

**EFFECT OF ULTRASONIC ON REMOVAL OF TOTAL SULFUR  
BY CO-SOLVENT OF HYDROGEN PEROXIDE: ACETIC ACID  
(PAA) SOLUTION**

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This Final Year Project Report entitled “**Effect Ultrasonic on Removal of Total Sulfur In Coal By Co-Solvent Of Hydrogen Peroxide: Acetic Acid (PAA) Solution**” was submitted by Adhwa Nadia binti Nor Saidi in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry in the Faculty of Applied Science and was approved by

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## **ABSTRACT**

### **EFFECT OF ULTRASONIC ON REMOVAL OF TOTAL SULFUR IN COAL BY CO-SOLVENT OF HYDROGEN PEROXIDE: ACETIC ACID (PAA) SOLUTION**

The fossilized plant material known as coal, which ranges in colour from dark brown to black and resembles graphite, has historically played a significant role in energy production. However, sulfur is one of the main pollutants present in coal, which contributes to air pollution. This study addressed the removal of total sulfur from coal by combining ultrasonic digestion and acid leaching processes to improve the desulfurization rate. Coal samples were treated with hydrogen peroxide and acetic acid in different ratios (80:20, 40:60, 60:40, and 20:80) under ultrasonic digestion at different times (10, 20, and 30 minutes). The effects of reaction time and chemical concentration were determined. The total sulfur removal was supported by the FTIR spectrum, which showed a decrease in bands between the raw coal and the treated coal sample. It was found that the coal treated with a higher acetic acid content removed more sulfur compared to that treated with a higher hydrogen peroxide content. The highest percentage of total sulfur removal is 61.91% at a ratio of 20:80 under 30 minutes of sonication. The total sulfur removal depending on the ratio concentration of co-solvent and sonication reaction time.

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