Analysis Influence Variation Frequency on Characterization of Nano-Particles in Preteatment Bioetanol Oil Palm Stem (Elaeis guineensis JACQ) Use Sonication Method with Alkaline Peroxide Activators on Improvement of Celullose

Authors : Luristya Nur Mahfut, Nada Mawarda Rilek, Ameiga Cautsarina Putri, Mujaroh Khotimah

Abstract : The use of bioetanol from lignocellulosic material has begone to be developed. In Indonesia the most abundant lignocellulosic material is stem of palm which contain 32.22% of cellulose. Indonesia produces approximatelly 300.375.000 tons of stem of palm each year. To produce bioetanol from lignocellulosic material, the first process is pretreatment. But, until now the method of lignocellulosic pretretament is uneffective. This is related to the particle size and the method of pretreatment of less than optimal so that led to an overhaul of the lignin insufficient, consequently increased levels of cellulose was not significant resulting in low yield of bioetanol. To solve the problem, this research was implemented by using the process of pretreatment method ultasonifikasi in order to produce higher pulp with nano-sized particles that will obtain higher of yield ethanol from stem of palm. Research methods used in this research is the RAK that is composed of one factor which is the frequency ultrasonic waves with three varians, they are 30 kHz, 40 kHz, 50 kHz, and use constant variable is concentration of NaOH. The analysis conducted in this research is the influence of the frequency of the wave to increase levels of cellulose and change size on the scale of nanometers on pretreatment process by using the PSA methods (Particle Size Analyzer), and a Cheason. For the analysis of the results, data, and best treatment using ANOVA and test BNT with confidence interval 5%. The best treatment was obtained by combination X3 (frequency of sonication 50 kHz) and lignin (19,6%) cellulose (59,49%) and hemicellulose (11,8%) with particle size 385,2nm (18,8%).