

INVESTIGATION OF APPLICABILITY OF GHUZAYIL DIATOMITE IN WATER FILTRATION (EASTERN LIBYA)

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ABSTRACT

Mineral resources can be equated to “Wealth”, and of all major natural resources needed for development in terms of trade. The supply of mineral raw materials is a widely discussed topic. The awareness of resources and how to explore, produce and strategically utilize them have been an unparalleled challenge for scientists and economists.

The most common use (68%) of diatomaceous earth is a filter medium, especially for swimming pools. The aim of this study was to utilize this material in water treatment based on its unique properties. The diatomite rock examined is mainly composed of biogenic amorphous silica (diatom frustules) and expanded clays, such as smectite and vermiculite. Mainly amorphous silica, alumina and iron are the predominant constituents of the raw material studied with low percentage of clay contents. Therefore, the main factor of diatomite valorization is the enhancement of chemical and physical properties which is the key of industrial uses of this material.

An experiment was carried out to test the benefit of Libyan diatomite for filter-aid. This experiment carried two tests for diatomite sample subjected to different processing modes: calcinations and sintering.

Consequently, natural, calcined and sintered diatomite was used in the filtration of different contaminated water samples obtained by addition of different quantities of admixture powder ranging from 0.4 to 12.0 g/l in concentrations. These different contaminated water samples were passed through filtration cartridge filled with natural ore treated diatomite to remove suspended solids as a one side and physico-chemical characteristics of filtered water before and after filtration. The results obtained showed that the calcined diatomite is more appropriate for water filtration than sintered material. Significant amounts of salt cation (sodium and potassium) moved from diatomite filter to treated water. This fact imposes diatomite washing by water and /or acid before its use as filtering material.

KEYWORDS: Filtration by Diatomite, Water Treatment, Suspension Removal, Salt Contamination, Filter Media, Filtration