Supplementary Materials Table Captions:

Figure S1 Fertilizer particle model.

Table S1 The material properties and other relevant contact parameters.

Figure S1 Fertilizer particle model.

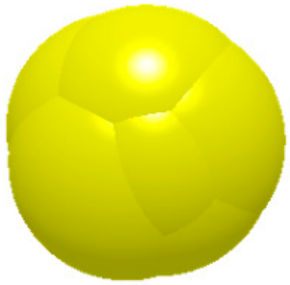	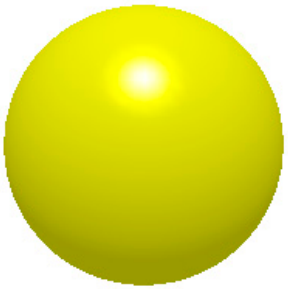
a. Quick acting fertilizer model	b. Slow release fertilizer model
Figure S1. Fertilizer particle model	

Table S1 The material properties and other relevant contact parameters.

Table S1

The DEM parameters of the materials.

Materials	Poisson ratio	Shear modulus (GPa)	Density (g/cm3)
Quick acting fertilizer	0.25	0.27	1.571
Slow release fertilizer	0.21	0.32	1.320
PLA	0.29	0.22	1.110
Nylon	0.31	0.05	1.220

The DEM parameters of contacts between materials.

Material Contact	Restitution coefficient	Static friction coefficient	Rolling friction coefficient
QAF-QAF	0.28	0.42	0.13
QAF-SRF	0.31	0.32	0.11
SRF-SRF	0.35	0.26	0.08
QAF-PLA	0.29	0.30	0.09
QAF-Nylon	0.35	0.35	0.08
SRF-PLA	0.42	0.24	0.06
SRF-Nylon	0.45	0.14	0.05