Characteristics of New Granular Rockwool©

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INTRODUCTION

Rockwool has been developed as a nutrient culture medium in the Netherland. The rockwool culture system was introduced to Japan in 1983 and has been expanding in tomato and rose culture. Rockwool as a culture medium has been used in a slab bed system. In this system the rockwool fibers are mixed with a binder and formed into a rectangular shape. In contrast to the rockwool slab, granular rockwool has not been popular, although granular rockwool for potted plant media is effective for improving of physical soil conditions. We believe the reason for granular rockwool's lower popularity is high price. On the other hand, granular rockwool has attracted attention as an alternative construction material to asbestos and every year has been used at 200,000 tons in Japan. So we converted rockwool used in the construction field to the agricultural field, and developed a new granular rockwool for horticulture.

MATERIALS AND METHODS

Four new rockwool types were used; fine granular rockwool (R210), roughly granular rockwool (rough rockwool), medium granular rockwool (medium rockwool), and grainy granular rockwool (grain rockwool) along with two types of commercial granular rockwool; Ryu-jou-men (Nippon Rockwool Co.) and 012-519 (Grodan), were used as controls.

Granular rockwools were mixed at 0, 10, and 20% into a commercial peat moss mix (BM-2, Berger). The pH (KCl), electrical conductivity (EC), and cation exchange capacity (CEC) were measured.

To investigate growth effects of these granular rockwools, the mixed media with these rockwools were used for cultivation of *Spathiphyllum* 'Fairy Wing'. Micropropagated plantlets were transplanted to plug tray with 200 cells filled with BM-2 on 29 October 2012, and acclimated. After 2 months, the plants were transplanted to 6-cm pots filled with the mixed potting media consisting of BM-2 and 10 or 20% granular rockwool. On 19 April 2013 the plants were transplanted to 9-cm pots filled with the same potting media. There were 10 plants per treatment and maximum leaf length and leaf numbers were measured.

RESULTS AND DISCUSSION

The CEC of R210 was lowest and was 1.11 me/100 g and CEC of grain rockwool was next at 1.78 me/100 g (Fig. 1). Ryu-jou-men had a high CEC of 6.84 me/100 g. The mixed media with BM-2 had the same CEC as rockwools. Although pH values of the rockwools were high at around 9.0, the mixed media with BM-2 were 6.5 to 7.0. The EC of all rockwools was around 0.1 $mS \cdot cm^{-1}$. Electrical conductivity increased by mixing with BM-2, and all media mixed with 20% BM-2 were around 0.3 $mS \cdot cm^{-1}$.

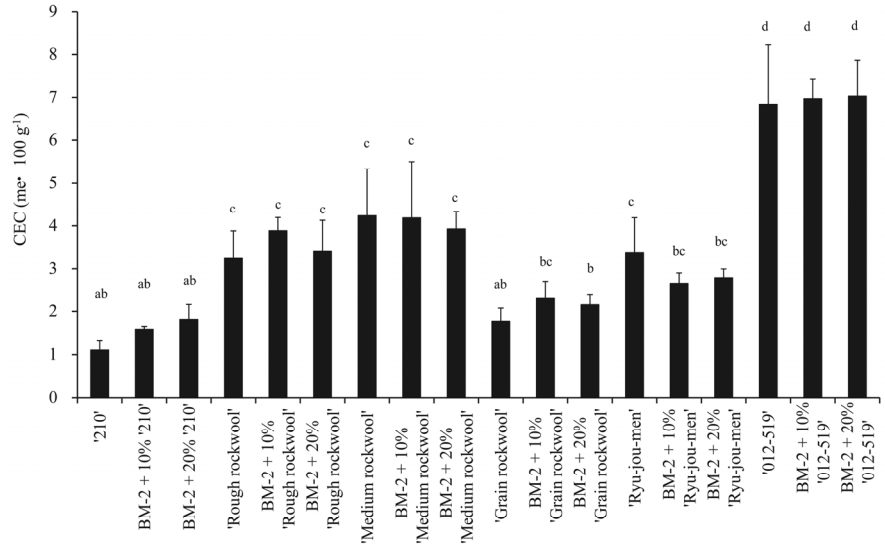

Fig. 1. Cation exchange capacity of mixed media with BM-2.

Effects of mixed potting media containing of BM-2 and 10 or 20% granular rockwool on growth of *Spathiphyllum* 'Fairy Wing' is shown in Figures 2 and 3. In BM-2 medium containing no rockwool, maximum leaf length was 7.7 cm on 19 April, and was 15.6 cm on 3 September. Maximum leaf length in all mixed potting media containing rockwools was larger than that of BM-2 mix and the effectiveness on plant growth by mixed rockwool was observed. The leaf length of the plants on medium rockwool was 21.3 cm compared to Ryu-jou-men and 012-519 at 19 and 18 cm respectively; medium rockwool therefore had a significant promotive effect of plant growth.

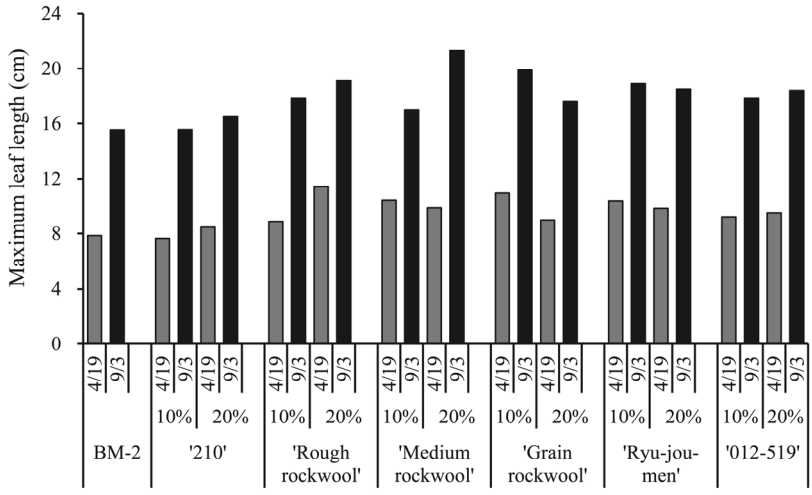

Fig. 2. Effect of mixed culture media containing of BM-2 and 10 to 20% granular rockwool on growth of *Spathiphyllum* 'Fairy Wing'.

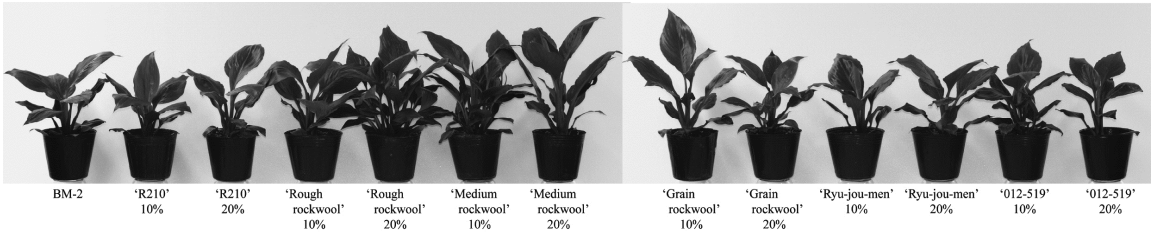

Fig. 3. Growth of *Spathiphyllum* 'Fairy Wing' in 29 October 2012.

From the above results, the newly developed granular rockwools (rough, medium, grain and R210) had no different physicochemical properties compared to the commercial rockwools used to grow plants. In addition, these rockwools had the same growth property effects for the cultivation of *Spathiphyllum* 'Fairy Wing' as the commercial granular rockwools with medium rockwool having a greater promotive effect on plant growth.

It is believed that rockwool improves the rhizosphere environment by increasing the gaseous phase ratio and soil water retention, and plant growth was promoted by these effects. We would like to promote the more wide spread use of these granular rockwools in pot-plant production in the future.