



NOTE

Antibacterial Activity of the Vegetable Extract from Chestnut (*Castanea mollissima* Blume) Shell

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The vegetable extract obtained from the aqueous acetone solution of chestnut (*Castanea mollissima* Blume) shell was screened for its antimicrobial activity. The extract showed a wide spectrum of antibacterial activities against tested gram-positive and gram-negative bacteria.

Key Words: *Castanea mollissima* Blume, Vegetable extract, Antibacterial activity.

China is rich in chestnut (*Castanea mollissima* Blume) resources, which output reaches over 60 % of the world in recent years. This plant is known to be antioxidant^{1,2}, anti-hepatic steatosis³, anti-obesity⁴ and heavy metal adsorbent⁵. Chestnut fruit is processed in the food industry for the production of various food products, while the shell is separated as a waste product in the chestnut peeling process, which is a great waste of resources. In the recent years, strong attention has been devoted to the utilization of agronomic residues. This feedstock is very attractive because it is renewable and it is not in competition with food sources. The objective of this work was to study the antibacterial activity of the vegetable extract obtained from the aqueous acetone solution of chestnut. Chestnut (*Castanea mollissima* Blume) shell was kindly provided by Hebei Yun Guan Tannin Extract Factory. The plant was identified by Professor Xiaodong Wang, Institute of Process Engineering, Chinese Academy of Sciences and a voucher specimen is kept at National Key Laboratory of Biochemical Engineering.

Escherichia coli, *Staphylococcus aureus* and *Bacillus subtilis* were used as the tested microorganisms.

General procedure: The ground sample of chestnut was mixed with the appropriate 50 % aqueous acetone solution and then sonicated three times. The combined extraction solution was transferred to the centrifuge tube and centrifuged at 5000 rpm for 10 min. The extract was then concentrated to dryness by removing the solvent in the rotary evaporator (Shanghai Ya Rong Biochemistry Instrument Factory, Shanghai, China) under reduced pressure.

Detection method: The tannin content was determined by hide powder method^{6,7} and the correspondent parameters of the vegetable extract was determined by Forestry Industry Standard of Republic of China LY/T 1082-93. Antibacterial activity was tested by the Oxford cup method^{8,9}.

The main constitute of the extract was tannin (63 %) according to the hide powder method. The correspondent parameters of the vegetable extract were listed in Table-1. The antibacterial activities were observed through the three microorganisms and the results were reported in Table-2.

TABLE-1
CONTENTS AND PROPERTIES OF THE VEGETABLE
EXTRACT FROM CHESTNUT SHELL

Component	Content/Value
Total solid	94.1 %
Water	5.9 %
Soluble substance	90.68 %
Insoluble substance	9.32 %
Non-tannin	27.00 %
Tannin	63.68 %
pH	3.81
Colour value	22

TABLE-2
ANTIBACTERIAL ACTIVITY OF THE VEGETABLE
EXTRACT FROM CHESTNUT SHELL

Microorganisms	MIC ($\mu\text{g/mL}$)
<i>Escherichia coli</i>	97.65
<i>Staphylococcus aureus</i>	781.25
<i>Bacillus subtilis</i>	390.625

Conclusion

A wide range of antibacterial activities ranging from MICs of 97.65 to 781.25 µg/mL, depending on bacterial species, were apparent. The vegetable extracts of chestnut (*Castanea mollissima* Blume) shell display potentially useful antibacterial activity which should be confirmed against a number of strains of the same species before further use. The observed antibacterial properties against both gram-positive and gram-negative bacteria show that the extract has a good potential use in phytotherapy and pharmacy.

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