Implement

End users

Our project hopes to inoculate the transformed engineering bacteria into the earthworm carrier, and apply the earthworms to the farmland before the crops are planted in each season, so as to protect the agricultural soil from the deterioration of lead pollution. Our project is finally applicable to cultivated land in southern China. First of all, the Eisenia vulgaris we chose is widely used as a compost introduction in southern China. Secondly, the lead content of some cultivated land in the south is higher than the risk screening value, but far below the risk control value. Therefore, our earthworms can ensure their normal growth and at the same time have a certain effect on the treatment of lead pollution in the soil.

Application in the real world(需改动)

After obtaining the engineered bacteria in the laboratory, we will register them for patents and sell them to biological companies. After obtaining the engineered bacteria, the biological company will conduct further screening, expand the cultivation and freeze-dry storage. Wash the artificially cultivated earthworms and put them in a turnover box with absorbent paper and a small amount of water at the bottom, add the freeze-dried powder of engineered bacteria, take out and wash them after one day, and sell them to farmers. Before planting each season, Inoculate farmland with X.

（图+1）

Safety

Due to the epidemic, we will not enter the laboratory for experiments this year, and we attach great importance to safety work. We learned lectures and regulations related to safety and ethics to ensure the safety of all parts of our project from the design topic.

Security of project design

* Overall biosafety

Our project envisages using Bacillus subtilis WB800N as the chassis organism, Bacillus subtilis YCD as the source of phytase, and Eisenia vulgaris as the engineering bacteria carrier. Bacillus subtilis is a very safe and commonly used strain in laboratories, and basically does not cause obvious risks to human health, the community or the environment. Eisenia vulgaris is a widespread species in China and is widely introduced as a compost in southern China, so our project is very safe.

* Genetic safety

We designed a suicide switch in the gene pathway to initiate suicide when the engineered bacteria enter the environment, avoiding the risk of gene drift to the greatest extent.

Implement security

When we envision our project to play a role in the soil environment in the real world, we will follow the principle of gradual evaluation, gradually increase the release scale, evaluate each step of the implementation, and reasonably optimize the implementation plan.

* Laboratory safety

We will not enter the laboratory to conduct experiments, but we still have received laboratory safety training and passed the laboratory safety exam, and are familiar with laboratory safety operations and emergency measures.

照片（3）

Challenge

How to ensure the activity of earthworms and engineered bacteria？

The use of pesticides and fertilizers on farmland may cause problems such as low activity of earthworms or engineered bacteria. If follow-up research can give full play to the synergistic effects of earthworm compost and beneficial microorganisms, the use of chemical fertilizers can be greatly reduced.

Wrong suicide

In addition, when the biological company feeds the freeze-dried powder to earthworms, the engineered bacteria may be recovered in the turnover box. In order to ensure the safety of the earthworms, if the suicide gene leaks when IPTG is not added, it may cause false suicide, but this This possibility is also very small, and the loss caused is small.