

Effect of light quality on growth of Danshen (*Salvia miltiorrhiza*)



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Introduction

Danshen (*Salvia miltiorrhiza*), a traditional Chinese herbal medicinal plant, has been used in China since ancient times to treat various cardiovascular diseases. To meet the increased demands of the market and to conserve natural resources, artificially planted Danshen became the main source of medicinal production.

Medicinal plants require specific habitat. Light quality is one of the most important factors. In our investigation about the effects of light quality on Danshen growth, we compared morphology, biomass and physiological indicators of Danshen grown under different colored films.



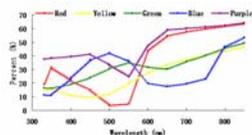
Materials and Methods

Plant materials and culture conditions

- Danshen seeds (offered by Shaanxi Tasly plants pharmaceutical Co.Ltd. China) were sown in August and grown over winter.
- On the following March, uniform Danshen seedlings were selected and transplanted into 30-cm-wide by 28-cm-high pots. Seedlings were acclimatized for 2 weeks after transplanting, and then covered with different color films, colorless films were used as control.
- Growth conditions were controlled at same level.

Color plastic films

- Red, yellow, green, blue, purple plastic films (supplied by Shanghai Weikang Color Film Factory, China) and colorless plastic film control were used.



Light transmittance of different color films.



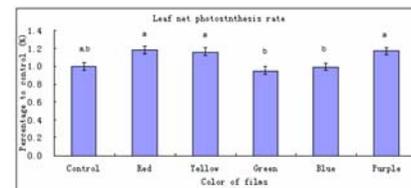
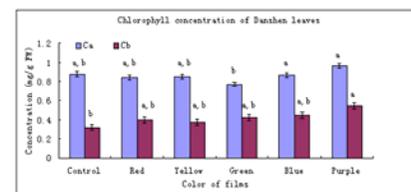
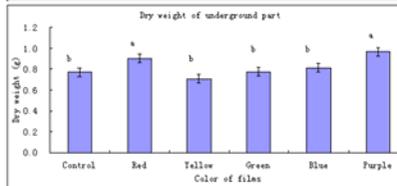
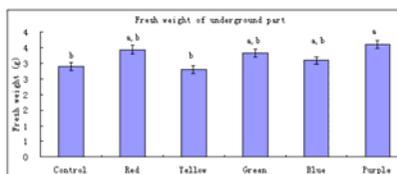
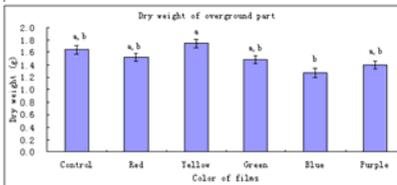
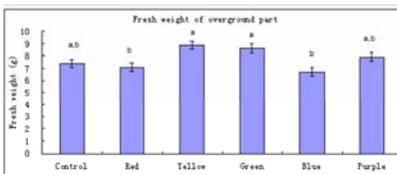
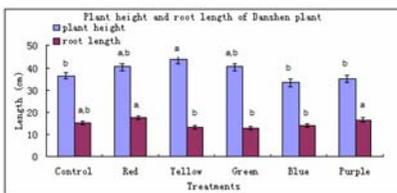
Measurements

- Plant height, root length, fresh weight, dry weight, chlorophyll concentration and leaf net photosynthesis rate were quantified after one month of colored film treatment

Statistical Analysis

- Data were analyzed using SPSS 11.0 and difference between treatment means were compared using LSD and $\alpha \leq 0.05$

Results and Discussion



Plants grown under yellow and green films had the highest plant height than control and other treatments. These films also have the lowest transmittance to blue light. Purple films, which had the highest transmittance to red light, increased the root length of Danshen.

The highest fresh weight of above-ground tissues was found in the yellow and green film treatments. Also, the highest dry weight of above-ground tissues were found in the yellow film treatment.

The fresh weight of the root system was highest in the purple film treatments, while the dry weight was highest in red and purple treatments.

The concentration of *Chl a* was highest in the purple and blue film treatments. The concentration of *Chl b* was highest under the purple film treatment.

High rates of *Pn* could be found in all of the red, yellow and purple films treatments.

Conclusion

The investigation concludes that purple films can be used to create an optimal light condition which can enhance the commercially important root system growth of Danshen.

The effects on the medicinal elements within the plant are still under investigation.

