Deadwood and Flowers - Anti-insect and antibacterial effect of the extract of Chinese medicine dye

I. Preface (including research motivation, purpose, and literature review)

1、Research Motivation

Wood began to be related to people's living habits at this stage. Wood can not be separated from food, clothing, housing, and transportation. When people began to use wood, they found the problem of insect-eaten and mildew, and these problems need to be overcome with chemicals, the most serious of which is the use of formaldehyde. If we use wood dyeing as the substitute, we may supplement market needs, and slow down the disappearance of precious timber. In addition to reducing the cost, it is also beneficial to environmental protection.

2、Purpose

（1）Experiment 1: Wood pretreatment
（2）Experiment 2: Moisture absorption of wood and changes after drying
（3）Experiment 3: Discuss the dyeing fastness of wood after dyeing
（4）Experiment 4: Discuss the bacteriostatic effect of wood dyeing
（5）Experiment 5: To explore the anti-termite effect of herbal extract

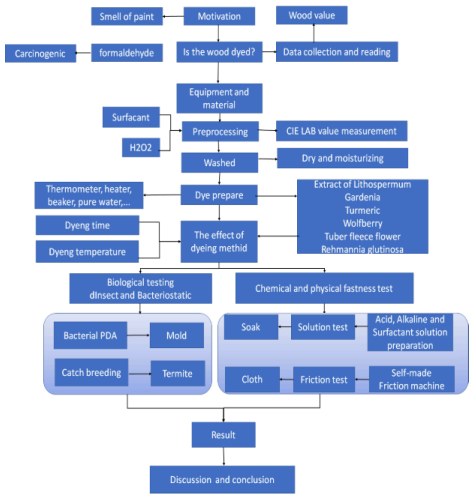
II. Research process or method

1. Raw materials and medicinal materials: Chinese herbal medicine, hydrogen peroxide, fatty alcohol surfactant, thermometer, cleaner, acid and alkali test paper, ADVANCE # 1 filter paper, pure water, Kanten Powder (agar), potato, glucose, cotton white cloth, double-sided adhesive tape.

2. rubbing fastness machine

In this group, a self-made friction fastness tester was used to measure the dyeing fastness of wood chips fairly.

3. process



4、Experiment preparation

（1）Termite rearing
（2）Chinese herbal medicine extraction

(3）Preparation of PDA medium

Key Experiments:

- **Discuss the bacteriostatic effect of wood dyeing**
- **To explore the anti termite effect of herbal extract**

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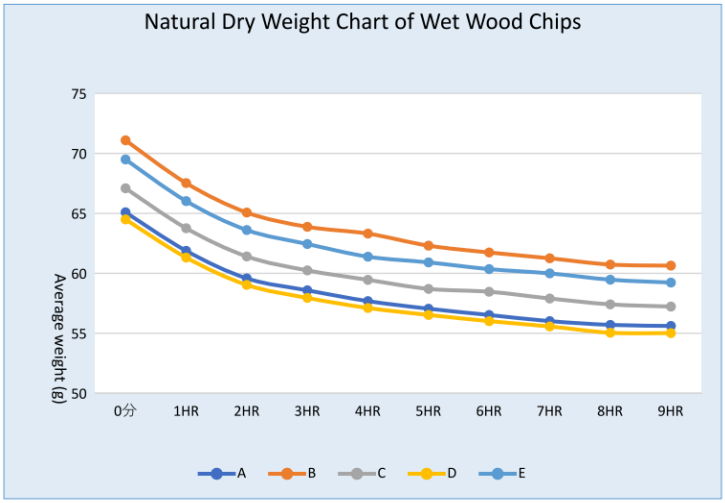
Ⅲ. Research Results & Discussion

1、Experiment 2: Moisture absorption of wood and changes after drying After fully wetting, place the wood in the indoor air conditioner at 26.5 ℃, and dry it naturally at 55% humidity. Record it once an hour.



Results: In the early stage of drying, more moisture was lost, and the weight of wood chips was reduced. After 8 hours, it became less and less.

2、Experiment 3: Discuss the dyeing fastness of wood after dyeing

（1）Influence of Acid and Alkali Aqueous Solutions and Interfacial Activators

A. pH3 hydrochloric acid aqueous solution

Results: After soaking in pH 3 hydrochloric acid solution for 15 minutes, measure the color difference value: turmeric>rehmannia> lithospermum =wolfberry>tuber fleece flower>gardenia.

B. pH10 sodium hydroxide aqueous solution

Results: After soaking in pH 3 hydrochloric acid solution for 15 minutes, measure the color difference value: turmeric>rehmannia> lithospermum =wolfberry>tuber Fleece flower>gardenia.

C. Aliphatic alcohol surfactant aqueous solution

Results: After soaking in neutral fatty alcohol surfactant aqueous solution for 15 minutes, measure the color difference value: rehmannia=turmeric>tuber fleece flower>wolfberry>gardenia>lithospermum.

3, Testing of rubbing fastness:

Results: After the friction test, judged from the contamination on the cloth, and the rubbing fastness was ranked from the best to the worst: lithospermum =tuber fleece flower =wolfberry=rehmannia>turmeric>gardenia.

4、Experiment 4: Discuss the bacteriostatic effect of wood dyeing

Results:
7th day, bacteria appeared：Rehmannia glutinosa.
12th day： There are bacteria growing in Rehmannia glutinosa, Lithospermum, Gardenia, Wolfberry, and Tuber fleeceflower.
18th day：Except the control group treated with 2.0% boric acid, which was no bacteria growth, and others grew.
5、Experiment 5: To explore the anti termite effect of herbal extract
Results:
1. in the termite test, turmeric, and boric acid in the control group were killed the fastest.
2. Tuber fleece flower, Gardenia, Rehmannia, Wolfberry, and Lithospermum in turn.
3. On the fifth day, only two groups survived: 21 Lithospermum (35%) and 10 wolfberry (16.7%).

IV. Conclusion and Application

Conclusion
1、Experiment 1: Wood pretreatment
Before wood dyeing, pretreatment must be carried out to remove pigments, tannins and other impurities that affect the dyeing, so as to reduce external interference in the dyeing project. The wood selected in this group is relatively soft, so only 5.0% H2O2 is used for bleaching, and then 5.0g/l fatty alcohol surfactant is used for washing. Lab value measured after bleaching: the red and yellow parts are reduced, indicating that the bleaching effect is reached.
2、Experiment 2: Moisture absorption of wood and changes after drying
After moisture absorption, the test material will be dried for about 8~9 hours under constant temperature and humidity in the indoor air conditioner. Continue drying at 50 ℃ for 35 hours to achieve a more dry degree. After drying, the test material will be placed indoors. The quality will change due to changes in temperature and humidity.
3、Experiment 3: Discuss the dyeing fastness of wood after dyeing
After being bleached, the test materials were dyed with six different Chinese medicinal materials, and the color after being dyed with "rehmannia" was similar to that of high-value walnut. After immersion in pH 3 hydrochloric acid and pH 10 sodium hydroxide aqueous solution for 15 minutes, the color difference value is between 3 and 4, indicating that strong acid or strong acid treatment is not allowed after dyeing with Chinese herbal medicine. In addition, if the detergent is soaked for 15 minutes, the color difference value is less than 2, which requires an experienced observer to notice the difference; The rubbing fastness is above grade 4.

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4、Experiment 4: Discuss the bacteriostatic effect of wood dyeing
37During the bacteriostasis time, no fungus was found on the first three days of the six test materials. On the seventh day, it was found in Rehmannia glutinosa group, and on the twelfth day, no fungus was found on the control group in the 2.0% boric acid aqueous solution. This

provided a method to inhibit fungi for this group of experiments, that is, boric acid can be added at the time the traditional Chinese
medicine staining.
5、Experiment 5: To explore the anti termite effect of herbal extract
In this experiment, six kinds of Chinese medicinal materials' effects on termite resistance result good, and the fastest death is turmeric and boric acid in the control group; On the fifth day, only two groups survived: 21 lithospermum (35%) and 10 wolfberry (16.7%).。

Application

1. With the continuous development of natural forest resources, people have less and less precious wood. Wood dyeing can improve the decorative quality of wood. Wood dyeing can be used to make all kinds of wood with bright color, clear texture, and natural wood characteristics. It can be used to produce industrial products in line with market demand to improve the value of low-quality wood, reduce the cutting of precious trees, and also have the function of environmental protection and carbon reduction.
2.
In this experiment, it is initially feasible to dye the cheap radiata pine wood with the extract of traditional Chinese medicine. However, there are still many post-processing works to be treated, just like fabric dyeing, finishing treatment is still required; After treatment of wood, it is a long way. At present, the problems to be overcome list as in below:
（1）Natural medicinal materials have bacteriostatic effect. In order to avoid "polysaccharides" in plant materials and let bacteria grow nutritionally, it is proposed to use borax (called lunar stone in Chinese medicine) with natural minerals to prevent and control biological hazards.
（2）The increase of wood strength, that is, the increase of density, is intended to be filled and improved in the low density wood gap with cohesive and significant materials (such as silver ions, which also have bacteriostatic effects).
（3）Beeswax or paraffin oil can be used to increase the brightness and waterproof protection of the dyed wood.

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