

Extracting of rubia dyestuff by enzyme-ultrasonic method

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1. INTRODUCTION

Generally, the natural dye should be extracted before dyeing process. Currently the extract technology includes water extract, drying method, heating drying, ultrasonic, enzymatic, etc.

The traditional extractions, such as water extract, heating drying method cause a certain environmental pollution and numerous energy consumption due to the organic solvent used in separation and purification for extraction process, so the clean extract technologies such as biological enzyme and ultrasonic method are more and more popular.

In order to increase the extract yield, we chose enzyme – ultrasonic method to extract rubia and studied various factors in the extract process.

2. EXPERIMENTAL

2.1 materials and agents

Dried rubia(china) was chose. Cellulase was provided by Zhaodong enzyme agent Co., Ltd(china)

2.2 instruments

Ultrasonic instrument (KQ2200E,50Hz,220V) was made by Kunshan ultrasonic Instrument Co., Ltd (china). UV spectrophotometer instrument was provided from The American PerkinElmer Co.,Ltd.

2.3 extract process

2.4 measurement of extracting yield

3. RESULT AND DISCUSSION

3.1 extraction yield of rubia by four different methods

According to the absorption peaks in Fig. 1, it was found that, for rubia, the absorbance peak appears at the region of 328nm wavelength.

No matter use what method, maximum absorption peaks of rubia was unchanged, as well as absorption wavelengths.

3.2 optimized extracting process of rubia

It was indicated that, as the temperature increased, absorbance of four extraction methods increased in

the initial phase but declined in different degrees after 50 °C under enzyme and enzyme – ultrasonic method.

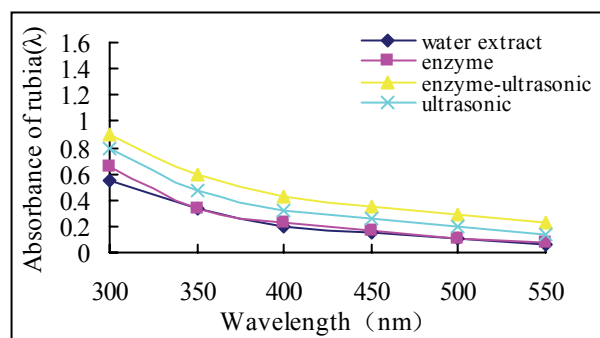


Fig. 1. Absorbance of rubia in water.

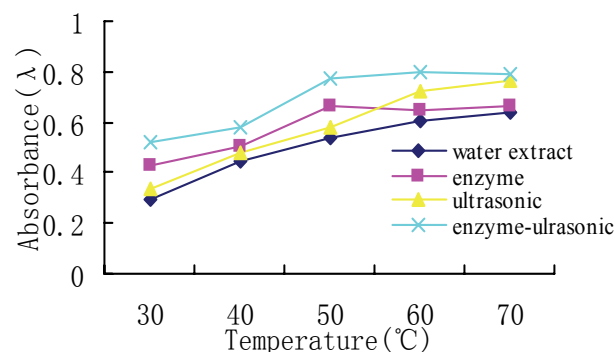


Fig. 2. Effect of temperature on extracting.

3.3 effect of time on extracting of rubia

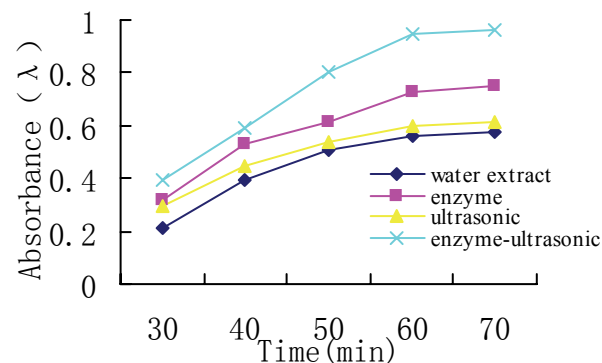


Fig. 3. Effect of time on extracting of rubia.

It can be seen from fig.3 that when time between 30 and 60 min, absorbance value was increasing but lost velocity at steady rate when time was after 60 min because extracting quantity would not increase a lot after the maximum value by increasing time due to colorant could be extracted was limited.

3.4 effect of pH on extracting of rubia

In Fig. 4, for rubia, with the pH value increasing, absorbance values of four extract method have no obvious changing regularity and fluctuation, which indicated that pH value has impact on rubia. In conclusion, 4.5 is the optimum pH value for extraction.

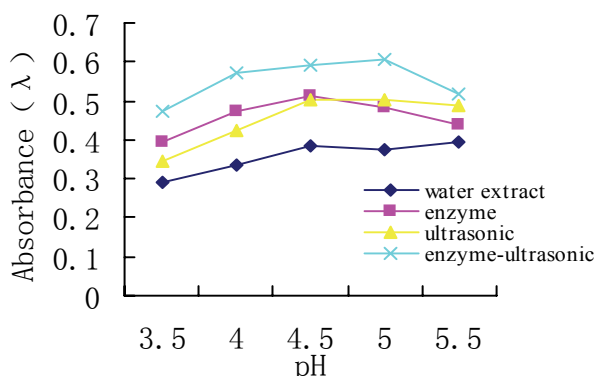


Fig. 4. Effect of pH on extracting of rubia.

4. CONCLUSIONS

Extract yield of nature plants dyestuff by using biological enzyme and ultrasonic together in extract process was higher than enzyme, ultrasonic and water extract method. The optimized process for extracting dyestuff from rubia is time 60 min, temperature 50°C, pH 4.5.

5. REFERENCES

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