Supporting Information

Biodegradation and Mineralization of Polystyrene by Plastic-Eating Mealworms. 1. Chemical and Physical Characterization and Isotopic Tests

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7pages, 5figures, and 1 table

Supplementary Figures

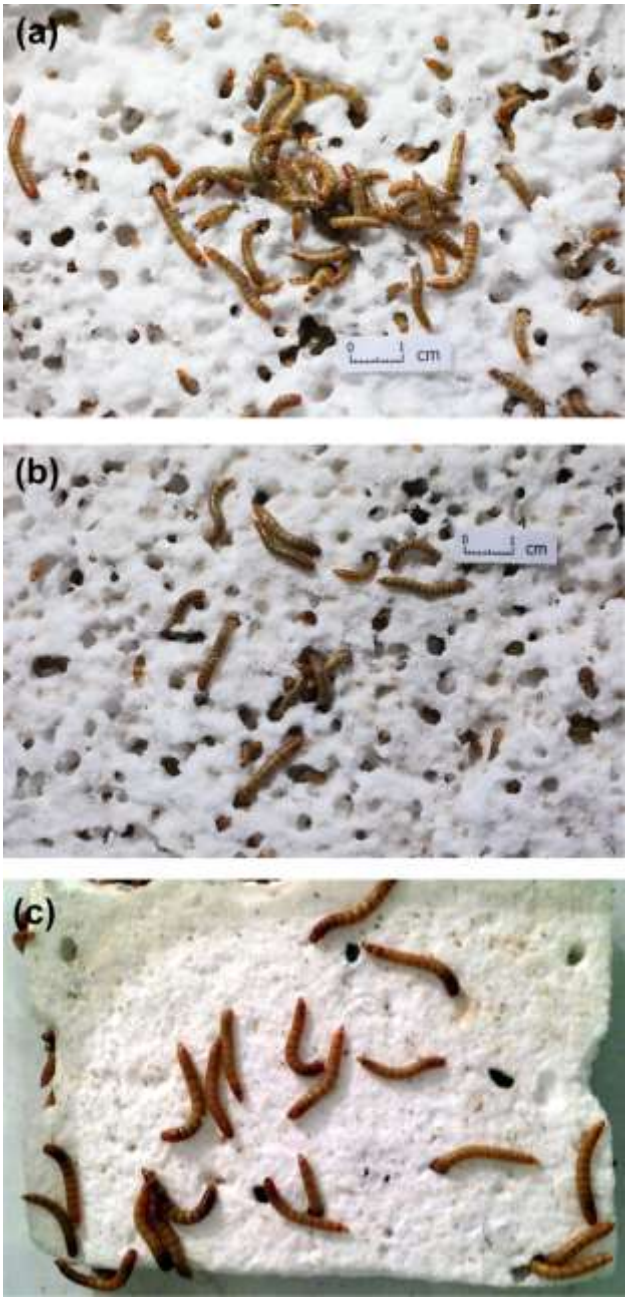
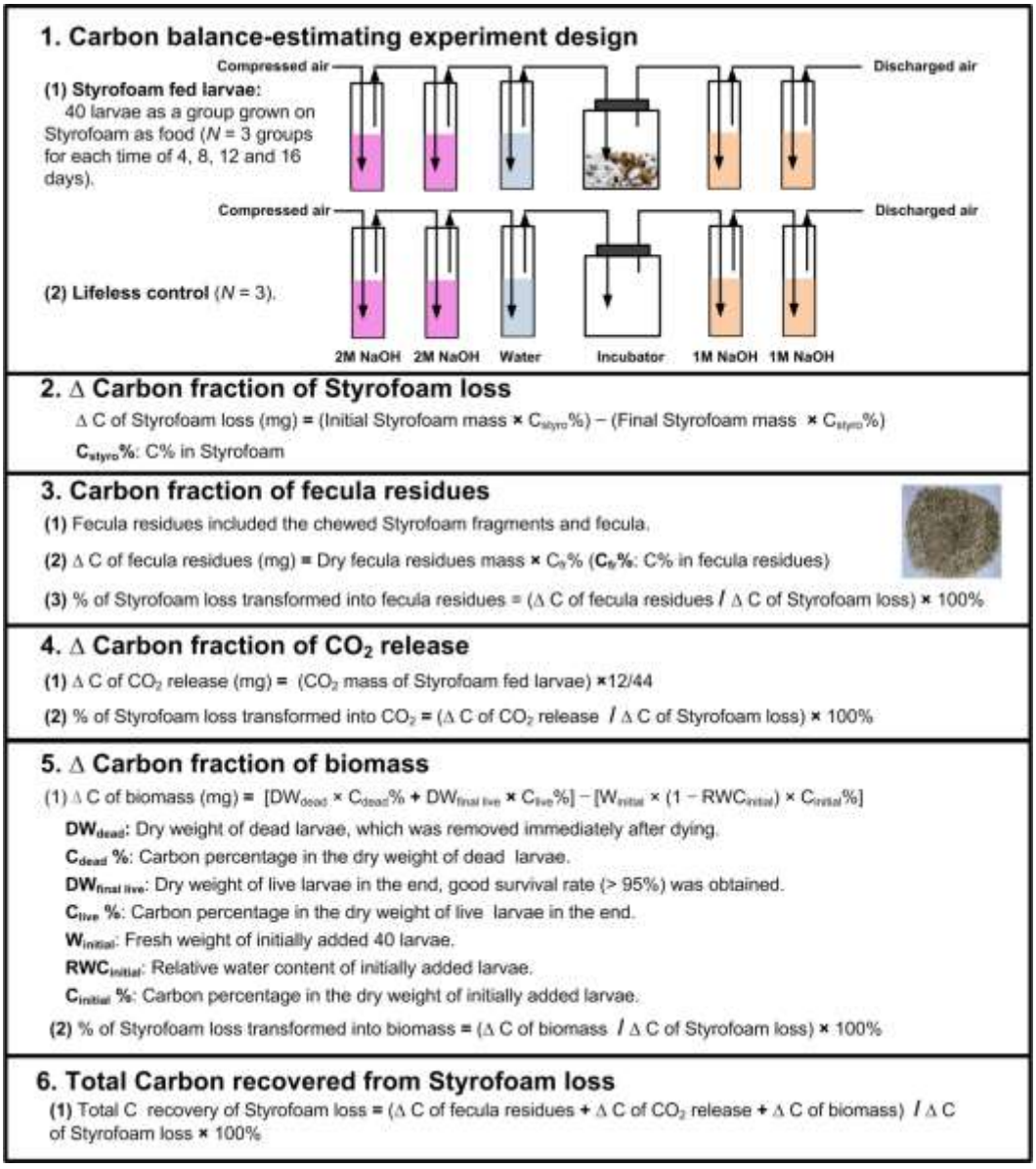


Figure S1. Styrofoam-eating mealworms from three different sources: Beijing (500 worms), China (**a**), Qinhuangdao (500 worms), Hebei, China (**b**)and Ham Lake (50 worms), MN, the USA (**c**).



FigureS2. Procedures and calculation used to estimate carbon balance of Styrofoam loss, fecula residues, CO_2 and biomass in batch Styrofoam-feeding trails. Carbon element percentageof the Styrofoam was determined by using an Elemental Analyzer (Vario EL, USA).

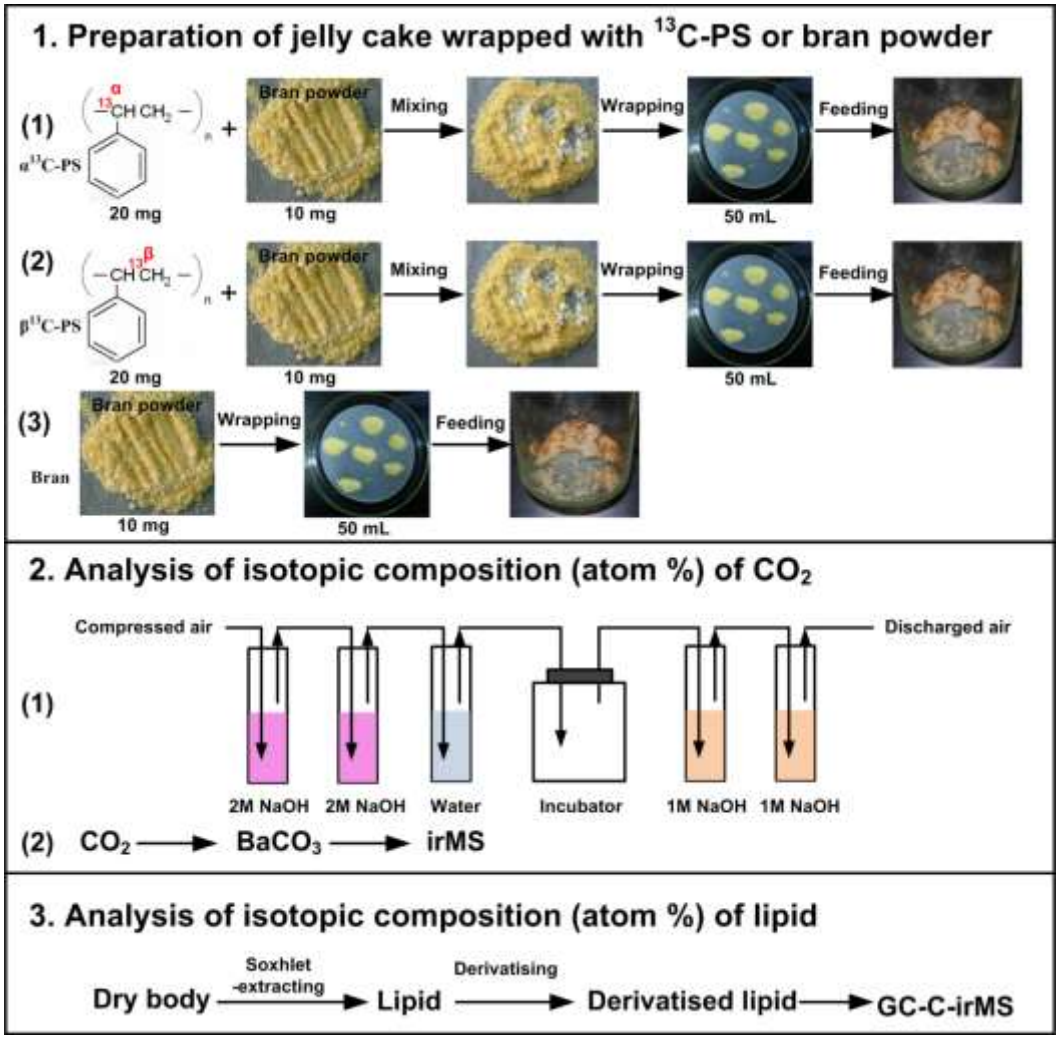
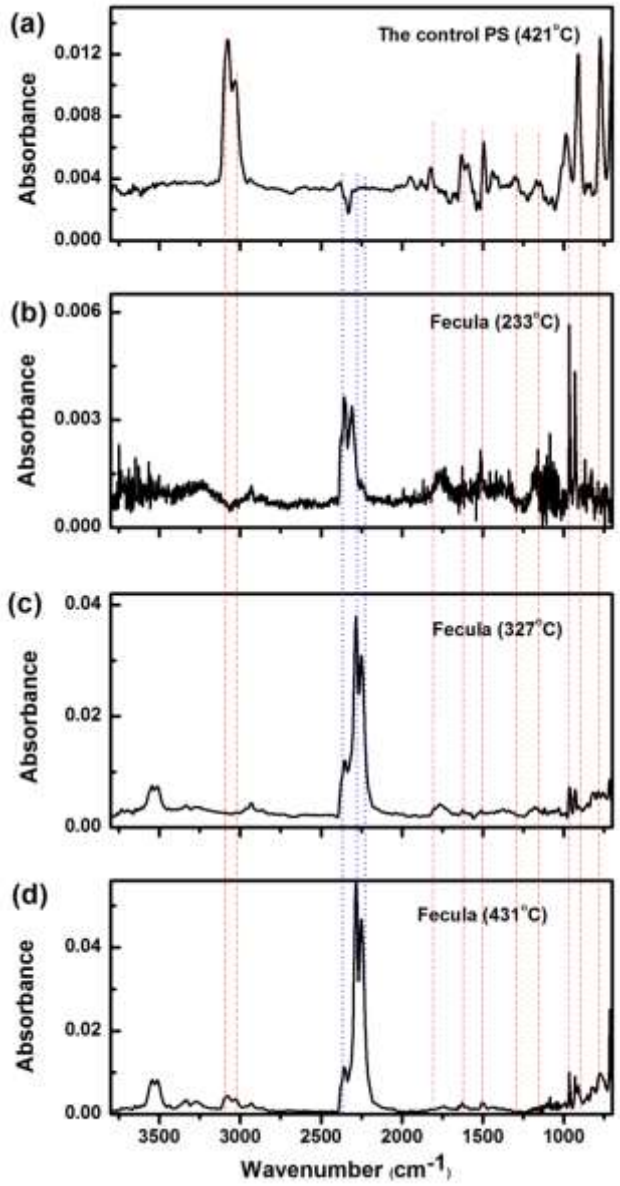


Figure S3. Procedures for ^{13}C stable carbon isotope tracer experiments.irMS: isotope ratio mass spectrometry, GC-C-irMS: gaschromatography-combustion-isotope ratio mass spectrometry.



FigureS4.TGA-FTIR thermograms representing absorbance with respect to temperature (^{o}C) and wave number (cm^{-1}).(a) FTIR spectra of the evolved gas in the maximumdecomposing rate temperatures (421 ^{o}C) of the control sample of Styrofoam. (b-d) FTIR spectra of the evolved gas in the three maximum decomposing rate temperatures (233,327 and 431^{o}C) of the three decomposition stages of the fecula.

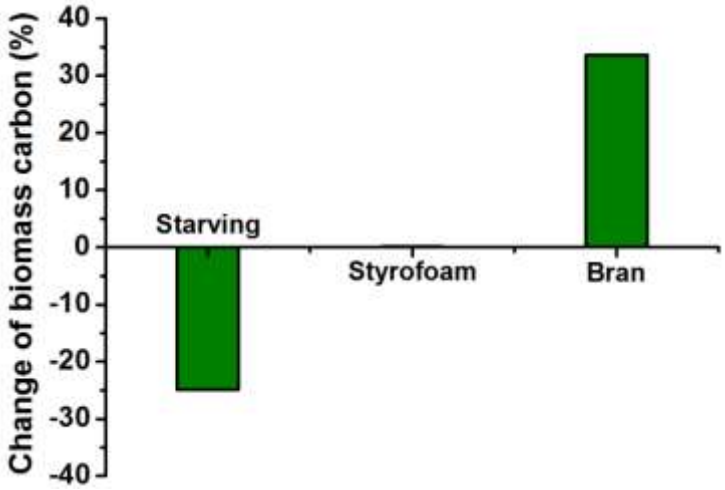


Figure S5. Impact of feeding condition on the biomass dry weight of mealworms after 16-day test period. The starving group lost 24.9% of dry weight; Styrofoam-feeding group increased only 0.2 % of dry weigh; and bran-feeding group increased weight by 33.6%. 40 mealworms as a group and triplicate were used for each condition.

Table S1. Characterization of Styrofoam feedstock (the controlpolystyrene).

	Chemical property	**Method**
Chemical composition	> 98.0% polystyrene	TG-FTIR
Chemical composition	All resonance signals attributed to polystyrene	^{13}C CP/MAS NMR
Molecular weight	M_n=40,430; M_w=124,200	GPC
Residual styrene	< 0.1%	GC