately 1.23 times. Then, the fire extinguishing agent from para rubber seed protein in formula 1 was suitable for improve in commercial.