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ECO FRIENDLY PAINT MADE FROM AGRICULTURAL WASTE

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ABSTRACT

This study presents the development of eco-friendly paint formulated using agricultural waste and natural materials. Tamarind seed extract served as a natural binder, turmeric powder as a pigment, and neem extract as an antimicrobial agent. Agricultural waste was utilized as a filler to enhance texture and coverage. The paint was applied on wooden surfaces to evaluate coating performance. Characterization tests including pH, drying time, and ash content indicated acceptable physical and chemical properties. The results demonstrate that the prepared paint is biodegradable, low-cost, and environmentally safe, offering a sustainable alternative to conventional synthetic paints.

***KEYWORDS*:** Eco-friendly paint, Agricultural waste, Tamarind seed , Turmeric pigment, Neem extract.

1. INTRODUCTION

Conventional paints contain synthetic chemicals and volatile organic compounds (VOCs), contributing to environmental pollution and health hazards. With increasing demand for sustainable materials, eco-friendly paints derived from natural and renewable resources have gained attention. Agricultural waste can serve as an effective filler, reducing environmental burden while providing functional benefits. This study aims to formulate biodegradable, low-toxicity paint for indoor applications using agricultural waste, turmeric, tamarind seed extract, and neem extract.

2. MATERIALS & METHODS

2.1 Preparation of Raw Materials

Cow dung was collected and sun-dried to remove moisture. The dried material was crushed and ground into fine powder and sieved to ensure uniform particle size.

The powdered raw material was stored in airtight containers.

Figure 2.1(a) Cow Dung.

2.2 Preparation of Filler

Dried cow dung powder was used as a filler. It was finely ground and sieved to obtain uniform particles to enhance paint thickness and coating quality. The filler was stored in dry, airtight containers.

Figure 2.2(a) Extraction of Filler.

2.3 Preparation of Binder

Natural binder materials were prepared using plant extracts and oils. These binders provide adhesion and film formation in the paint.

Figure 2.3(a) Extraction of Binder.

2.4 Preparation of Neem Extract

Fresh neem leaves were collected, washed, and boiled in distilled water. The extract was filtered and stored in dark bottles for use as an additive to impart antimicrobial properties.

2.5 Preparation of Paint

Paint was formulated by mixing the cow dung filler with binder, pigments, and additives such as neem extract. The mixture was stirred thoroughly to achieve a uniform consistency suitable for coating wooden surfaces.

Figure 2.5(a)Paint Coating on Wood.

3. Characterization of Paint

The prepared eco-friendly paint was characterized using pH, drying time, and ash content tests to evaluate its suitability for coating applications.

pH Test: The pH of the paint was found to be 7.1, indicating a near-neutral nature. This shows that the paint is safe, non-toxic, and suitable for indoor applications without causing surface damage.

Drying Time: The drying time of the paint was observed to be 25 minutes under room temperature conditions. This relatively fast drying time indicates good performance and makes the paint suitable for practical applications.

Ash Content: The ash content of the paint was determined to be 15%, confirming the presence of inorganic materials. These materials contribute to the strength, thickness, and coating efficiency of the paint.

Overall, the characterization results confirm that the prepared paint exhibits desirable properties and can be considered a suitable eco-friendly alternative to conventional paints.

4. RESULTS & DISCUSSION

The prepared paint exhibited smooth consistency and uniform coating on wooden surfaces. Adhesion was satisfactory, and no peeling or cracking was observed. Drying time was moderate due to absence of chemical agents, allowing better film formation. pH was near-

neutral, ensuring safety and stability. Ash content reflected proper filler incorporation, contributing to structural strength. Natural additives enhanced antimicrobial activity and prevented microbial growth. Limitations include slight color variation over time and longer drying duration, which can be addressed through optimization. Economically, using locally available agricultural waste makes the paint cost-effective and sustainable.

5. CONCLUSION

Eco-friendly paint can be successfully formulated using tamarind seed binder, turmeric pigment, agricultural waste fillers, and neem extract. The prepared paint demonstrated acceptable adhesion, coverage, drying time, pH stability, and antimicrobial properties. It offers a low-cost, biodegradable, and environmentally safe alternative to conventional paints, with potential for indoor applications. Further research may optimize color stability, water resistance, and shelf life to enhance commercial viability.

6. REFERENCES

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