

# Comparison of Fuller's Earth & China Clay for the Control of Leachate Generated from Municipal Solid Waste-A Review

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**ABSTRACT:** Leachate generation is a major problem for municipal solid waste (MSW) landfills and causes significant threat to surface water and groundwater. Leachate is defined as a liquid, which passes through a landfill and has extracted dissolved and suspended matter from it. Leachate is the outcome from precipitation entering the landfill from moisture that exists in the waste when it is composed. A comparative evaluation between the china clay and fullers earth is performed to control the leachate, generated from the solid waste.

Permeability and type of bonding are the major factors, which are affecting the water movement from surface to below the clay liners. In this study the effect of china clay and fuller's earth clay are compared to control the leachate from MSW. The china clay has advantages over fuller's earth.

**Keywords:** Leachate, Fuller's Earth, China Clay, MSW, permeability, Clay Liner, Landfill, kaolinite, bentonite

## 1. INTRODUCTION

Waste management is one of the major challenges faced by municipality officials, public health engineers and environmentalists in their quest to protect and preserve our environment. The wastes that generate in cities dispose their wastes in different ways. Historically waste is disposed of unscientifically leading to the development of many waste dumps around. These general natural anomalies in the ground where trash is disposed of with very little or no environmental regulations. One of the major pollution problems caused by the municipal solid waste landfill leachate can be defined as a liquid that is generated when water or another liquid comes in contact with solid waste. It contains number of dissolved and suspended materials. After municipal solid waste landfill site is closed, landfill will continue to produce contaminated leachate process could last for 30-50 years. Due to increase growth of population and development of the industry, the landfill leachate problem becomes increasingly serious. Leachate has potential to contaminate ground and surface water and threaten human health which migrating from the landfill and contaminates surrounding lands and water. Once the leachate enters the water bodies, it is very difficult and expensive to clean up the contaminated water.

In this, the performance of a landfill clay liner is generally evaluated; the design and maintenance of landfills for waste disposal are the concerns over the last few decades due to increasing awareness towards environment protection issues, such as ground and ground water protection. For last few decades, the landfill liner construction has developed and advanced technology has emerged such as the addition of engineered clays, synthetic lining material and designing of more sophisticated leachate collection systems etc. The main aim of these technology and methods are to improve the landfill liner performances as a hydraulic resistant and to minimize or prevent the migration of landfill leachate into surrounding environment. Clay minerals are available in bulk, these are inexpensive, and are safe materials for environmental applications. Because of their high porosity, surface charge, large specific surface area, and surface functional groups, clay minerals function as adsorbents, filters, flocculates, and carbon stabilizers.

Fullers earth (palygorskite) and china (kaolin) clay is taken for the clay liner. Fuller's earth is any clay material that has the capability to decolorize oil or other liquids without chemical treatment. Fuller's earth typically consists of palygorskite or bentonite. Palygorskite is hydrated Mg-Al silicate material. This mineral actually resembles the amphiboles more than it does clay minerals, but has a special property that smectite lacks - as a drilling fluid, it is stable in salt-water environments. When drilling for offshore oil, conventional drilling mud falls apart in the presence of salt water. Fuller's earth (palygorskite) consists primarily of hydrous aluminum silicates (clay minerals) of varying composition. Common components are montmorillonite, kaolinite and attapulgite. Small amounts of other minerals may be present in fuller's earth deposits, including calcite, dolomite, and quartz. In some localities fuller's earth refers to calcium bentonite, which is altered volcanic ash composed mostly of montmorillonite. Kaolinite is this clay mineral is the weathering product of feldspars. It has a white, powdery appearance. Kaolinite is named after a locality in China called Kaolin, which invented porcelain (known as china) using the local clay mineral. The ceramics industry uses it extensively. Because kaolinite is electrically balanced, its ability of adsorb ions is less than that of other clay minerals.





