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Optimization of froth flotation variables for pyritic sulfur removal from Pakistan's coal (bituminous)

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Coals are heterogeneous, complex and non-crystalline macromolecules containing both organic and inorganic materials. Inorganic constituents, especially sulfur plays a decisive role in the utilization of coal systems. The undesirable ash and sulfur contents can be reduced using physical–chemical and chemical methods. 'Froth flotation' is a physical–chemical method that is capable of reducing pyritic sulfur and the ash content of coal. In this research work, key operating variable (pH, air flow rate, composition of feed and separation time) were investigated in a lab-scale froth flotation unit and separation time and air flow rate were found to be the most effective variables for the removal of pyrite sulfur and ash contents from the coal samples. Wetting agent (Polyvinyl Alcohol) and frothing agent (Pine oil) are used that helps for stabilizing air bubble in the froth flotation column and capturing the pyrite sulfur from the column. Present research showed that PVA has a good role as good wetting agent for the pyrite sulfur/coal mixture. Considering the market price of PVA, it is the most feasible option as wetting agent. The optimum values for pH, separation time and air velocity were 7, 40 minutes and 90 scfh respectively. At these optimum values, removals of sulfur and ash contents were highest. This combined approach consisting of physical followed by chemical cleaning of coal was found to have potential applications for significant removal of ash and sulfur from bituminous coal with less investment and less generation of waste water.

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Synthesis of antifungal compound from isolated curcumin

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Turmeric belongs to the ginger family and is a rhizomatous herbaceous perennial plant. It may be considered the strong effective nutritional supplement in existence. It has revealed numerous medical studies about the importance of turmeric in the treatment of a large number of illnesses beginning of cancers, leading to Alzheimer disease. Turmeric is the spice which gives curry yellow color. This study investigates the best methods to isolate, purify, and identify the chemical composition and the important biological activity of turmeric. At the beginning, the turmeric was bought from market and followed by: 1) The plant used in research was classified as Turmeric (*Curcuma longa L.*) , By Dr. Kadri Nabih Sayed Abdul Khaliq, Professor of Plant Classification at Umm Al Qura University. 2) The percentage of moisture in the dried samples was assessed. The results showed that the moisture content of turmeric tubers was 12%. 3) Various compounds of dry turmeric rhizomes were extracted by ethanol , GC-MS was achieved to this extract and showed the presence of a large number of compounds belonging to different types of terpenes and aromatic compounds. The largest component of these compounds was the turomene (19.0%), zingiberen (17.0%) and curcumene (20%). 4). Isolation of curcumin from ethanolic extract. 5). Synthesis of curcumin epoxide by using mcpba thermally. 6). Antifungal activity was done to new compound " curcumin epoxide" with the fungi (*Candida albican, Aspergillus parasiticus, Fusarium proleferatum, Penicillium verrucosum* and *Aspergillus niger*) and the results were highly positive.

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