



Review on Different Beneficial Ways of Applying Alum Sludge in a Sustainable Disposal Manner

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Abstract

Disposal of waste from water treatment plant is one of the major issues most treatment plants seem not to overcome due to the constant generation of this waste as a result of meeting the demand of water and purification of water for human consumption. The effect of disposing sludge constantly in the environment has called for an economical and sustainable way of reusing alum sludge. However, this paper aimed at reviewing the possible literature on applying waste from water treatment plant in various ways, example; in building material; as brick and tiles, in concrete ; as replacement of cement and aggregate, in Geotechnics; as soil stabilizer and in agriculture; as soil fertilizer, in pottery; use as replacement of clay in flower pot production for sustainable disposal. All the above mentioned categories of uses have revealed an effective and efficient way in managing waste from water treatment plant (alum sludge), also a safer and economical manner of disposal. However, the effects when used and the behaviour when it is incorporated with other materials were highlighted, other reuse and disposal options were discussed and the areas not covered (knowledge gap) was identified.

Keywords: Alum Sludge; Sustainable Disposal; Soil Stabilizer; Soil fertilizer; Building and Construction.

1. Introduction

Water Treatment plants use alum for purification of drinking water. The term Alum means Aluminium sulphate which is the main agent in flocculation and coagulation for pre-treatment process in most water industry in the world for purification of water [1-2]. Aluminium and iron salts have been utilized in this regard over the years, Alum salt is commonly utilized as a coagulant agent due to its availability, effectiveness, easy to use and cheap cost supply [2-3]. Therefore, Alum sludge is a by-product generated from water treatment plant which is basically inevitable when purifying portable water for drinking purposes and it's the core by-product of "coagulation and flocculation" processes basically used by most water treatment plants [4-5]. Alum sludge can also be described as waste generated through the process of water purification process of hydrated aluminium sulphate addition to water. This process produces alum sludge as a waste with a negative environmental impact when disposed in landfill or in watercourse which will cause excessive accumulation of aluminium concentration in human body and harm the aquatic life. Many studies on alum sludge disposal linked aluminium accumulation in river to be responsible for children mental illness and other skin diseases due to some of the heavy metals accumulation in the water bodies [6]. This waste needs to be disposed properly to avoid any harm to human life.

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