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# Effect of Remained Stem Height on Yield, Quality of *Inula helenium* I. and on Soil Water Content

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## ABSTRACT

To explore the reason causing low yield, poor quality of *Inula helenium* I., this paper investigated the influence of different remained stem heights on the yield, quality and water consumption of *Inula helenium* I. in Gannan plateau area using field single factor randomized block method. Research results showed that *Inula helenium* I. which was cut before blooming period in the last ten-day of July with remained stem height of 25 cm had the lowest water consumption, the best underground root traits (including main root length, root diameter, and root dry weight per plant), and the highest yield which was higher than control group by 18.73% ( $P < 0.01$ ). Moreover, *Inula helenium* I. with remained stem height of 25 cm had the lowest ash content while the highest *alantolactone* content, therefore its quality was the best. The water use efficiency (WUE) of *Inula helenium* I. with remained stem height of 35 cm at September was the highest (1.12 kg·hm<sup>-2</sup>·mm<sup>-1</sup>). However, in terms of biological yield WUE and economic yield WUE, *Inula helenium* I. with remained stem height of 15 cm was the highest. Therefore, it can be concluded that remained stem height from 15-25 cm is an ideal solution, which can not only save water, but also improve yield and quality of *Inula helenium* I.

**Keywords:** Tibet *Inula* Root; Growth; Quality; Water Use Efficiency; Water Consumption

## 1. INTRODUCTION

*Inula helenium* I., known as "Ma Na Ba Zha" in Tibetan language (1991), belonging to the composite family and *Inula* flower genus, is the dried root of *Inula racemosa* Hook. f. and *Inula helenium* L. (2003). This plant has astringent flavour, mild and non-poisonous nature. It contains volatile oil, resin, Saussurine, synanthrin, etc, thus smelling a special aroma (Gogoba et al., 2017). This plant has therapeutic effects including promoting qi circulation, easing pain, invigorating spleen, promoting digestion, neutralizing stomach & chest pain. *Inula helenium* I. is a cold-resistant deep-rooting plant grown in mountainous area, which does not have strict requirement of fore-rotating crop and can be grown both in uncultivated land or cultivated land, especially in mountainous area in elevation of 1500 m ~ 3000 m where the growth situation is the best (Kudus et al., 2017).

Currently, there are more researches on the chemical composition (Re et al., 2008; Bi et al., 2009), identification, pharmacology, pesticide effect (Zou, 2006; Hai, 2009; Ullah et al., 2016), and clinical effect of *Inula helenium* I., and there are seldom reports on the cultivation of *Inula helenium* I. (He et al., 2012; He et al.,

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