



## kemenyan (*Styrax benzoin* Dryand) extract as green inhibitor of calcium carbonate ( $\text{CaCO}_3$ ) crystallization

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Received 15 March 2017; Accepted 22 September 2017

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### ABSTRACT

To study the effect of kemenyan extract from *Styrax benzoin* Dryand resin as green inhibitor on calcium carbonate ( $\text{CaCO}_3$ ) scale formation, experiment has been carried out using a bottle roller bath method at temperature of 80°C and at various growth solutions from 0.050 to 0.100 M. The extraction result of the kemenyan was characterized using Fourier transform infrared spectroscopy to identify functional groups found in the kemenyan extract. The morphology of  $\text{CaCO}_3$  crystal obtained was analyzed using SEM and the particle size distributions of the  $\text{CaCO}_3$  crystals produced were measured by a particle size analyzer. The result of the experiment showed that kemenyan extract can be used as a green inhibitor of calcium carbonate scale formation. The presence of kemenyan extracts in the various growth solutions of  $\text{CaCO}_3$  0.050, 0.075, and 0.100 M gives percentage of inhibition ability from 12% to 77% in inhibiting the formation of the  $\text{CaCO}_3$  scale. The ability of the kemenyan extract to inhibit the growth rate of  $\text{CaCO}_3$  crystallization depends on amount of the inhibitor concentration added and the growth solution concentration as a crystal growth media under these experiment conditions.

*Keywords:* kemenyan extract;  $\text{CaCO}_3$  crystal; Green inhibitor

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