VI6-Y-003

Production and effectiveness of SMART® organic fertilizer from marine biowastes

Thazin Han*, Kyaw Nyein Aye, Nitar Nwe

Department of Biotechnology, Yangon Technological University, Ministry of Science and Technology, Yangon, Myanmar

E-mail address: thazinhann@gmail.com (T. Han).

Nowaday, organic fertilizers play an important role in agriculture to prevent environmental pollution while having high yield, safety products and shorter harvesting time of crops. This research has applied bioagents from plenty of marine waste materials to obtain valuable products for agricultural development in Myanmar. For sustainable agriculture, the National Program on Biotechnology aims to promote researches on bioagents and natural agents by gradually replacing chemical fertilizers in the fields. Chitosan from shrimp's shell is a natural polymer, low and moderate molecular weight should be used as a seed coating agent, plant growth promoter, fungicide and insecticide. Fish products also have been used as foliar fertilizers to improve crop yield, seed germination, insect and fungal disease resistance and low temperature tolerance. Bamboo vinegar has been applied as pest control agent, anti-fungal and anti-bacterial agents. Combination of those natural agents (SMART®), chitosan from shrimp shells 50 ppm, fish amino acid 80 ppm from unmarketable fish and bamboo vinegar 20 ppm from bamboo have been produced to formulate a smart organic fertilizer for economic crops production. The yields of chick pea obtained from SMART® organic fertilizer applied fields and chitosan solution (50 ppm) applied fields were significantly higher than 1% acetic acid applied fields and water only applied fields. Moreover, SMART® organic fertilizer applied fields could be harvested 7–10 days earlier and resulted higher yield of chick pea, 2945 ± 35.86 kg/ha than chitosan only applied fields, 2777.8 ± 8.6 kg/ha. Seeds were soaked in chitosan solution (100 ppm), 1% acetic acid and water and germinated 97%, 89% and 85%, respectively, in chick pea. The effect of SMART® organic fertilizer on cotton production was 1836 ± 172 kg/ha and control was 1326 ± 8.5 kg/ha. Therefore, biowastes are proposed to apply in Myanmar agriculture to obtain high and safety production in short period toward the economy of the country.

References

Booth, E., 1965. The manurial value of seaweed. Bot. Marina 8, 138–143.
Dzung, N.A., Thang, N.T., 2002. Adv. Chitin Sci. 11, 463–467.
Dzung, N.A., 2003. Forest and aquaculture. In: Proceedings of First National Conference on Agriculture, pp. 12–15.

doi:10.1016/j.jbiotec.2008.07.1189

VI6-Y-011

Antifouling potential of marine sessile organisms from the southeast coast of china against the barnacle *Balanus albicostatus*

Danqing Feng*, Caihuan Ke, Changyi Lu, Shaojing Li

Key State Laboratory of Marine Environmental Science, College of Oceanography and Environmental Science, Xiamen University, Xiamen 361005, China

E-mail address: dqfeng@xmu.edu.cn (D. Feng).

Marine fouling organisms constitute a worldwide technical and economical problem. Environmental and human health problems associated with the use of toxic antifoulants makes it a necessity to develop environmentally friendly alternatives (Yebra et al., 2004). The present study investigated the antifouling activity of a series of hexane, ethyl acetate, ethanol and aqueous extracts from *Ulva pertusa*, *Thalassia hemprichii*, *Enhalus acoroides*, *Tedania anhelans*, *Halichondria* sp., *Bugula neritina*, *Tubularia mesembryanthemum*, *Anthopleura* sp., *Notarcus leachii cirrosus*, *Styela plicata* and *Styela canopus* from the southeast coast of China. Settlement inhibition of cyprid larvae of the barnacle *Balanus albicostatus* was used to evaluate antifouling efficacy. The EC_{50} value (the concentration of extract that reduced the settlement rate by 50% relative to the control) was estimated using the Spearman–Karber method. Screening of the 44 extracts showed antifouling activity in 90.9% of the hexane extracts followed by 90.9% of ethyl acetate, 72.7% of ethanol, and 36.4% of aqueous extracts. The hexane extracts of *T. mesembryanthemum*, *N. leachii cirrosus* and *S. canopus*, the ethyl acetate extracts of *B. neritina* and *N. leachii cirrosus*, and the ethanol extracts of *B. neritina* and *Anthopleura* sp. were the most active in inhibiting *B. albicostatus* settlement, with EC_{50} all below 50 μg/mL. At least 1 of the 4 extracts of each tested species exhibited antifouling activity, suggesting that all 11 marine sessile organisms harbored antifouling substances and they may have evolved chemical defenses against biofouling on their surfaces. The present findings could form the basis for exploring the compounds responsible for antifouling activity in these marine sessile organisms, which could be exploited not only for elucidating their potential chemical antifouling mechanisms but also for developing novel antifouling technology.

Reference

Yebra, D.M., Kiil, S., Dam-Johansen, K., 2004. Antifouling technology—past, present and future steps towards efficient and environmentally friendly antifouling coatings. Prog. Org. Coat. 50, 75–104.

doi:10.1016/j.jbiotec.2008.07.1190

VI6-P-001

Bromophenol derivatives from algae, novel inhibitors of PTP1B as potential agents for treatment of T2DM

Dayong Shi*, Feng Xu, Xiaohong Li, Jing Li, Shuju Guo, Lijun Han

Center of Bioengineering and Technology, Institute of Oceanology, Chinese Academy of Sciences, Qingdao 266071, China

E-mail address: shidayong@ms.qdio.ac.cn (D. Shi).

Protein tyrosine phosphatase 1B (PTP1B) plays an important role as a negative regulator in insulin signaling pathways (Goldstein et al., 2000). PTP1B is an effective target for the treatment of type 2 diabetes mellitus (Elchebly et al., 1999). In order to discover new type inhibitors of PTP1B for treatment of T2DM, inhibitory activities against PTP1B of compounds were screened by colorimetric assay. The anti-hyperglycemic effects of ethanol extraction of *Rhodomela confervoides* on streptozotocin-diabetes (STZ-diabetes) with high fat diet in male Wistar rats were investigated. Four bromophenol derivatives from red algae *R. confervoides* (Fan et al., 2003), 3,4-dibromo-5-(methoxymethyl)-1,2-benzenediol (1), 2-methyl-3-(2,3-dibromo-4,5-dihydroxy)-propylaldehyde (2), 3-(2,3-dibromo-4,5-dihydroxy-phenyl)-4-bromo-5,6-dihydroxy-1,3-dihydroiso-benzofuran (3) and 3-bromo-4-[2′,3′-dibromo-4′,5′-dihydroxypheny]methyl-5-(ethoxymethyl)-1,2-benzenediol (4) showed significant inhibitory active against PTP1B (IC_{50} were 3.4, 4.5, 2.8 and 0.83 μmol L^{-1}, respectively) as potential therapeutical agents for the treatment of T2DM. The STZ-diabetic rats treated with medium-dose and high-dose extraction of alga showed a