

Green Innovations for Farming

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ommercial agriculture is known for over reliance on chemical fertilisers. Recent research has shown that prolonged use of chemical fertilisers in oil palm plantations may cause the top soil to compact and form an impenetrable shell. This prevents fertilisers from seeping into the soil to reach the plant's roots. The compacted soil becomes a run-off track during the monsoon season which channels the fertiliser directly to the drains. In this manner, an estimated 50% of the chemical fertilisers used in oil palm plantations go straight to our rivers. Despite this, the current practise is to load even more fertilisers into the soil in the hope that some of it will reach the plants.

My research has been inspired by the virgin tropical forest, which covers only 2% of the earth's surface but houses about 50% of all land diversity on earth. What makes the soil so productive here are the microbes present in the soil. They release the nutrients from decomposing wood

into the soil and make them available for young trees. The plant roots host microbes which help with nutrient turnover. Just like there are hundreds of species of plants, there is a huge diversity of microbes. The benefits of microbes are well known and their use on an industrial scale is being advocated, especially as fertilisers and soil conditioning agents.

Based on this concept my research collects ideal microbial varieties, isolates and enhances their usefulness as bio-fertilisers while eliminating the harmful microbes which may also be present in the samples collected. Through biotechnological processes such as fermentation, these useful microbes can be scaled up to a large volume for agriculture applications in a formulation that include other beneficial organic matters.

In view of the potential applications of microbial biodiversity in agriculture and biotechnology sector, Swinburne Sarawak has formed research partnerships with the Sarawak Timber Association and the Sarawak Forestry Corporation for forest plantation, and with Daitoku Sdn. Bhd. to develop bio-fertilisers for the palm oil plantations.