

Study on Hydroponic Cultivation of *Polygala senega* L.



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About *Polygala senega*

Polygala senega L. var. *latifolia* Torr. et A. Gray

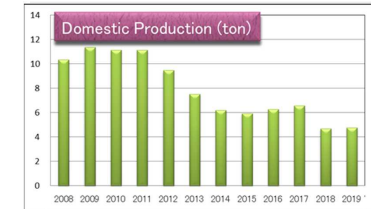
- A perennial medicinal herb of the family *Polygaraceae* that is native to North America.
- The dried root is listed in the Japanese Pharmacopoeia as the crude drug "Senega".
- It has expectorant and antitussive properties and is prescribed as senega powder and senega syrup.



At Osaka University



Root (soil cultured)



- Between 2011 and 2019, the domestic production **reduced to 40%**.
- In the last two years, some were imported.

Problems that Hydroponics Can Solve

Problems on Senega Cultivation

- Unstable in germination
- Large work load
- Senega cultivation relies heavily on experience and intuition.

Unstable germination rate in open field cultivation.



Hydroponic can easily control seeding and growing conditions.

Weeding, unnatural posture, washing after harvest, and other work loads in open field cultivation.



Hydroponics requires no weeding, has a natural working posture, and is easy to wash after harvest.

Open field cultivation requires experience and intuition.



In hydroponics, growing conditions are controllable and cultivation management can be done by following the procedures.

Test Cultivation in Vertical Farming System (indoor)

Hydroponic (indoor)

senegose B (t_r, 17.6 min)
senegose A (t_r, 18.5 min)
senegin III (t_r, 21.7 min)
senegin II (t_r, 21.9 min)

Market (soil)

senegose B (t_r, 17.6 min)
senegose A (t_r, 18.5 min)
senegin III (t_r, 21.7 min)
senegin II (t_r, 21.9 min)

Absorption spectrum of root extract

(1) Persistent fine bubbles
(2) Absorption maximum at 318 nm

➤ From planting to flowering, photos show how quickly it grows.

➤ Three months after planting, the roots have begun to enlarge.

➤ HPLC patterns show no significant differences in both of samples.

➤ The hydroponic sample has rather higher content of major.

➤ Confirmation test of Senega shown in Japanese Pharmacopoeia were carried out.

(1) persistent fine bubbles
(2) The absorption maximum is at around 317nm.

The hydroponically produced root meets the criteria.