# DIGEST

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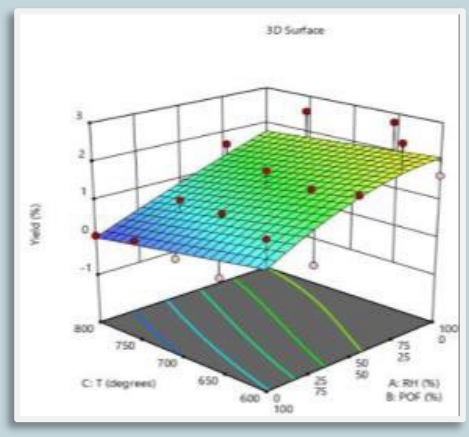
Nano silica synthesized from agricultural waste is a nanomaterial produced from converting agricultural waste such as rice husk, bagasse, wheat straw, and sugarcane bagasse into nano silica. Nano silica synthesized from agricultural waste is a novel and eco-friendly nanomaterial that can provide a valuable by-product and reduce the environmental impact as a result of its accumulation. Agricultural waste such as rice husk and palm oil fibre could be a source of nano silica since they have a high silica content. Rice husk contains 93% silica, while palm oil fibre has 34.1%. However, the extraction of nano silica from a mixture of rice husk and palm oil fibre has yet to be extensively studied.

In our recent study, we synthesized nano silica from rice husk and palm oil fibre using the sol-gel method. The relationship between the nano silica yield produced with agricultural waste mass ratio and heating temperature was studied using response surface methodology (RSM). The findings show that the most suitable heating process temperature to produce nano silica is 600°C, which gives the highest yield of nano silica. The best mass ratio of rice husk is 100%, resulting in the highest yield of nano silica. However, a 50:50 mixture of rice husk and palm oil fibre is also a good option, as it produces a high yield of nano silica. The presence of the Si-O-Si bond in the nano silica was confirmed by Fourier Transform Infrared (FTIR), which indicates the silica element. The data was best fitted by a quadratic linear model using response surface methodology (RSM).

# The Green Revolution of Nano Silica Synthesized from Agricultural Waste

**Raw of palm oil fiber and nano silica**

**Raw rice husk and nano silica**




**RSM contour plot**

This study provides insight into producing green nano silica from a combination of different agricultural waste for various applications. The use of a statistical approach allows researchers to explore the effects and interactions of the response variable more indicatively.

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