

The issue of soil pollution solved using organic farming: a case study from Thailand

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INTRODUCTION

This work is part of the Bakery for tomorrow and ECO Bakery for Friendly Environments projects, which focus on producing safe food, achieve zero hunger and a healthy environment to support the SDG 2030. In Thailand, the problem of soil pollution is rising, due to the use of agrochemicals that can have harmful effects on humans, both farmers and consumers, and on the environment, as well as on the rice, which is the main food in Asia. To tackle this problem and improve soil quality, several agricultural methods are proposed, such as organic agriculture and crop rotation, which also have benefits on food safety and the environment. This research proposes the use of organic fertilizers, such as legumes, prior to planting the rice, thus ensuring the safety of the ingredients for bakery and safety rice for human consumption.

OBJECTIVES

In Thailand, there is the increasing problem of soil pollution from the dangerous chemical usage which has an effect on humans, both the farmers and consumers and on the environment by agricultural such as in the rice planting. Normally, the rice can be planted 2 times per year together with other crops or plants such as groundnut, which has a short life cycle. They can cultivate plants that use to be the ingredients of bakery such as leguminous. The root can be plowed and buried as the bio-fertilizer for the rice, which has become the organic matter to improve the soil biological and chemical qualities. Researchers have launched this concept for testing the conducted research in the land where rice is planted.

METHODOLOGY

Random sampling was carried out at 302 sites where farmers were previously known, including water quality and soil properties, to reduce uncertainties. Biological, chemical and physical soil tests were carried out before and after the planting of legumes. The results were analyzed for statistical significance using t-test based on different sample pairs, with the SPSS program. The mean and SD values were taken with tolerance limits of 5%. All data will be evaluated based on 4 levels: excellent, good, moderate and poor.

The results of this experiment show that soil quality improves after the test. In the biological parameters, we find soil bioindicators, such as peanut bugs and macro-fauna and forest lice, which accelerate the rates of decomposition of soil organic matter. Through chemical qualification, it was observed an improvement in soil cation exchange capacity (CEC), an increase in soil buffering capacity, and an increase in soil organic matter content, which reduces the toxicity of aluminum and manganese. The physical qualification shown an increase in soil productivity.

CONCLUSION

Legumes, such as peanuts, green beans, red beans, or soybeans, are suitable for live amendment and the seeds can be used as the ingredients of the bakery. Because they grow quickly, once the seed is harvested, they can be incorporated into the soil by ploughing and decompose in 15-30 days. The leaves and root will serve as fertilizer to increase soil nutrients, improving rice productivity in the next crop.

| One-Sample Test | | | | | | |
|-----------------|---------------|-----|-----------------|-----------------|-------------------------------------------|-------|
| | est Value = 0 | | | | | |
| | t | df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference | |
| | | | | | Lower | Upper |
| Soil_Bio Q | 54.70 | 302 | 0.00 | 2.72 | 2.62 | 2.82 |
| Soil_Chem Q | 56.23 | 302 | 0.00 | 2.23 | 2.15 | 2.31 |
| Soil_Phy Q | 52.29 | 302 | 0.00 | 1.55 | 1.49 | 1.61 |

Table 1: The descriptive statistics of the soil pollution of agricultural solving by organic farming for food safety and friendly environment research has significant $\alpha = 0.05\%$ or 95%, $Z = 0.512$, and critical $t < 1.49$ to $t > 2.82$



Fig 1: Leguminous planting



Fig. 2: Rice Planting



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