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Correlation Study Of Sulphur and Ash Content In Patappa Coal Area Pujananting Sub-District Barru District

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ABSTRACTS

Coal is an organic sedimentary rock formed by the breakdown of diverse plant remnants. It is a heterogeneous mixture of organic chemicals and inorganic components that combine under the weight of the strata that crush it. This study aims to determine the relationship between ash concentration and sulphur content in Patappa coal region, Pujananting sub-district, Barru Regency. The goal of this investigation is to see if there is a relationship between ash concentration and sulphur content in Patappa coal. The research method used in this study is as follows: the first preliminary stage includes administration, literature review, and discussion; the data collection stage includes both primary and secondary data; and the data analysis and processing stage determines the correlation between ash content and sulphur content based on the analysis results. This study's materials included a geological hammer, compass, GPS, sample bag, camera, and roll meter. The sample method is carried out using channel sampling. Sample 1 shows the findings of this study's examination, with an ash content of 18.32% and a sulphur concentration of 7.22%. Sample 2 contains 15.58% ash and 8.63% sulphur. As a result, the link between the two analyses is inversely proportional, with greater ash content values resulting in lower sulphur content values and vice versa.

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INTRODUCTION

Coal is an organic sedimentary rock formed by the breakdown of diverse plant remnants. It is a heterogeneous mixture of organic and inorganic chemicals that fuse under the weight of the strata that compress it (Muchjidin, 2006).

It is necessary to remove the bordering rock layer above the coal (roof) and below it (floor) and either utilise them immediately to reclose the old mining area or stack them in a disposal area. Both materials may contain minerals that contain sulphur, particularly iron sulphide (FeS) as pyrite. When these materials are exposed to air and water, the oxidation process of sulphide compounds, aided by microbial activity, would result in the production of acidic water from sulphuric acid (Gautama, 2014).

Despite its relatively modest percentage, sulphur is one of the key factors influencing coal quality. The effect of flanking rocks that were formed in a marine environment is one of the many ways that sulphur can originate in coal (Williams and Keith, 1963). Typically, plant-derived compounds and sulphate seawater entering the swamp are the sources of sulphur in coal with a high sulphur content (>1%). The amount of seawater effect during accumulation and diagenesis greatly influences the sulphur overlay in coal (Chou, 2012).

The inorganic substance known as coal ash is produced when minerals change during burning. The coal ash content value can be used to illustrate the coal deposition environment. Low-lying swamps are linked to coal with a high ash level, whereas higher swamps are linked to coal with a low ash concentration. Sediments deposited in brackish or marine environments are linked to coal that has a high ash and sulphur content (Cecil et al., 1979 in Talla, 2018).

Examining the test findings for coal's ash and sulphur contents as well as the trend graph showing the correlation between the two is the aim of this study.

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METHODS

The Patappa region, Pujananting Subdistrict, Barru Regency, South Sulawesi Province, is the site of the sampling. Both primary and secondary data were collected at the research site. While secondary data is gathered from literature or journals that are specifically relevant to the research area, primary data is collected at the research place in the form of coal position data, coordinate points, and documentation, specifically photographs. The research methodology combines primary and secondary data in a quantitative manner. The data processing activities involved correlating the sulphur and ash content test findings in each sample of coal based on the coordinate points of the research region. The data processing activities were derived from field observations sample test results.

RESULTS AND DISCUSSION

This research produces two data, namely in the form of ash content data and sulfur content data in Patappa coal area, Pujananting District, Barru Regency. The results of the sampling (channel sampling) are divided into 2 samples, namely sample 01 taken at the top and bottom layers combined and sample 02 taken at the middle layer of coal, each of which will be analysed regarding the comparison of ash content and sulfur content.

Coal Ash Content

Analysis of coal ash content in Patappa area, Pujananting sub-district, Barru regency was conducted using proximate analysis. The results of the analysis can be seen in Table 1.

Table 1. Coal Ash Content Analysis Results

No	Sample Code	*Ash Content*	% (adb)	Methods
1	Sample 01	18.32	% (adb)	Gravimetric
2	Sample 02	15.58	% (adb)	Gravimetric

Table 1 shows the data from the analysis of coal ash content in Patappa area, Pujananting sub-district, Barru Regency, where there are 2 samples taken in 1 layer of coal outcrop. In sample 01 (combined upper and lower layers), it can be seen that the ash content value is 18.32%. Meanwhile, sample 02 (middle layer) has an ash content value of 15.58%, which was analysed using the gravimetric specification method.

Coal Sulphur Content

The Eschka method was used to analyse the sulphur content of coal in the Patappa region, Pujananting Subdistrict, Barru Regency. Table 2 displays the analysis's findings.

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Table 2. Coal Sulphur Content Analysis Results

No	Sample Code	*Sulphur Content*	% (adb)	Methods
1	Sample 01	18.32	% (adb)	Spectrophotometric UV-Vis
2	Sample 02	15.58	% (adb)	Spectrophotometric UV-Vis

In Table 2, it can be seen the data from the analysis of coal sulfur content in the Patappa area, Pujananting sub-district, Barru Regency where there are 2 samples that are the same as those carried out in the ash content analysis, where in sample 01 (combined upper and lower layers) the sulfur value can be seen at 7.22%. Meanwhile, sample 02 (middle layer) has a coal sulfur value of 8.63% which was analysed using the UV-Vis spectrophotometric specification method. In table 2, it can be seen that the sulfur content values of sample 1 and sample 2 have a difference that is not significantly different, which is only 1.41%.

Based on the results of the analysis carried out through the literature study, it can be seen that there are 2 coal samples taken using the channel sampling method where the two coal samples are each analysed to determine the ash content and sulfur content and then the correlation or relationship between the two analyses is carried out. The correlation between the two samples based on sulphur content analysis and ash content analysis can be seen in Table 3.

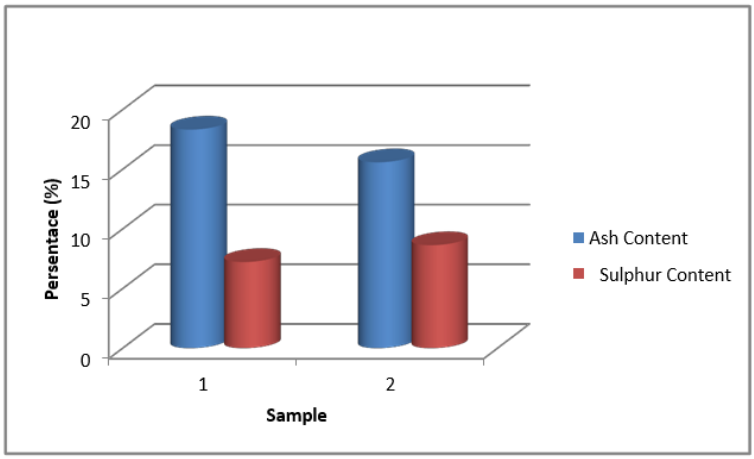

Figure 1. Correlation of Coal Ash and Sulphur Content

In Figure 1, we can see the correlation graph or the relationship between ash content and sulfur content in each sample. The ash content in sample 1 is higher than that in sample 2, which is 18.32% while in sample 2 the ash value is only 15.58%. Can It can be seen that there is a decrease in the value of ash content from sample 1 to sample 2, which is 2.74%. While in sample 2, the sulphur content analysis increased from sample 1 to sample 2 (inversely proportional to the ash content), namely in sample 1 the sulphur content value was 7.22% while in sample 2 the sulphur content value was 8.63%. From the graph, it can be seen that the correlation between ash content and sulfur content in both samples is inversely proportional, where the higher the ash content value, the lower the sulfur content value, and vice versa, the lower the ash content value, the higher the sulfur content value.

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CONCLUSION

The conclusion of this research is that in sample 1 it can be seen that the ash content value is 18.32% while the sulfur content has a value of 7.22%. In sample 2, the ash content is 15.58% while the sulphur content is 8.63%.

Inversely proportionality between the two analyses is evident from the results of the ash and sulphur content analyses performed on each sample; the higher the ash content value, the lower the sulphur content value, and vice versa, the lower the ash content value, the higher the sulphur content value.

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