

The Efficacy of African Shrubs and Herbs in Earth Material Stabilization for Quality Low-Cost Houses in Developing Countries



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ABSTRACT

Earth material(mud) possesses an inherent non-toxic qualities that ensures good in-room quality houses for the occupants. Using the earth material for earth buildings also makes it an agent of bio-diversity and non-degradability that engenders recycling and utility in its usage.

Naturally the unstabilised earth material possess a natural weakness to water penetration/erosion and low compressive strength that makes natural material unfit for modern housing requirements. To overcome this inherent weakness of the material, several researches and design changes have resulted in high quality products such as the cement stabilised earth blocks(CSEBs) which has increased the flexibility and capacity utilization of the earth material for earth building construction.

On the other hand the growing acceptance of these cement stabilised earth blocks(CSEBs) for home construction among the elite class in many countries were the cement stabilised earth blocks(CSEBs) technologies are wide spread, has brought with it increases in the cost of these cement stabilised earth blocks(CSEBs) beyond the reach of the low income bracket. This has added impetus to the need to find other locally available cheaper methods of stabilizing the earth material at minimal cost to the house owner.

This research investigates the efficacy of the juice of some African shrubs/herbs - *grewia venusta* or *grewia mollis* (*kelli in fufulde language*) and the bark of the Kubewa tree - which is traditionally used locally to improve the plasticity and water resistance of the earth mortar for plastering earth building walls. The research involved experimentation with different mix proportions of the juice to 1:15 cement stabilised compressed earth blocks and 1:1:20 cement, rice husk ash stabilised earth blocks for three different common earth building soil types. In this research it was discovered that some chemical compounds in these juice react with the chemicals in the soil and/or cement/rice husk ash to form amorphous compounds that makes the earth material impervious to water penetration, while some of the chemical compounds react with the alkaline content of the earth material to resist chemical and insect attacks.