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Fast Treatment of Food Waste Utilizing a Smart Food Recycle Bin (S-FRB)

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Food waste treatment technology should be simple to maintain, quick, economical, environmentally friendly, and socially acceptable. This research aims to accelerate food waste treatment and produce high-quality fertilizer using a smart food recycling bin (S-FRB). S-FRB is a portable household-appropriate technology, consisting of a semiautomatic chopper, stirrer, and drying unit. In this smart bin, a highest matrix temperature of 57°C can be achieved. To start compost production, addition of a combination including a bioactivator (16g) + dolomite lime (1g) + bulking agent to the food waste in a ratio of 70:30, v/v is needed. During utilization, the water content decreases from 78.94% to 30% in 7 days, and the pH matrix turns from initially 7.5 to 8.0. Compost produced from food waste using the S-FRB has matured within 7 days and meets quality standards of SNI 19-7030-2004. The

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produced compost has 18.41% C-organic, 1.23–1.63% total N, smells like soil, and is black. The used combination of bulking agent/bioactivator/lime is effective for processing food waste into compost. The S-FRB system is a practical way to solve the problem of recycling food waste into compost without having to be taken to a final processing plant. © 2022 Wiley-VCH GmbH.

Author keywords

compost; fertilizer; food waste; household scale; waste

Indexed keywords 

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References (41)

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-
- 1 Adani, F., Baido, D., Calcaterra, E., Genevini, P.
The influence of biomass temperature on biostabilization-biodrying of municipal solid waste

(2002) *Bioresource Technology*, 83 (3), pp. 173-179. Cited 162 times.
doi: 10.1016/S0960-8524(01)00231-0

[View at Publisher](#)

-
- 2 Azizah, A.
(2017) *MSc Thesis*
Universitas Diponegoro

-
- 3 Bindra, N., Dubey, B., Dutta, A.
Technological and life cycle assessment of organics processing odour control technologies

(2015) *Science of the Total Environment*, 527-528, pp. 401-412. Cited 31 times.

www.elsevier.com/locate/scitotenv
doi: 10.1016/j.scitotenv.2015.05.023

[View at Publisher](#)

-
- 4 Ika, B.P., Irawan, W.W.
(2018) *Sustinere: J. Environ. Sustainability*, 2, p. 156.

-
- 5 Choi, H.L., Richard, T.L., Ahn, H.K.
Composting high moisture materials: Biodrying poultry manure in a sequentially fed reactor

(2001) *Compost Science and Utilization*, 9 (4), pp. 303-311. Cited 51 times.
doi: 10.1080/1065657X.2001.10702049

[View at Publisher](#)

- 6 de Bertoldi, M., Vallini, G., Pera, A.
The Biology of Composting: A Review

(1983) *Waste Management & Research*, 1 (2), pp. 157-176. Cited 496 times.
doi: 10.1177/0734242X8300100118

View at Publisher
-
- 7 (2001) *Compost Maturity Index*. Cited 78 times.
California Compost Quality Council, Nevada
-
- 8 Eitzer, B.D.
Emissions of Volatile Organic Chemicals from Municipal Solid Waste Composting Facilities

(1995) *Environmental Science and Technology*, 29 (4), pp. 896-902. Cited 142 times.
doi: 10.1021/es00004a009

View at Publisher
-
- 9 Bennbaia, S., Wazwaz, A., Abujarbou, A.
Towards sustainable society: Design of food waste recycling machine

(2018) *Proceedings of the International Conference on Industrial Engineering and Operations Management*, 2018 (JUL), pp. 1340-1353. Cited 4 times.
<http://iieom.org/iieom2015/iieom.org>
-
- 10 Wiharyanto, O., Mochtar, H., Ika, B.P., Purwono, P.
(2018) *3rd Int. Conf. Energy, Environmental and Information System*, 73, pp. 1-4. Cited 2 times.
(Ed, Hadiyanto, DP Sciences, Semarang, Indonesia)
-
- 11 Yasuhara, A., Fuwa, K.
(1977) *Bull. Chem. Soc. Jpn.*, 50, p. 731. Cited 24 times.
-
- 12 Yuan, J., Li, Y., Zhang, H., Zhang, D., Chadwick, D., Li, G., Wang, G., (...), Yang, F.
Effects of adding bulking agents on the biodrying of kitchen waste and the odor emissions produced

(2018) *Journal of Environmental Sciences (China)*, 67, pp. 344-355. Cited 36 times.
<http://www.journals.elsevier.com.proxy.undip.ac.id:2048/journal-of-environmental-sciences/>
doi: 10.1016/j.jes.2017.08.014

View at Publisher
-
- 13 Ab Jalil, N.A., Basri, H., Ahmad Basri, N.E., Abushammala, M.F.M.
Biodrying of municipal solid waste under different ventilation periods (Open Access)

(2016) *Environmental Engineering Research*, 21 (2), pp. 145-151. Cited 12 times.
<http://www.eeer.org/upload/eeer-21-2-145.pdf>
doi: 10.4491/eeer.2015.122

View at Publisher
-

-
- 14 Yang, F., Li, G.X., Yang, Q.Y., Luo, W.H.
Effect of bulking agents on maturity and gaseous emissions during kitchen waste composting

(2013) *Chemosphere*, 93 (7), pp. 1393-1399. Cited 214 times.
www.elsevier.com/locate/chemosphere
doi: 10.1016/j.chemosphere.2013.07.002

View at Publisher
-
- 15 Bernal, M.P., Albuquerque, J.A., Moral, R.
Composting of animal manures and chemical criteria for compost maturity assessment. A review

(2009) *Bioresource Technology*, 100 (22), pp. 5444-5453. Cited 1563 times.
doi: 10.1016/j.biortech.2008.11.027

View at Publisher
-
- 16 Van Fan, Y., Tin, C., Roji, M., Woh, C.
(2017) *J. Environ. Manage.*, 216, p. 41.
-
- 17 Sarkar, S., Pal, S., Chanda, S.
(2016) *Proc. Environ. Sci.*, 35, p. 435. Cited 31 times.
-
- 18 Fang, Y., Jia, X., Chen, L., Lin, C., Zhang, H., Chen, J.
Effect of thermotolerant bacterial inoculation on the microbial community during sludge composting

(2019) *Canadian Journal of Microbiology*, 65 (10), pp. 750-761. Cited 19 times.
www.nrc.ca/cgi-bin/cisti/journals/rp/rp_desy_e?cjm
doi: 10.1139/cjm-2019-0107

View at Publisher
-
- 19 Noor, E., Rusli, M.S., Yani, M., Halim, A., Reza, N.
(2005) *J. Teknol. Ind. Pertanian*, 15, p. 40.
-
- 20 Danner, S.
(2010) *J. Agroqual.*, 8, p. 2.
-
- 21 Chew, K.W., Chia, S.R., Show, P.L., Ling, T.C., Arya, S.S., Chang, J.-S.
Food waste compost as an organic nutrient source for the cultivation of *Chlorella vulgaris*

(2018) *Bioresource Technology*, 267, pp. 356-362. Cited 68 times.
www.elsevier.com/locate/biortech
doi: 10.1016/j.biortech.2018.07.069

View at Publisher
-

- 22 Som, M.-P., Lemée, L., Amblès, A.
Stability and maturity of a green waste and biowaste compost assessed on the basis of a molecular study using spectroscopy, thermal analysis, thermodesorption and thermochemolysis
(2009) *Bioresource Technology*, 100 (19), pp. 4404-4416. Cited 74 times.
doi: 10.1016/j.biortech.2009.04.019
View at Publisher
-
- 23 Chang, B.V., Lu, Y.S., Yuan, S.Y., Tsao, T.M., Wang, M.K.
Biodegradation of phthalate esters in compost-amended soil
(2009) *Chemosphere*, 74 (6), pp. 873-877. Cited 49 times.
doi: 10.1016/j.chemosphere.2008.10.003
View at Publisher
-
- 24 Sadaka, S., Vandevender, K., Costello, T., Sharara, M.
(2011) *Partial Composting for Biodrying Organic Materials*. Cited 15 times.
University of Arkansas, Fayetteville, NC
-
- 25 Mendoza Chávez, E.A., Márquez-Benavides, L., Sánchez-Yáñez, J.M., Buenrostro Delgado, O., Rutiaga-Quiñones, J.G.
Effects of leachate recirculation on the physical and chemical MSW properties under anaerobic digestion
(2013) *Revista Internacional de Contaminacion Ambiental*, 29 (SUPPL. 3), pp. 73-78. Cited 2 times.
<http://www.journals.unam.mx/index.php/rica/article/download/43636/39545>
View at Publisher
-
- 26 Fadlilah, N., Yudiyanto, G.
(2013) *Tek. POMITS*, 2, p. 289. Cited 4 times.
-
- 27 Nugroho, J., Rahmi, N., Setyowati, P.
(2011) *Prosiding Seminar Nasional Perteta 2011*, p. 775.
(Ed, E. Suryadi, Jember University Press, Bandung, Indonesia, p
-
- 28 Purwono, P., Hadiwidodo, M., Rezagama, A.
(2016) *J. Presipitasi*, 13, p. 75. Cited 3 times.
-
- 29 Ayuningtyas, D.N.
(2009) *MSc Thesis*
Institut Pertanian Bogor
-
- 30 Siswanto, M.H., Fausiah, M.A.
(2012) *Sinas Research Incentive Seminar*
A. D. Gunadi, IPB, Semarang, Indonesia
-

-
- 31 Mehl, J., Kaiser, J., Hurtado, D., Gibson, D.A., Izurieta, R., Mihelcic, J.R.
Pathogen destruction and solids decomposition in composting latrines: Study of fundamental mechanisms and user operation in rural Panama ([Open Access](#))

(2011) *Journal of Water and Health*, 9 (1), pp. 187-199. Cited 34 times.
<http://www.iwaponline.com/jwh/009/0187/0090187.pdf>
doi: 10.2166/wh.2010.138

View at Publisher
-
- 32 Hadiwidodo, M., Sutrisno, E., Sabrina, A.
(2019) *J. Presipitasi*, 16, p. 36.
-
- 33 Ullah, S., Liang, H., Ali, I., Zhao, Q., Iqbal, A., Wei, S., Shah, T., (...), Jiang, L.
Biochar coupled with contrasting nitrogen sources mediated changes in carbon and nitrogen pools, microbial and enzymatic activity in paddy soil ([Open Access](#))

(2020) *Journal of Saudi Chemical Society*, 24 (11), pp. 835-849. Cited 22 times.
<http://www.sciencedirect.com.proxy.undip.ac.id:2048/science/journal/13196103>
doi: 10.1016/j.jscs.2020.08.008

View at Publisher
-
- 34 Suswardany, D.L., Ambarwati, Y.K.
(2006) *J. Penelitian Sains Teknol.*, 7, p. 141. Cited 3 times.
-
- 35 Yunia Cesaria, R., Wirosodarmo, R., Suharto, B.
(2014) *J. Sumberdaya Alam Lingkungan*, 1, p. 8.
-
- 36 Iswanto, B., Astono, W., Sunaryati, S.
(2007) *J. Teknol. Lingkungan*, 4, p. 24.
-
- 37 Muhammad, T.A., Zaman, B., Purwono, P.
(2017) *J. Tek. Lingkungan*, 6, p. 1.
-
- 38 Sutanto, R., Organik, P.
(2002) *Menuju Pertanian Alternatif Dan Berkelanjutan*
Banyumedia Publishing, Malang
-
- 39 Oktiawan, W., Zaman, B., Purwono, P.
(2018) *Int. Conf. Energy, Environmental and Information System*
-

□ 40 Chew, K.W., Chia, S.R., Yap, Y.J., Ling, T.C., Tao, Y., Show, P.L.

Densification of food waste compost: Effects of moisture content and dairy powder waste additives on pellet quality

(2018) *Process Safety and Environmental Protection*, 116, pp. 780-786. Cited 24 times.

http://www.elsevier.com.proxy.undip.ac.id:2048/wps/find/journaldescription.cws_home/713889/description#description

doi: 10.1016/j.psep.2018.03.016

[View at Publisher](#)

□ 41 Chia, W.Y., Chew, K.W., Le, C.F., Lam, S.S., Chee, C.S.C., Ooi, M.S.L., Show, P.L.

Sustainable utilization of biowaste compost for renewable energy and soil amendments

(2020) *Environmental Pollution*, 267, art. no. 115662. Cited 50 times.

<https://www.journals-elsevier-com.proxy.undip.ac.id/environmental-pollution>

doi: 10.1016/j.envpol.2020.115662

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