

PREVENTION OF MICROBIAL GROWTH IN PAINTS USING HERBAL BIOCIDES AVAILABE IN SRI LANKA

By

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ABSTRACT

Certain fungal types can grow on dried paint films. They cause to deteriorate the dried paint films. Currently synthetic fungicides are used to prevent fungal growth. They are hazardous compounds, which caused irritation of eyes and skin, skin rashes, etc of humans. Therefore it is important to replace synthetic fungicides by environmentally friendly natural fungicides (extracted from plants).

In this work cinnamon leaf oil, citronella oil and neem seed oil were used as natural fungicides. 8 fungal types grown on dried paint films were used to investigate the anti-fungal activity of the above oils. Quantitative analysis of cinnamon leaf oil and citronella oil were done using gas chromatography and quantitative analysis of neem seed oil was not done due to unavailability of standards. Modified method of agar over-layer technique was used to determine minimum inhibition concentration of the fungal types used, after introducing three oils. The results indicated cinnamon leaf oil is the best to use as fungicide for exterior emulsion paint out of three oils, as growth of all used fungal types were inhibited below at concentration of 2000 ppm, when introducing cinnamon leaf oil into each fungal type individually. It was more than 12000 ppm in citronella oil and more than 20000 ppm in neem seed oil.



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Modified method of ASTM D2373-74 was used to determine the minimum inhibition concentration of cinnamon leaf oil to inhibit fungal growth on exterior emulsion paint film. Aging tests were done to determine effect of cinnamon leaf oil on viscosity, pH, colour of exterior emulsion paint and adherence of binder to the substrate after aging for three years. Tropical chamber test was used as an accelerated test method to investigate fungal degradation after applying cinnamon leaf oil as fungicide. According to the results, fungal growth in exterior emulsion paint could be inhibited below 3500 ppm of cinnamon leaf oil and applied paint film on a surface of an exterior substrate will not attack by fungi for 2-3 years. Significant changes in viscosity, pH, colour of the exterior emulsion paint and adherence of binder to the substrate were not detected due to cinnamon leaf oil. Results suggest that cinnamon leaf oil can be used as a fungicide to prevent growth of fungi considered and for the exterior emulsion paint used.

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CONTENTS

	Page No
CHAPTER- 1. INTRODUCTION	02
1.1. Chemical composition	02
1.1.1. Pigments	03
1.1.2. Extenders	03
1.1.3. Binders	03
1.1.4. Solvents	04
1.1.5. Additives	04
1.2. Classification of paints	06
1.2.1. Emulsion paints	06
1.3. Methods of degradation of emulsion paints	07
1.3.1. Biological degradation of emulsion paints	07
1.4. Most common types of fungi which grow on paint films	11
1.5. Function of fungicide in preventing fungal growth	12
1.6. Fungicides used in paint industry	14
1.7. Anti- microbial activity of natural oils	14
1.8. Objectives of the research	16
CHAPTER-2. IDENTIFICATION OF FUNGI WHICH GROW ON PAINT FILMS	
2.1. Experimental methods	
2.1.1. Preparation of Potato Dextrose Agar (PDA)	18
2.1.2. Growth of fungal types	18
2.1.3. Identification and purification of fungal types	18
2.2. Results and Discussion	
2.2.1 Identification and purification of fungal types	19

CHAPTER - 3. INFLUENCE OF HERBAL OILS ON FUNGAL GROWTH AND PROPERTIES OF PAINTS

3.1. Experimental Methods	
3.1.1. Quantitative analysis of oils	26
3.1.2. Determination the minimum inhibition concentration of herbal oils	26
3.1.3. Preparation of mixed fungal spore suspension	28
3.1.4. Determination the minimum inhibition concentration of cinnamon leaf oil for mixed fungal spore suspension	29
3.1.5. Preparation of exterior emulsion paint	29
3.1.6. Determination of minimum inhibition concentration of cinnamon leaf oil for liquid paint	30
3.1.7. Effect of cinnamon leaf oil on properties of paints	31
3.1.8. Tropical chamber test	32
3.2. Results and Discussion	
3.2.1. Quantitative analysis of oils	33
3.2.2. Determination the minimum inhibition concentration of herbal oils	38
3.2.3. Determination the minimum inhibition concentration of cinnamon leaf oil for mixed fungal spore suspension	42
3.2.4. Determination of minimum inhibition concentration of cinnamon leaf oil for liquid paint	42
3.2.5. Effect of cinnamon leaf oil on properties of paints	44
3.2.6. Tropical chamber test	46

CHAPTER-4 CONCLUSION AND FUTURE WORK

4.1. Conclusion	48
4.2. Future work	48

LIST OF FIGURES

Figure	Page
1. Slide culture preparation	19
2(a). <i>Aspergillus niger</i> colonies on PDA, 7days, 28 ⁰ C.	19
2(b). <i>Aspergillus niger</i> conidial head x 400.	19
2(c). <i>Aspergillus niger</i> conidia x1000.	19
3(a). <i>Aspergillus</i> species type one colony on PDA, 7days, 28 ⁰ C.	20
3(b). <i>Aspergillus</i> species type one conidial head x 400.	20
3(c). <i>Aspergillus</i> species type one conidia x1000.	20
4(a). <i>Aspergillus</i> species type two colonies on PDA, 7days, 28 ⁰ C.	20
4(b). <i>Aspergillus</i> species type two conidial head x 400.	20
4(c). <i>Aspergillus</i> species type two conidia x400.	20
5(a). <i>Aspergillus</i> species type three colonies on PDA, 7days, 28 ⁰ C.	21
5(b). <i>Aspergillus</i> species type three conidial head x 400.	21
5(c). <i>Aspergillus</i> species type three conidia x400.	21
6(a). <i>Penicillium</i> species type colonies on PDA, 7days, 28 ⁰ C.	21
6(b). <i>Penicillium</i> species type one conidial head x 400.	21
6(c). <i>Penicillium</i> species type one conidia x1000.	21
7(a). <i>Penicillium</i> species type two colonies on PDA, 7days, 28 ⁰ C.	22
7(b). <i>Penicillium</i> species type two conidial head x 400.	22
7(c). <i>Penicillium</i> species type two conidia x1000.	22
8(a). <i>Penicillium</i> species type three colonies on PDA, 7days, 28 ⁰ C.	22
8(b). <i>Penicillium</i> species type three conidial head x 400.	22
8(c). <i>Penicillium</i> species type three conidia x1000.	22
9(a). <i>Penicillium</i> species type four colonies on PDA, 7days, 28 ⁰ C.	23
9(b). <i>Penicillium</i> species type four conidial head x 400.	23
9(c). <i>Penicillium</i> species type four conidia x1000.	23

LIST OF TABLES

Table	Page
1. Fungal genera and characteristic morphological features	12
2. Endemic species of cinnamon	15
3. Introduced herbal oil concentrations to determine minimum inhibition concentration	27
4. Chemical formula of exterior emulsion paint	29
5. Composition of cinnamon leaf oil	33
6. Composition of citronella oil	35
7. Some fatty acids present in neem seed oil with their relative percentage	37
8. Some active components present in neem seed oil	37
9. Minimum inhibition concentration ranges of introduced herbal oils (ppm)	38
10. Introduced concentrations of cinnamon leaf oil to prevent fungal growth	42
11. Evaluation of fungal growth in samples of exterior emulsion paint	42
12. Effect of cinnamon leaf oil on properties of prepared paint (before aging)	44
13. Effect of cinnamon leaf oil on properties of prepared paint (after aging)	44