CHAPTER V
CONCLUSION AND SUGGESTION

5.1 Conclusion

Several important conclusions can be drawn from the current study on Actinobacteria proliferation in biochemical fertilizers made from Palm Oil Mill Effluent Digestate (POMED) and the effects of different NPK concentrations:

1. The ability of actinobacteria to adapt to a wide range of nitrogen (N), phosphorus (P), and potassium (K) levels found in fertilizers based on POMED was impressive.
2. Both higher pH values and higher Colony Forming Unit (CFU) counts across all treatments demonstrated how the enrichment process greatly accelerated Actinobacteria growth. Interestingly, the F3 treatment (15-15-15) showed the fastest relative growth, increasing sixfold, while the F1 formulation (5-5-5) achieved the highest CFU, reaching 820 × 10^8 CFU/g. The samples' pH rose from 6.3–7.3 to 7.2–7.9, suggesting increased microbial metabolic activity and conducive growth conditions.

5.2 Suggestion

Several recommendations are made in light of these findings to direct further study and real-world implementations :

1. It is advised to conduct thorough microbial profiling, which includes enzyme activity tests and DNA sequencing, in order to identify the precise roles that different microbes play in improving soil fertility.
2. To maximize overall microbial performance and boost fertilizer efficacy, more research should examine the functions of other microbial species in POMED-based fertilizers.
3. In order to ensure that POMED-based fertilizers are effective as environmentally friendly agricultural inputs, it is recommended that long-term assessments look at how they affect crop productivity, agricultural sustainability, and soil health.
4. To increase consistency in sample preparation, it is advised to replace manual mixing with mechanical shakers for homogenizing samples.

5. To evaluate how well the fertilizer supports growth and development in actual plant environments, future research should incorporate hands-on plant trials.
6. Future research should use multiple replicates for every treatment to increase the reliability of the results, enabling thorough statistical analysis and reducing sample variability.