

# Phytorestoration of DDT-contaminated soil by pumpkin

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**Abstract.** To choose cucurbitaceous plant pumpkin as the selected plant and the paper initially discussed on the repair effects of DDT-contaminated soil by pumpkin under a variety of measures. Results showed that the content of DDT in soil reduce significantly after the same repair period. The experimental group which have the most obvious repair effect has two kinds of bacteria for control measures. The second one added compound fertilizer as measures.

## 1. Introduction

Soil is one of the most important natural resources which collected about 90% of the pollutants in environment. Therefore there are many different kinds of soil pollutants, the soil pollution problem has become increasingly seriously.

Although as early as in 70-80s of the 20<sup>th</sup> century, most countries in the world had to stop using the Organ chlorine pesticide DDT, but its effects on ecological environment is still there. DDT is the first batch of listed in the 'high pollution, high environmental risk' products list of the pollution list of the pollutants in China. The world health organization reports that china's adult male HCH intake is 15 times more than Japan's and 84 times more than American's. DDT intake is 16 times more than Australia's and 24 times more than Japan's and American's. People's health risk is huge in our country, even the content of DDT and other pesticides in human breast milk is still significantly higher than that of developed countries and relevant international organizations of standards. As a result, the fixing problem of DDT in soil was imminent.

In the repair of DDT-contaminated soil, the principle of phytoremediation plant secretion to degradation of organic pollutants concentration bio surfactant. Choosing pumpkin as the tested plants for phytoremediation, pumpkin as the annual cucurbitaceous plants, it can be resistant to DDT pollution, easy dry biomass, root developed, field management, to adapt to the characteristics of northern climate, the economic value. At the same time also added several control measures, such as compound fertilizer and two types of plant growth promoting rhizobacteria.

Wang and others show that fertilizer is commonly used to improve the quality of crop yield and soil as an agronomic measure. In the repair process, the use of fertilizer on the degradation of organic pollutants in soil also has the certain influence.

Staphylococcus pasteurii and Agrobacterium tumefaciens produce organic acid, amino acid, and polysaccharide, hormones which can be advantageous to absorb and make use of the material. As the important function in the microbial fertilizer bacterium, Staphylococcus pasteurii and Agrobacterium tumefaciens can increase the crop yield and the quality.

This article chooses pumpkins as the selected plant and repairs the DDT pollution soil by different control measures. The results may show the effect of pumpkin repair DDT pollution soil, and whether a threat to human health.

## 2. Materials and methods

### 2.1 Materials

The soil in Shenyang city Xinmin city Dalama Aoduoni village vegetable base, cucurbitaceous plant pumpkin, fertilizer, Staphylococcus pasteurii and Agrobacterium tumefaciens, n-hexane, acetone, chromatographically pure n-hexane and other organic solvents.

## 2.2 Methods

Several experimental groups that deal with soil are designed: the control check group, the plant+ fertilizer group, the plant+ *Staphylococcus pasteurii* group, the plant+ *Agrobacterium tumefaciens*' group, the plant+ *Staphylococcus pasteurii*+ *Agrobacterium tumefaciens*' group. All of the groups are planted through the same cycle. To test the variation of DDT in soil samples before and after the experiment, accelerated solvent extraction, rotary evaporation, solid phase extraction method are elected.

## 3. Results and discussion

As the selected plant, pumpkin showed stronger resistance to DDT and had obvious effect to repair the pollution soil. The combined action of *Staphylococcus pasteurii* and *Agrobacterium tumefaciens*' play a significant role in promoting the repair. Fertilizer was the second one to promote the repair. *Staphylococcus pasteurii* or *Agrobacterium tumefaciens*' almost made nothing in promoting the repair.

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