# ABSTRAK

Silika gel merupakan material adsorben yang banyak digunakan dalam berbagai bidang industri karena memiliki luas permukaan yang tinggi, struktur berpori, dan kemampuan adsorpsi yang baik. Salah satu alternatif sumber silika yang berpotensi dimanfaatkan adalah limbah biomassa, seperti kulit kacang tanah dan sekam padi, yang memiliki kandungan silika cukup tinggi. Penelitian ini bertujuan untuk mengetahui pengaruh jenis pelarut (NaOH dan KOH), pengaruh komposisi campuran abu kulit kacang tanah dan abu sekam padi, serta interaksi keduanya terhadap karakteristik silika gel yang dihasilkan.

Penelitian dilakukan dengan metode sol-gel melalui proses ekstraksi silika menggunakan larutan NaOH dan KOH, dilanjutkan dengan proses gelasi menggunakan larutan asam. Variasi komposisi bahan baku yang digunakan meliputi perbandingan abu kulit kacang tanah : abu sekam padi sebesar 100% : 0%, 75% : 25%, 50% : 50%, 25% : 75%, dan 0% : 100%. Karakteristik silika gel yang dianalisis meliputi rendemen, kadar air, dan daya serap air. Hasil penelitian menunjukkan bahwa peningkatan proporsi abu sekam padi menyebabkan rendemen silika gel meningkat dan kadar air cenderung menurun pada kedua jenis pelarut. Rendemen tertinggi diperoleh pada komposisi 0% : 100% menggunakan NaOH sebesar 30,9%, sedangkan rendemen terendah diperoleh pada komposisi 100% : 0% menggunakan NaOH sebesar 0,7%. Kadar air tertinggi diperoleh pada komposisi 100% : 0% menggunakan KOH sebesar 0,1627%, sedangkan kadar air terendah diperoleh pada komposisi 25% : 75% menggunakan NaOH sebesar 0,0010%. Pada parameter daya serap air, nilai tertinggi diperoleh pada penggunaan KOH dengan komposisi 75% : 25% sebesar 32,86%.

Hasil penelitian menunjukkan bahwa komposisi bahan baku memberikan pengaruh yang lebih dominan terhadap rendemen dan kadar air dibandingkan jenis pelarut. Sementara itu, interaksi antara jenis pelarut dan komposisi bahan baku lebih berpengaruh terhadap daya serap silika gel. Berdasarkan kemampuan adsorpsi yang dihasilkan, kombinasi pelarut KOH dan komposisi abu kulit kacang tanah : abu sekam padi sebesar 75% : 25% merupakan kondisi terbaik dalam penelitian ini.

**Kata kunci**: silika gel, kulit kacang tanah, sekam padi, NaOH, KOH, sol-gel, adsorben.

# *ABSTRACT*

*Silica gel is an adsorbent material widely used in various industrial applications due to its high surface area, porous structure, and excellent adsorption capacity. One potential alternative source of silica is biomass waste, such as peanut shells and rice husks, which contain considerable amounts of silica. This study aimed to determine the effect of solvent type (NaOH and KOH), the effect of the composition of peanut shell ash and rice husk ash mixtures, and the interaction between these factors on the characteristics of the silica gel produced.*

*The study was conducted using the sol-gel method through silica extraction with NaOH and KOH solutions, followed by a gelation process using an acid solution. The compositions of raw materials investigated were peanut shell ash : rice husk ash ratios of 100% : 0%, 75% : 25%, 50% : 50%, 25% : 75%, and 0% : 100%. The characteristics of the silica gel analyzed included yield, moisture content, and water adsorption capacity. The results showed that increasing the proportion of rice husk ash led to higher silica gel yields and lower moisture content for both solvent types. The highest yield was obtained at the 0% : 100% composition using NaOH, reaching 30.9%, while the lowest yield was obtained at the 100% : 0% composition using NaOH, reaching 0.7%. The highest moisture content was obtained at the 100% : 0% composition using KOH, reaching 0.1627%, whereas the lowest moisture content was obtained at the 25% : 75% composition using NaOH, reaching 0.0010%. For water adsorption capacity, the highest value was obtained using KOH at the 75% : 25% composition, reaching 32.86%.*

*The results indicate that the raw material composition had a more dominant effect on yield and moisture content than the solvent type. Meanwhile, the interaction between solvent type and raw material composition had a greater influence on the water adsorption capacity of the silica gel. Based on its adsorption performance, the combination of KOH as the solvent and a peanut shell ash : rice husk ash ratio of 75% : 25% was identified as the optimum condition in this study.*

***Keywords**: silica gel, peanut shell, rice husk, NaOH, KOH, sol-gel, adsorbent.*