



EFFECT OF CONDITIONING OF A MICROBIAL CONSORTIUM ON THE FIRST STAGE OF ORGANIC SOLID WASTES DEGRADATION

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Introduction. Addition of microbial consortium could accelerate aerobic degradation of organic solid waste (OSW), under controlled conditions. Respirometry is an indirect method for monitoring aerobic processes providing information on the respiration rate in terms of CO₂ production or O₂ consumption. The aim of this study was to assess the effect of the addition of a conditioned mixed microbial consortium during the first stage of the aerobic degradation of OSW.

Methods. Conditioned microbial consortium consisted of dry cow manure (2/5, w:w) and dry compost maturity (3/5, w:w). This material was impregnated with a mineral medium containing (g/L): NaCl: 2; K₂HPO₄: 2; MgSO₄: 1; C₆H₁₂O₆: 30; (NH₄)₂SO₄: 14 [1]. Approximately 25 g of the wet material (60 % moisture) was packed in glass columns and incubated at 35°C under aerobic conditions during 8 h. Then this conditioned (activated) consortium was mixed with fresh OSW coming from fruits and vegetables and bulking agent [2]. Two assays were realized with and without microbial consortium. Assays were carried out as reported early [3]. Air supply was kept at 1.0 ml/min/g. The CO₂ (%) and O₂ (%) in exit air, were continuously monitored. Temperature was controlled at 35 °C and initial humidity was set at 70%

Results. Figure 1 shows the CO₂ production rate during the process aerobic digestion of OSW. In assays added with conditioned microbial consortium the maximum production rate was almost twice (10 mgCO₂/gDM/h) compare to that without conditioned microbial consortium (5 mgCO₂/gDM/h). Nevertheless the time required to reach the maximum of CO₂ production rate was close to 35 h and 24 h for activated and not activated microbial consortium, respectively. After reaching the maximum rate of CO₂ a constant decrease was observed for both cases.

Some authors recommend the addition of media as a source of nutrients to improve the preparation and/or conditioned of

microorganisms in order to increase organic waste degradation [4, 5].

Some times, utilization of microbial consortium could be a controversial approach, since the results are not easy to compare because of different methodologies used. In this work it is clearly demonstrate of convenience of using conditioned (adapted) microbial consortium in order to accelerate the aerobic conditions promotes partial degradation of organic solid waste (OSW), under controlled conditions, degradation of OSW.

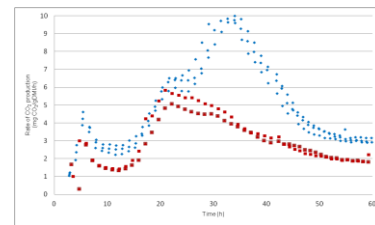


Fig.1 Rate of CO₂ production during first stage of aerobic degradation of OSW. Assay with (◇) conditioned microbial consortia and (□) no conditioning

Conclusions. Using of conditioned (adapted) microbial consortium, composed of cow manure and compost, was considered as positive to accelerate the degradation of OSW under controlled aerobic conditions.

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