Effects of microwave treatment on seed vigor and salt tolerance of different plants

In order to study the effects of microwave drying equipment on salt tolerance of different plant seeds and the universality of the selected technological parameters, Na CI solution and raw water were used as seed germination medium respectively, and the seeds (Chinese cabbage), herbaceous plants (tall fescue, ryegrass) and woody plants were selected. The effect of microwave pretreatment on seed vigor of four different species of Robinia pseudoacacia was studied by comparing the relative seedling vigor index. The results showed that the stress effect of single salt of NACL on seed germination was greater than that of the original water. The relative seedling vigor index of 29 seeds treated with microwave parameters 2450 M H z, 65 w, 6, 10 m in interval and repeated irradiation for 1 time were significantly increased by 31% to 84% under the condition of original water culture. Because the physiological and biochemical basis and mechanism of microwave effect on seed vigor are the same, the same microwave treatment parameters can significantly improve seed vigor.

At present, the main harnessing technology is planting ecological plants after high water pressure and saline-alkali pressure. This method consumes a lot of money and water resources, and the cost of new construction and maintenance and management of green space is relatively high.

On the one hand, seed drying equipment can improve the utilization rate of seeds, reduce the restriction of plant establishment and maintenance on soil salinity and alkali content, reduce the amount of soil used for soil improvement and the amount of water used for washing salt, thereby reducing the comprehensive cost of greening.

On the other hand, it can expand the species of introduced plants, increase plant diversity and improve the quality of ecological environment. therefore, it is of great significance to improve plant seed vigor and salt tolerance. physical treatment is an important way to improve seed vigor. Microwave is an electromagnetic wave with a frequency of 30 M H:30 G H Z (wavelength 1 M-L m). Microwave interacts with biological systems and produces many biological effects. In recent years, many literatures have reported that microwave treatment can improve seed vigor, but there are many reports about salt and alkali tolerance. Studies on rice seeds showed that microwave irradiation could induce changes in peroxidase activity and peak area, indicating that microwave irradiation could induce changes in plant physiological metabolism or physiological characteristics. It can be concluded that the physiological and biochemical basis and mechanism of microwave effect on seed vigor of different species are the same. Melon, wheat, soybean, eggplant and tomato showed that microwave had positive effects on seed vigor to varying degrees. The microwave treatment parameters were low power (65-Zo w) and short time (4-145). In order to study the tolerance of microwave pretreatment technology to different kinds of plant seeds. In view of the site soil conditions in Tianjin coastal area, vegetable seeds (Chinese cabbage), herbaceous plants (tall fescue and ryegrass) and woody plants (black locust) were selected as experimental objects, using N aC I solution and raw water (i.e. original water). The effects of the same microwave treatment parameters (such as microwave power and irradiation time) on the seed vigor of four different species of plants were studied by

comparative experiments. The P H value of the solution was measured by digital acidity meter. Compound salt culture medium: with raw water (salt concentration of 13107 methyl 7 g/L, P H 7.38), N a O H and distilled water to allocate a certain P H value and salt content of the solution, reserve. Low N-5K 80 M FS frequency converter microwave oven (theoretical output power of 100 W at 10% power level, 65 O W at actual measurement, continuously adjustable at 10% to 10% power level) was irradiated with different levels of microwave power and irradiation time respectively.

The dishes (90 m in diameter) were washed with distilled water and then dried in a human oven. Two layers of filter paper were placed on the dishes. A certain amount of culture solution (fully wetted but without water film) was added and one seed was evenly placed in each dish. Artificial light incubator, set the selected temperature, germinate under constant temperature. Take the day radicle and germ grow to half the length of seed itself as germination standard, record the number of germination every day from the beginning of germination. At the end of the experiment, measure the normal seedling fresh weight, calculate the seedling vigor index and relative seedling vigor index. Number.