



ZYMO BIOGROW / ZYMO GREEN GROW



XYMO BIOFERT / XYMO BIOFERT



XYMO BIONIQ AG / XYMO BIONIQ AG



ZYMO GROWELL / ZYMO GROWELL



ZYMO BIOGUARD WLT604



XYMO BUGTROL



XYMO ULTRA SPECTRUM



XYMO MAX SPREAD

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## OILPALM CULTIVATION IN ZYMO AGRICULTURE SYSTEM

The current agriculture system with indiscriminate use of chemical fertilizers is spoiling the chemical, physical and biological properties of soil, resulting in depletion of soil productivity. Imbalance of soil P<sup>h</sup> and Electrical conductivity resulting in the following hazardous aspects:

1. Accumulation of Chlorides in the rhizosphere due to indiscriminate use of Muriate of Potash (MOP)
2. Increase in rhizosphere P<sup>h</sup> to above 7.5 due to use of Di-Ammonium Phosphate (DAP) and NPK complex fertilizers with P<sup>h</sup> above 7.5

### SOME FACTS ABOUT CHEMICAL FERTILIZERS IN RELATION WITH P<sup>h</sup> AND E.C.:

**UREA:** It has been confirmed that Urea increases the measured P<sup>h</sup> of aqueous solutions

**DAP:** The initial P<sup>h</sup> of DAP solution is Basic (7.5 to 8.5). This will influence the microsite reactions of phosphate and soil organic matter (Zhang et al., 2017)

**MOP:** Muriate of Potash (MOP) is suitable for acidic soils but not for alkaline soils. Most of the NPK fertilizers contain MOP as a source of Potassium as it is a cheap source of Potassium compared to Sulphate of Potash (SOP). Chlorides in MOP will increase the Electrical conductivity of soil.



Most of the essential plant nutrients are available in a P<sup>h</sup> range of 6.5 to 7.5. Hence most of the applied essential plant nutrients in the form of chemical fertilizers are not available to plants due to imbalance of P<sup>h</sup> and EC in the Rhizosphere.

### ROLE OF SOIL MICROBES IN AGRICULTURE:

Soil microbiome - a complete set of microbes that can live in a soil ecosystem is called the Soil microbiome.

Soil Microbes are dynamic components of soil. Soil Microbes perform many beneficial functions in the soil.

Soil microbes are essential for decomposing organic matter and recycling old plant material.

Soil Microbes produce polysaccharides, which is important for the soil aggregation process, which improves the water holding capacity of soil. Rhizosphere competence is much required because some microbes perform well in laboratory conditions but fail to perform when introduced into the soil.

Soil Microbes help in buffering soil P<sup>h</sup> and converting hazardous chemicals into safe forms. They also help in increasing the nutrient use efficiency of existing plant nutrients in the soil.

Indiscriminate use of chemical fertilizers and pesticides kills the beneficial soil microbiome. Sometime conventional agricultural practices like burning crop debris kills beneficial soil microbes.





**ZYMO AGRICULTURE SYSTEM - OIL PALM PROTOCOL**

| Crop     | Category         | Time of Application | Product              | Dose / Plant       | Method of Application                                                                                                                                                                             |
|----------|------------------|---------------------|----------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oil Palm | Soil Application | June - July         | Zymo OPT Supra       | 60 to 80 g/ Plant  | 1. Make 4 holes on 4 sides of the Plant<br>2. The Distance from Tree trunk and holes should be 1 to 1.5 Meters and depth should be 3 to 5 Inches<br>3. Pour Powder in 4 holes and cover with soil |
|          |                  |                     | Biotoniq (Ag) Powder | 10 to 20 g / Plant |                                                                                                                                                                                                   |
|          | Soil Application | October - November  | Zymo OPT Supra       | 60 to 80 g/ Plant  |                                                                                                                                                                                                   |
|          |                  |                     | Biotoniq (Ag) Powder | 10 to 20 g / Plant |                                                                                                                                                                                                   |



Agricultural systems with indiscriminate use of chemical fertilizers and pesticides results in emission of hazardous gases and carbon dioxide (Co<sub>2</sub>) into atmosphere.

Now the current situation demands a new technology to address the above problem. UAL biotechnology recognised the need of the day and come up innovative biotechnology solutions to address the above problems.

UAL Biotechnology (Pvt) Limited did extensive research by coordinating with renowned Agricultural Research institutes in India and abroad. After extensive research we evolved with neo-agricultural system called ZYMO AGRICULTURE SYSTEM with an array of products and protocols. These protocols are being implemented in Indonesia, Malesia, Singapore, Philippines, India etc.,

In India major corporates like Tata Tea and Tata Coffee are implementing these protocols.

The ZYMO and XYMO Products are certified by top national and international agencies like ISO9001:2015, ISO22000:2018, ISO14001:2015, ISO45001:2018, HACCP, UPASI, ECOCERT and FSSAI. The ZYMO and XYMO products are certified as 100 % Organic and contains zero residues of hazardous chemicals.

The crop yields in ZYMO AGRICULTURE SYSTEM are more or less same as that of crop management with chemical fertilizers and pesticides.

**ADVANTAGES OF ZYMO AGRICULTURE SYSTEM:**

1. Helps in increasing population of beneficial microorganisms in the soil.
2. Helps in buffering of Rhizosphere P<sup>H</sup> (Range: 6.0 to 7.5)
3. Helps in increasing availability of fixed nutrients in soil
4. Helps in increasing Nutrient use efficiency form soil and Organic matter
5. Helps in increasing Organic Carbon and soil productivity
6. Helps in increasing biodiversity of soil microbiome
7. Helps in stabilizing C: N ratio of organic matter
8. Helps in increasing water holding capacity of soil
9. Helps in stabilizing the soil temperature
10. Helps in development of immunity in plants against biotic and abiotic stress.
11. Reduces the emission of hazardous gases including Co<sub>2</sub>
12. End products (Fruits, Spices, Vegetables, Grains etc.,) are suitable for export without any harmful residues.

