Natural Cooling Brick Using Aloe Vera (Cement Brick)

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Abstract- *In recent years, the demand for sustainable and energy-efficient building materials has increased due to rising temperatures and environmental concerns. This study focuses on the development of natural cooling bricks using aloe vera mixed with cement. Aloe vera is known for its high water retention and cooling properties. The prepared bricks are tested for temperature reduction, water absorption, and compressive strength. Results show that aloe vera bricks maintain lower temperature than normal bricks.*

Keywords: Eco-friendly materials, Energy efficiency, Green building, Thermal insulation, Temperature reduction

I. INTRODUCTION

Natural cooling bricks using aloe vera (cement bricks) are an innovative and eco-friendly construction material designed to reduce heat inside buildings. With increasing temperatures and the need for energy-efficient structures, there is a growing demand for sustainable building solutions.

Aloe vera is a natural plant known for its high water content and cooling properties. When aloe vera gel is mixed with cement during brick manufacturing, it helps improve thermal insulation and reduce heat absorption. This results in lower surface temperature of bricks compared to conventional cement bricks.

These bricks work by slowing down heat transfer due to the moisture-retaining nature of aloe vera, making indoor spaces cooler, especially in hot climates. Additionally, the use of aloe vera reduces dependence on artificial cooling systems like air conditioners, thus saving energy.

Natural cooling bricks using aloe vera are cost-effective, environmentally friendly, and suitable for green building construction. They provide a promising solution for sustainable development in the construction industry.

II. LITERATURE REVIEW

1) Evaluation of Aloe barbadensis Miller as an Internal Curing Agent in Concrete

Authors: Ramalingam Malathy, Balakrishnan Selvam & Mayakrishnan Prabakaran

Published in: Sustainability (2023)

Summary: This study investigates Aloe barbadensis Miller gel as a bio- admixture replacing chemical curing agents in concrete. Results show improved fresh and hardened properties, including better hydration, strength gain, and thermal behavior, indicating aloe's potential to affect heat transfer properties in cement materials.

2) Experimental Study on Eco-Cooling Bricks Using Natural Admixtures (Including Aloe Extract)

Authors: Lalit B. Pawar, Vishakha V. Pawar, Manisha S. Dhomse Published in: International Journal of Civil Engineering and Architecture Engineering (2025)

Summary: This experimental research develops eco-cooling bricks by adding natural admixtures such as neem powder, rice husk ash, and aloe extract into brick mixes. It investigates engineering and thermal properties, supporting the use of plant-based additives to improve insulation.

3) Experimental Investigation of Aloe Vera Gel as a Self-Curing Agent

Author: Meron Tadesse

Institution: Addis Ababa University (2023)

Summary: Research shows that aloe vera gel can act as a self-curing agent in concrete, enhancing workability, strength, and moisture retention. These characteristics indirectly support thermal performance by improving hydration and internal moisture, which can influence heat transfer and cooling effects.

III. METHODOLOGY

- Collection of Materials – Gather cement, sand, aloe vera leaves, etc.

- Preparation of Aloe Vera Gel – Extract gel and filter it.
- Mixing – Mix cement and sand (1:3 ratio), add aloe vera gel replacing water.
- Moulding – Pour mixture into moulds and compact properly.
- Curing – Keep bricks for curing for 7–28 days.
- Testing – Perform compressive strength, water absorption, and temperature tests.

IV. RESULT

Property	**Normal Brick**	**Aloe Vera Brick**
Temperature	34°C	32°C
Compressive Strength	7.89N/mm2	9.03N/mm2
Water Absorption	0.13%	0.18%

V. CONCLUSION

- The study of natural cooling bricks using aloe vera (cement bricks) shows that incorporating aloe veragel into cement improves the thermal performance of bricks
- Due to its natural moisture-retaining and cooling properties, aloe vera helps reduce heat absorption and maintain lower surface temperatures compared to conventional cement bricks.
- The experimental results indicate that aloe vera bricks provide better insulation while maintaining adequate compressive strength and durability.
- These bricks can help reduce indoor temperature and decrease the need for artificial cooling systems, leading to energy savings.
- Overall, natural cooling bricks using aloe vera are an eco-friendly, cost-effective, and sustainable solution for modern construction, especially in hot climates.

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