Abstract

The use of agricultural bio-products for cultivation on highland reduce chemical hazards to the health of farmers and consumers, including the accumulation of toxins in the environment. To obtain quality and appropriate products for highland conditions, so researcher researched and developed bio-products from microbes and plants from highland. The study showed that (1) suitable carrier for antagonistic bacteria isolate 98 inoculum production to bio-product powder formulation which prevent stem rot *Botrytis* of capsicum was 300 g corn starch and 700 g talcum, cost of materials and labor was 61 baht/kg. The bacteria concentration of post-production was 4.56×10^{10} CFU/ml that could inhibit growth of pathogenic fungi mycelium of 87.04% and after 6 months of bio-product storage, the concentration was 1.33×10^{9} CFU/ml, but the use rate and duration must be selected, at a rate of 70 g/20 l of water, sprayed every 14 days, there is a good tendency (2) 8 isolates of bacteria, namely 21, S11 ,S14 ,S18 ,S20, S23, S36 and S43 including a concentrated extract from 5 types plant of eucalyptus leaves, pine leaves, basil, mint and sweet basil both water solvent extraction and 95% ethanol solvent extraction showed 100% inhibition for *Amaranthus viridis*, *Tridax procumbens* and *Eleusine indica* seed germination in laboratory. Culture media molasses formula consist of 10 g molasses, 0.5 g yeast extract, 0.5 g K_2HPO_4, 0.2 g $MgSO_4$, 0.1 g NaCl and its cost was 2.38 baht/l including extracts from pine leaves, eucalyptus leaves and basil for future studies (3) bio-product to prevent the soil-borne disease produced from antagonist bacteria isolates FT2, MTR13 and HRS8 in carrier consist of 300 g corn starch and 700 g talcum, cost of the carrier was 58.00 baht/kg. The cell concentration after production for 3 months storage was 2.7×10^{9} CFU/ml and 2.1×10^{9} CFU/ml could inhibit *Rhizoctonia solani*, *Pythium aphanidermatum*, *Fusarium oxysporum* and *Ralstonia solanacearum* was 50-65% after put the bio-product in pit before pepper, eggplant and kale trees transplantation at ratio of 10 g/plant in greenhouse tests. However the bio-product lower performance than using chemical, Terraclor Super-X (etridiazole+quintozene) (60-75%) therefore need to select new using methods. (4) Quality assessment of bio-products and chemical substitution agents from researches showed that (4.1) Spray of bio-product to prevent gray mold at a rate of 5 g/20 l of water per week, cost of 0.487 baht/time, causing the gray mold to be greatly reduced at 58.69%, resulting in the satisfaction of the farmers at a medium level while the use of chemicals reduced by 72% but with a higher cost (60.00

baht/time) (4.2) *Metarhizium* and *Beauveria* bio-products at 60 g/20 l of water, sprayed 2 times/week cost 3.80 and 4.30 baht/time shown effective in eliminating flea up 81.33% and 81.67%, not different to the chemical Spiromesifen and Propargite at 10 cc/20 l (83.34%) at a cost of 29.00 and 67.00 baht/time (4.3) Spray of chemical, 30 g Mancozeb, 20 cc Pyraclostrobin and 10 cc/20 l of water alternately 2 times/week reduces white rust on chrysanthemum (One Way Improved) to 3.00%, while bio-product at rate of 40 g and petroleum oil at rate of 600 ml/20 l of water, diseases of 11% and 15%, but the cost of using bio-product 4.57 baht/times lower than chemical and (4.4) mixed curcuma bulbs before planting at the rate of 1 g/bulb and pour around the base of the curcuma tree (Chiang Mai Pink) at rate of 400 g/20 l of water for every 1 month to 3 times reduces the wilt disease from *Ralstonia solanacearum* up 99% and 96% did not differ with chemicals Metalaxyl of 1 g/bulb caused 4% of the disease (2nd farmer's plot) and the unmanaged process (22%). Farmer's revenue had the highest loss of 192, 480, 576 and 1,056 baht, remaining income after deduction of damages and cost of plant protection substances were 4,336.146, 4,048.146, 3,952.146, 3,472.146 bath for 400 curcuma trees planting (12 bath/tree)

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