ABSTRACT

Rapid developments and tourism related activities in Islands have increased the per capita waste generation that led to increased waste disposal at landfill. To date, islands in Malaysia are generating approximately 400 metric tons of MSW. Approximately 60% of the waste are collected and disposed off in non-sanitary landfills. The remaining 35 % were illegally burned/ dumped and 5 % were dumped into ocean. 100% of landfills in Malaysian islands operate as mere open-dumps that lack proper lining system and without leachate treatment facilities. The vicinities bordering non-sanitary landfill sites became highly polluted due to certain harmful gases/ leachate generated from waste filled surface and hazardous chemicals. This had triggered a serious environmental health and safety problems to the citizens as well as that of the tourist. Information on the quantity and quality of solid waste generated is fundamental to almost all aspects of MSW management. To date, data on MSW management in Malaysian islands are lacking and requires serious attention. This project presents and discuss waste generation, composition, characterization and current waste management practices in four tourist islands namely Redang, Tioman, Pangkor and Langkawi. MSW samples were collected everyday for seven continuous days (Monday – Sunday) and segregated by manual sorting into individual waste components at each island. Segregated samples were composited and brought to the laboratory, and analyzed for proximate, ultimate and calorific value. Surveys were conducted to gather information on current waste management practices and effectiveness. The MSW generation rate for islands was in the range of 0.5 – 1.1 kg/person/day. Different socio-economic development and the degree of urbanization influenced waste generation rates in the islands. Among the four islands studied, Langkawi (urban island) has the highest waste generation and better waste management in place. While, Redang (rural island)

generates less waste and showed poor waste management. Redang do not have any waste disposal site in the Island and transported the MSW to mainland for disposal. Poor waste collection and interruption of MSW transportation service to mainland during the monsoon season were identified as major MSW management problem. The waste composition results indicate that food waste as the main waste component with 31.8 %, followed by paper (21.0 %) and plastic (14.3%). Since island MSW has equally 42.5 % compostable and 42.5 % recyclables in the waste stream, composting can be incorporated at all the landfills together with an integrated system of recycling. Study indicate that if MSW separated at source and treated in integrated approach of the municipal wastes generated in the island, almost 85 % of the waste can be diverted from the landfill. Island MSW has high moisture content of 69 (± 7) % and very low calorific value of 2501 (± 193) kcal/kg which was not cost-effective for incineration and energy recovery. These explained the failure of six units of mini-incinerator with a capacity of 3 to 20 metric ton/day with an overall cost of RM 17 million (US 4.6 million) in the Islands. MSW management in Malaysian Islands is still at an infant stage and challenges encountered were aesthetically displeasing sites, inefficient waste collection/ transportation, improper waste disposal method, marine pollution and lack of public awareness. These issues were discussed and suggestions made.