

The research of aquasorb's bibulous rate and water-retention property

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Abstract. The test compares and analyses the bibulous rate of different doses of 4g, 6g, 8g aquasorb in pure water and its water-retention property with EM bacteria in soil. The result shows: those three aquasorb all can absorb little water quickly, however, the larger the quantity, the slower the absorption rate. When absorbs 500ml water, the water-absorption rates of the 6g, 8g are almost the same and more than the 4g. They all have a certain water retention but the 6g and 8g aquasorb have the same ability to inhibit the evaporation while better than the 4g which prove the aquasorb can absorb water effectively and play a role in water-retention.

1. Introduction

Nowadays, the shortage of water have already became the grand factors of impacting even restricting agriculture and economy of China with the problem of contradiction of the water resource's supply and demand in agriculture is getting more and more serious. Therefore, it is a problem has to be settled as quickly as possible that developing the dry and water saving farming. Aquasorb is a macromolecular compound which can absorb water thousands weight of itself. Besides, aquasorb can improve the water-retention property of soil, the structure of the soil, the utilization of water and fertilizer, so it has a widely and prospecting future in terms of the agriculture production. In addition, microorganism in the EM bacteria form a complicated, stability structured, widely functioned, non-toxic effected efficient microorganisms that can improve water-retention property of soil to save water to a certain degree. The test combines aquasorb with EM bacteria in order to search the influence of the aquasorb's bibulous rate and combined action with the EM bacteria to the water-retention property of the soil, which might be a new solution of saving and retaining water.

2. Material and methods

2.1 Test material

The test was carried out in Nanjing vegetables and flowers institute in August, 2014. We used yellow soil on which grew tobacco early. The fermentation test of EM bacteria rejuvenation liquid and the water absorption of aquasorb are both indoors while the evaporation test was carried out outdoors with non rain and airless weather. During the test, the average daily highest temperature is 30.1 °C, the maximum average humidity is 64%, the aquasorb and EM stoste molasses are bought from The Nanjing Aimule Environmental Protection Biological LTD.

2.2 Test design

The application amount of the aquasorb are 0g, 4g, 6g, 8g per pot. The 0g aquasorb is a blank control, they all have 3 repetition per treatment. Put deionized water into different doses of aquasorb to 50ml, 100ml, 150ml, 200ml, 300ml, 350ml, 400ml, 500ml. Record the time from it starts absorbing water with a stopwatch and observe the bibulous rate's change with different doses of aquasorb. Bury the aquasorb which have absorbed water completely 2cm soil layer under the flower pots uniformly. Each process in the soil surface uniformly added 30ml of EM bacteria. After recording weighed pots of soil quality, natural evaporation into the open space. Don't forget to shelter them from the rain. The test continued 7 days and we weighed the soil bowl at 6 o'clock pm everyday.

3. Results and analysis

3.1 Bibulous rates with different doses of aquasorb

Bibulous rate is a important index which reflects the water absorption performance. It refers to retaining agent in an aqueous solution of unit mass per unit time can absorb the equivalent of how many times their own quality, which is a key index to measure whether the aquasorb can absorb water quickly or not.[9] From the figure 1,2 and 3 we know that different doses of the water absorbent rate different curves. From figure 4, Those three doses to 50ml water absorbent when used fairly, 8g aquasorb gradually absorbing water to 500ml rate slightly less than 6g insurance agent. However, statistically no significant difference between the two, and each quantitative water, than 4g aquasorb fast. 4g to about 350ml water absorbent is close to saturation, 6g, 8g still saturated when the water absorbent to 500ml. 4g, 6g, 8g aquasorb 150ml water used in the absorption time to reach 30.82% of the time water 350ml, 41.02%, 38.19% respectively. Illustrate the actual application, when the environmental conditions are exactly the same, insurance agent can quickly absorb a small amount of water, the more water-retaining agent dose, the greater the absorption rate, but after absorption rate became smaller and aquasorb exceed 6g, the time of absorbing 500ml water has little differences.

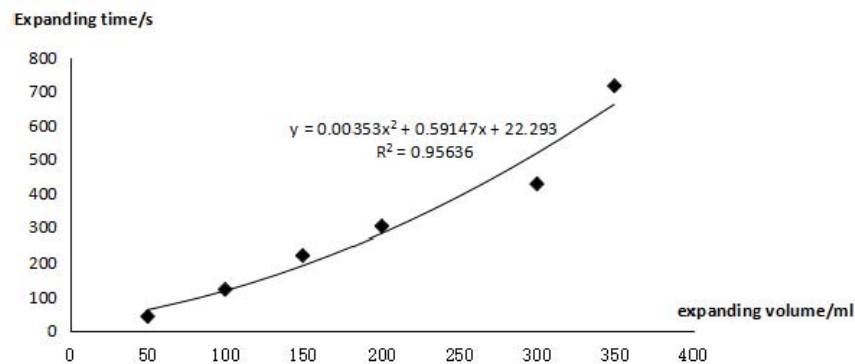


Figure1 the water absorption rate of the 4g aquasorb

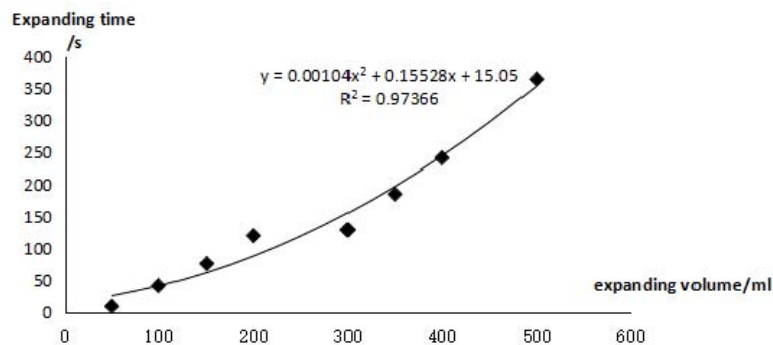


Figure2 the water absorption rate of the 6g aquasorb

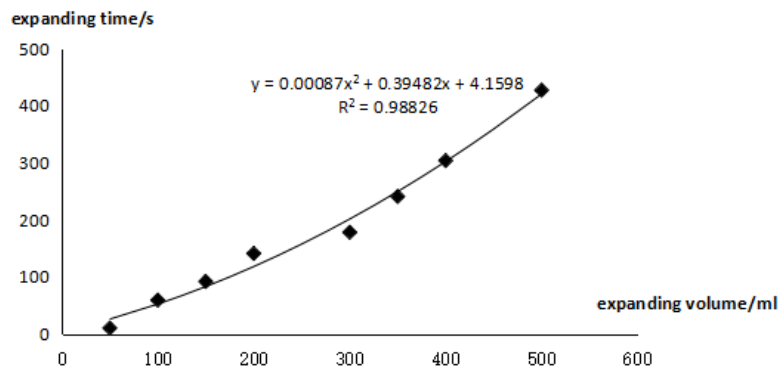


Figure3 the water absorption rate of the 8g aquasorb

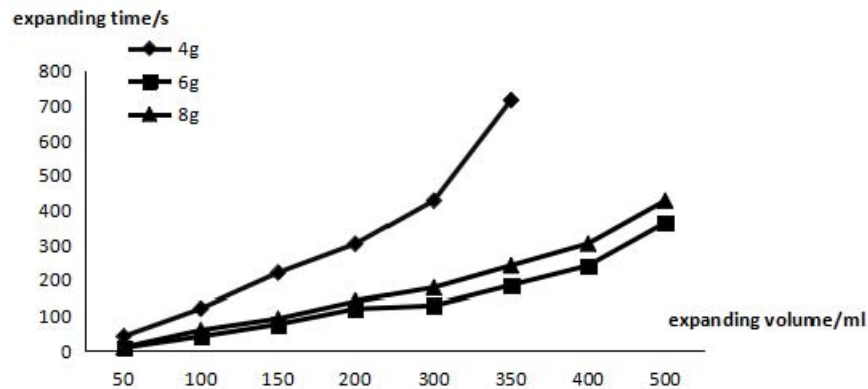


Figure4 the water absorption rate of different doses of aquasorb

3.2 Different doses of super absorbent polymers in the soil water retention

Aquasorb water retention refers to the expansion of the body after absorbing ability to maintain an aqueous solution without isolation is a reflection of whether the resulting solution can be fully utilized and be an important indicator of long-term application [10]. As can be seen from Figure 5, compared with the control, different doses retaining agent could to some extent, inhibit evaporation. 4g, 6g, 8g aquasorb evaporation process accounted for 77.78% of the control, 55.56%, 55.56% respectively. Thus, when less than 6g saturated with water or water-retaining agent to 500ml, aquasorb the greater the dose, the better the water in the soil mediator, water retention stronger. 6g, 8g aquasorb same evaporation process, indicating that when water 500ml, the same two doses aquasorb water retention in the soil.

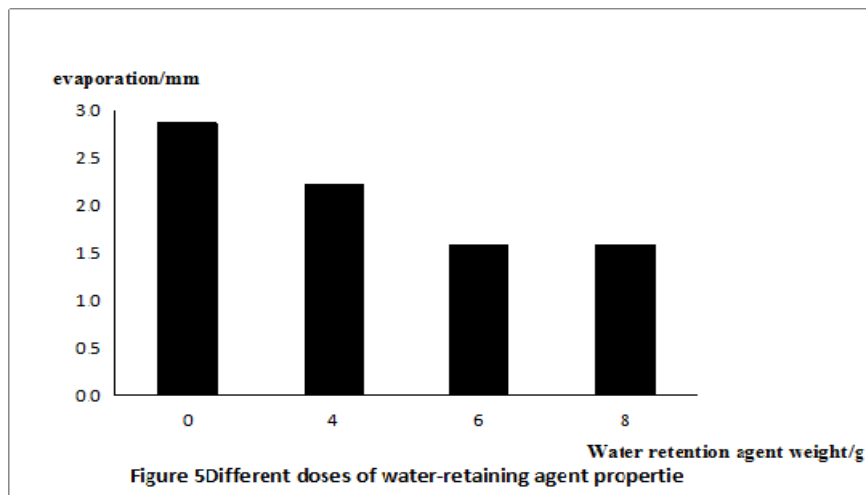


Figure 5 Different doses of water-retaining agent properties

4. Conclusion

(1) The results of the test shows that agent can effectively large amounts of water absorption and water retention agent dosage, the greater the water absorbing capacity. Super absorbent polymers can quickly absorb a small amount of water, with the increase of water quantity, bibulous rate is slow. 6 g, 8 g aquasorb bibulous rate close to but larger than 4 g water retention agent, visible, absorbs 500 ml water, relative 8 g, 6 g aquasorb aquasorb water absorption efficiency is higher.

(2) After each dose aquasorb added EM bacteria in the soil, can effectively reduce water evaporation, 6g, 8g aquasorb same amount of evaporation, we can see beyond a certain dose, the aquasorb same mass of water absorption, water retention in the soil little difference in performance.

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