

STUDY OF ANTIBACTERIAL PROPERTIES OF EXTRACTS OF THE HERB *Speranskia tuberculata* (BUNGE) BAILL

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The widespread and often excessive use of synthetic antibiotics has led to bacteria developing the ability to adapt and mutate rapidly. Consequently, the efficacy of known antibiotics and the development of new synthetic agents are diminishing as they become less effective against multidrug-resistant bacteria. On the other hand, medicinal plants offer a promising alternative to ineffective synthetic antibiotics in combating infectious diseases. One such example is the Chinese endemic herb *Speranskia tuberculata* (Bunge) Baill, which has been widely and successfully used in Chinese traditional medicine for centuries.

The study aims to assess the antibacterial efficacy of crude extracts of the herb *Speranskia tuberculata* (Bunge) Baill, obtained using various solvents, against three prevalent bacterial strains. Furthermore, cell experiments are conducted to confirm the biological safety of these extracts.

Materials: Dried *Speranskia tuberculata* (Bunge) Baill herbs (Tongrentang Pharmacy Ltd. Beijing, China); petroleum ether (PE); ethyl acetate (EA); n-butanol (n-But) and aqueous solution (AS); dimethyl sulfoxide (DMSO); 3 kinds of bacteria named *Staphylococcus aureus* (SA), *Escherichia coli* (EC), and *Propionibacterium Acnes* (PA); Methyl Thiazolyl Tetrazolium (MTT).

Methods: For experiments, the dried fruits were first powdered. The powder was sequentially extracted using a Soxhlet apparatus with petroleum ether, ethyl acetate, n-butanol and finally aqueous solution. Each extract was concentrated under reduced pressure, vacuum dried (-20°C). Further dissolution in dimethyl sulfoxide (DMSO) prepared working solutions with 10, 50, 100, 200 and 500 µg/mL concentrations. Three kinds of bacteria were used to evaluate the antibacterial activity: *Staphylococcus aureus* (SA), *Escherichia coli* (EC), and *Propionibacterium Acnes* (PA). Then disk diffusion method was used to verify the antibacterial effect of the herb extracts. Finally, MTT cytotoxicity test was used to detect the biological safety of the extracts of different concentrations.

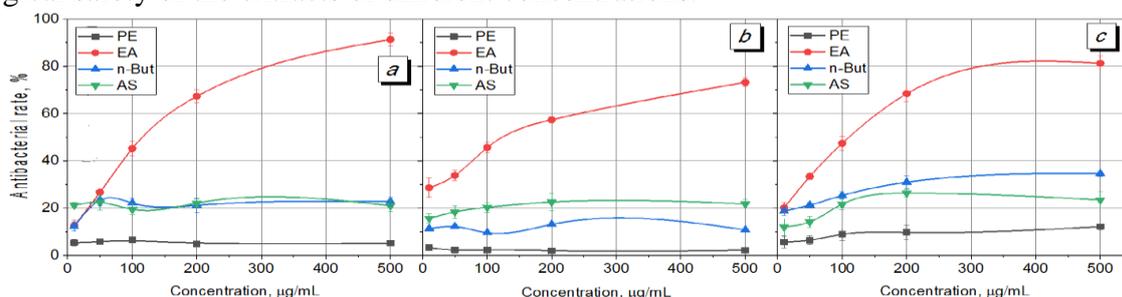


Fig. 1. Antibacterials rates for 4 kinds of extracts in the different bacteria media:
a – *Staphylococcus aureus*, b – *Escherichia coli*, c – *Propionibacterium acnes*

Table 1. The viability of L929 cells (Mouse Fibroblast Cell Line) exposed to different concentrations of *Speranskia tuberculata* (Bunge) Baill extracts derived from ethyl acetate

Concentration (µg/mL)	10	50	100	200	500
Cell viability (%)	91.14 ± 2.32	95.76 ± 3.14	94.89 ± 1.93	90.73 ± 3.67	87.56 ± 2.18

Conclusions: 1. Four kinds of extracts of a Chinese herb named *Speranskia tuberculata* (Bunge) Baill were examined for their antibacterial efficacy. The ethyl acetate extracts demonstrated significant antibacterial activity, with IC₅₀ values ranging from 112 to 135 µg/mL for three kinds of bacteria, whereas the other three extracts showed no antibacterial effect. 2. The ethyl acetate extracts of this herb showed no apparent toxicity towards L929 cells. These extracts have been proven to possess excellent biological safety within a concentration range of 10 µg/mL to 500 µg/mL, and it can be utilized as active compounds for antibacterial drugs.