

## P33

## 宇宙農業における栽培培地の検討

## Assessment of growing media for space agriculture

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## 1. Introduction

In recent years, research and development on space have been increasing for migration to other planets, use of space resources and exploration of undeveloped land. Humanity's exploration of Mars and the Moon is undertaken by international collaboration<sup>1)</sup>. Although space agriculture is essential to humanity's exploration of Mars and the Moon, there are many restrictions on growing media, unlike agriculture on Earth. For example, growing media should be virus free for safety<sup>2)3)</sup>, since water movement in loose materials is complicated due to the lack of a dominant gravity vector<sup>4)</sup>, using porous media with rigid pore spaces is desirable for reliable water management<sup>5)</sup>. Furthermore, it is challenging to use soil-like media for space agriculture. Therefore, choosing an inorganic growing media instead of soil to control water in space easily is necessary. This study, assessed growing media suitable for space agriculture in closed environments such as the International Space Station and space bases.

## 2. Experiments

Plants grown in five different growing media (Excel soil, Capillary mat, Cellulose sponge, Rockwool block, and Granular rockwool) were compared with those in Joint soil (Fig.1). Those growing media were packed in nursery trays (300×600×15mm). Two seeds of cos lettuce (*Lactuca sativa var. longifolia*) were sowed every 2.5 cm apart in a concentric pattern after saturating the growing media with tap water (Fig.2). Water was applied with a drip emitter every hour. The lettuce was grown for a month. Germination and cotyledon opening rates were measured weekly to evaluate the growth conditions.



Fig.1. Six growing media used for the experiments.

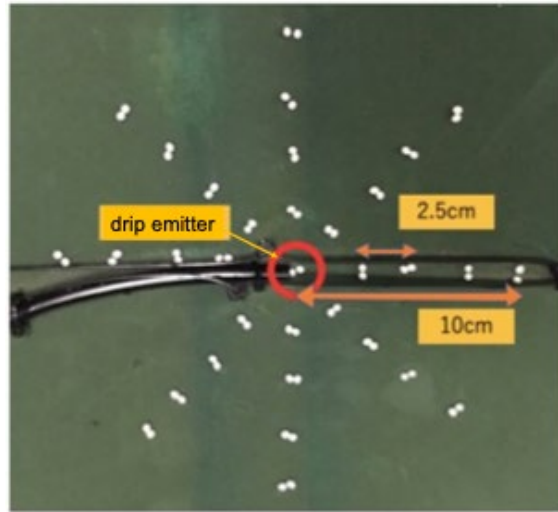


Fig.2. Location of seeds on a growing medium

### 3. Results and Discussions

Figure 3 shows germination and cotyledon opening rates on six growing media. Lettuce on Cellulose sponge and Granular rockwool had almost the same germination rate as Joint soil. In addition, the cotyledon opening rate of Granular rockwool was higher than on Joint soil. However, germination and cotyledon opening rates on other three growing media (Excel soil, Capillary mat, Rockwool block) were smaller than those on Joint soil. We concluded that Granular rockwool is the most suitable for growing lettuce among the five growing media.

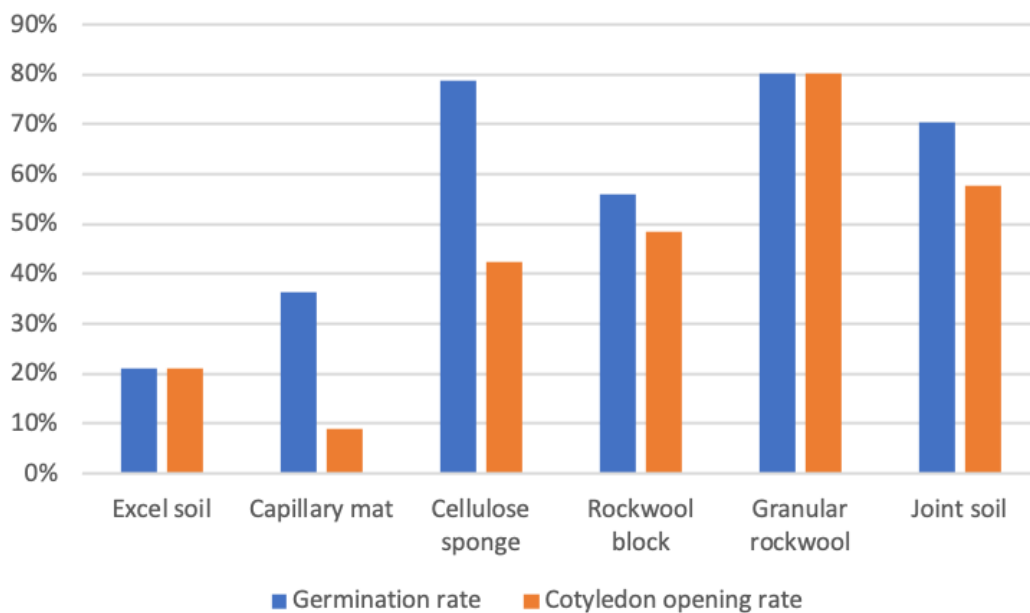


Fig.3. Germination and cotyledon opening rates on six growing media.

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