

และ carbaryl ลดลงในทุกกรรมวิธี โดยที่การผสมชีวภัณฑ์ผงของแบคทีเรีย ไอโซเลท 17 ร่วมกับการใส่ปูนทำให้ chlorpyrifos และ carbaryl ลดลงได้มากที่สุดคือ (-) 88.3 และ (-) 99.3% ตามลำดับ

จากผลการทดสอบประสิทธิภาพชีวภัณฑ์ชนิดเหลวและชนิดผง แสดงให้เห็นว่า โดยเฉลี่ยแล้วการใช้ชีวภัณฑ์ผงมีแนวโน้มทำให้ค่าโลหะหนักสองชนิดคือ Cd และ As รวมทั้งสารเคมีกำจัดศัตรูพืช 3 ชนิด คือ cypermethrin, chlorpyrifos และ carbaryl ลดลงได้ดีกว่าชีวภัณฑ์ชนิดเหลว นอกจากนี้ ผลการทดลองครั้งนี้แสดงให้เห็นว่า การปรับค่า pH มีผลต่อการเปลี่ยนแปลง และ/หรือการสลายตัวของทั้งโลหะหนักและสารเคมีกำจัดศัตรูพืช



Abstract

Effectiveness evaluation of bacterial isolate 17 and fungal isolate 24 in reduction of pesticides and heavy metals residues using the soils from field plots of Mr. Phanuwat Saelee was performed. The application of bacterial isolate 17 with liming showed lowest amount of As (3.12 mg/kg) with the decrease of (-) 10.40%. The application of bacterial isolates 17 and fungal isolate 24 could reduce the amount of chlorpyrifos to (-) 88.7% (0.0351 mg/kg) and (-) 90.2% (0.0305 mg/kg), respectively. Microbial growth determination in liquid media indicated that MLY⁺ formula 1 gave the highest number of bacterial isolate 17 (2.21×10^9 cfu/ml). In the powder form of bio-product, the carrier mixed media gave the higher number of bacterial isolate 17 than those in biochar + leonardite (1:1) and

perlite. After 15 and 30 days of incubation, mixed media gave the highest number of 1.65×10^8 and 2.62×10^7 cfu/gm, respectively. The effectiveness evaluation of liquid and powder form of bio-product was conducted. At 0 day of incubation, the use of liquid and powder bio-product with liming showed a better tendency to reduce heavy metal than without the bio-product and without liming. Application of liquid bio-product, liming with bacterial isolate 17 resulted in Cd and As reduction to 35.8 and 34.6 mg/kg, with the decrease in percentage of (-) 28.4 and (-) 30.8%, respectively. The application of powder bio-product of bacterial isolate 17 plus liming gave the highest reduction of Cd and As with the values of 28.9 and 24.7 mg/kg, and with the decrease in percentage of (-) 42.3 and (-) 50.6%, respectively. Regarding the amount of pesticides at 0 day of incubation, the use of bio-products both in liquid and powder form could reduce more than (-) 90% of the initial concentration of carbaryl with the remaining value between 0.02 to 0.08 mg/kg. The use of only powder bio-product gave the highest reduction of chlorpyrifos, (-) 82.7%. The treatments that gave the lowest reduction of cypermethrin were the use of only powder bio-product or with liming. The two treatments could reduce the amount of cypermethrin to the lowest values of 1.19 and 1.22 mg/kg with the decrease in percentage of (-) 60.3 and (-) 59.3%, respectively. At 30 days after incubation, the results of effectiveness evaluation of liquid bio-product showed that liming and blending with liquid bio-product of bacterial isolate 17, gave the lowest reduction of Cd and As with the reduced values of (-) 35.9 and (-) 39.1%, respectively. Pesticides analysis indicated that the same treatment gave the lowest reduction of cypermethrin, chlorpyrifos and carbaryl with the values of (-) 92.7, (-) 82.0 and (-) 99.0%, respectively. The same trend was found with the powder bio-product. The highest effectiveness was found with liming plus powder bio-product of bacterial isolate 17 but with higher reduced values of Cd and As; (-) 45.0 and (-) 58.5%, respectively. The results of pesticides analysis indicated that the use of only powder bio-product or together with liming could reduce similar amount of cypermethrin with the reducing percentage of (-) 93.7 and (-) 93.0%, respectively. The amount of chlorpyrifos and carbaryl were reduced in all the treatments. The highest reduction of chlorpyrifos and carbaryl were found with the use of powder bio-product plus liming with the reduced values of (-) 88.3 and (-) 99.3%, respectively.

Effectiveness determination of liquid and powder bio-products indicated that, on the average, the powder form of bio-product showed a better tendency to reduce the two heavy metals; Cd and As, and three types of pesticides; cypermethrin, chlorpyrifos and carbaryl, than the liquid form. In addition, the results of this

experiment suggesting that pH adjustment had the influences on change and degradation of heavy metal and pesticides.

