

CHAPTER 8

CONCLUSION

The properties of leonardite varied from one deposit to another. Despite the low pH ($\text{pH} < 3$) and low P levels of most leonardite samples, they contained quite high humic acid, major plant nutrients (except for P) and high trace elements. Leonardite from Lee mine gave the highest humic acid content ($>70\%$) followed by leonardite from Mae Moh (35-62%). The analysis of leonardite mineral composition by X-ray diffraction (XRD) showed that all the samples mainly consist of Silica group (quartz: SiO_2), Feldspar group (albite and brushite) and clay minerals (kaolinite, illite and montmorillonite). High Si content in leonardite indicated a good source of Si for plant growth particularly rice seedling vigor and growth. Chemical properties indicated a high potential of leonardite to use as a soil conditioner for soil fertility and crop yield improvement, however, the pH of leonardite should be raised to a suitable value for crop production. In addition to good chemical properties of leonardite, it also contained a certain number of microorganisms i.e. bacteria, fungi and actinomycetes and many of them exhibit a very high potential in cellulase production, phosphate solubilization and indole-3-acetic acid production. Thus, an excellence source of beneficial microbes for development of biofertilizer and other bio-products.

The application of leonardite and improved leonardite had promising effects on SOM, nutrient levels, yield components (tillers and panicles per plant) and grain yield of rice (jasmine rice cultivar KDML105) yield. Under pot experiment, the application of compost alone or with leonardite increased soil organic matter, N, P, and K levels about twice as compared to the control. The combination of improved leonardite and compost (IL + compost (ratio 3:1): 2000 kg/rai) significantly higher number of tillers, number of panicle and grain yield than the control. All the increased parameters did not show significant different from that obtained using chemical fertilizer. A similar trend was found under field experiment. The application of IL + compost (ratio 3:1) at the rate of 2000 kg/rai gave the highest tillers, panicles and grain yield of rice (1059.2 kg/rai). It can be concluded that, among organic fertilizers, the combined effects of improved leonardite

and compost at the rate of 2,000 kg/rai exhibited the highest increase in soil organic matter, plant nutrients and had led to the highest yield components and grain yield of Thai jasmine rice cultivar KDML105. From environmental and economic viewpoints as well as for sustainable soil management, application of IL + compost, 2,000 kg/rai could be recommended for use with lowland rice.



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