

REFERENCES

- Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Zinc. U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES: Public Health Service, Agency for Toxic Substances and Disease Registry.
- Akbari, Mohammad Zahir., Duangduean Thepnuan, Wan Wiriya, Rungruang Janta, Praphatsorn Punsompong, Phonpat Henwan, Arisara Charoenpanyanet, Somporn Chantara. 2021. Emission factors of metals bound with PM_{2.5} and ashes from biomass burning simulated in an open-system combustion chamber for estimation of open burning emissions. *Atmospheric Pollution Research* 12 (2021) 13–24.
- Amaral, S.S., de Carvalho Junior, J.A., Costa, M.A.M., Neto, T.G.S., Dellani, R., Leite, L.H. S., 2014. Comparative study for hardwood and softwood forest biomass: chemical characterization, combustion phases and gas and particulate matter emissions. *Bioresour. Technol.* 164, 55–63. <https://doi.org/10.1016/j.biortech.2014.04.060>.
- Aral, Hal., Angelica Vecchio-Sadus. 2008. Toxicity of lithium to humans and the environment—A literature review. *Ecotoxicology and Environmental Safety* 70 (2008) 349–356.
- Andini, Ade., Patrick Rousset, Udin Hasanudin, Sebastian Bonnet. 2016. Assessment of the proportion of crop residues subject to open burning available as energy feedstock in Indonesia. SEE 2016 Energy & Climate Change: Innovating for a Sustainable Future.
- Bandumula N. 2018. Rice production in Asia: Key to Global Food Security. *Proc Natl Acad Sci India Sect B - Biol Sci* 88:1323–1328.
- Beliles, R.P. 1994. Lithium. In: Patty's Industrial Hygiene and Toxicology. 4th ed., volume II, Part C. G.D. Clayton and F.E. Clayton, eds. John Wiley and Sons, Inc., New York.
- Birch, N.J. 1988. Lithium. In: *Handbook on Toxicity of Inorganic Compounds*. H.G. Seiler and H. Sigel, eds. Marcel Dekker, Inc., New York. pp. 383-393.

Bhattacharya, S.C., Pham, H.L., Shrestha, R.M. and Vu, Q.V. 1993. CO₂ emissions due to fossil and traditional fuels, residues and wastes in Asia, AIT Workshop on Global Warming Issues in Asia, 8-10 September 1992, AIT, Bangkok, Thailand.

Bolch, W.E., Farfán, E.B., Huh, C., Huston, T.E., Bolch, W.E. (2001). Influence of Parameter Uncertainties within the ICRP 66 Respiratory Tract Model: Particle Deposition. *Health Phys.* 81:378–394.

Brownell, P.F. 1980. Sodium as an essential micronutrient element for plants and its possible role in metabolism. In: Woolhouse, H.W. (Ed.), *Advances in Botanical Research*. Academic Press, pp. 117–224.
[https://doi.org/10.1016/S0065-2296\(08\)60088-9](https://doi.org/10.1016/S0065-2296(08)60088-9).

BPS - Statistics of Padang Municipality. 2022. *Padang Municipality in Figures 2022*.

Chantara, Somporn., Duangduen Thepnuan, Wan Wiriya, Sukanya Prawan, Ying I. Tsai. 2019. Emissions of pollutant gases, fine particulate matters and their significant tracers from biomass burning in an open-system combustion chamber. *Chemosphere* 224 (2019) 407-416.

Cooper, D., C., Alley, F., C. 2002. *Air Pollution Control Design Approach*. Third edition. Waveland Press, Long Grove.

EPA: Compendium Method 10-3.4. Determination Of Metals in Ambient Particulate Matter Using Inductively Coupled Plasma (ICP) Spectroscopy. EPA/625/R-96/010a.

Fardiaz, S.1992. *Polusi Air dan Udara* Edisi 11. Kanisius, Yogyakarta.

Furuuchi, M., Eryu, K., Nagura, M., Hata, M., Kato, T., Tajima, N., Sekiguchi, K., Ehara, K., Seto, T. and Otani, Y. 2010.. Development and Performance Evaluation of Air Sampler with Inertial Filter for Nanoparticle Sampling. *Aerosol Air Qual. Res.* 10: 185-192.
<https://doi.org/10.4209/aaqr.2009.11.0070>.

Franck, Ulrich., Leitte, Arne Marian., Suppan, Peter. 2014. Multiple exposures to airborne pollutants and hospital admissions due to diseases of the circulatory system in Santiago de Chile. <https://doi.org/10.1016/j.scitotenv.2013.08.088>.

Hafidawati, Puji Lestari, Asep Sofyan. 2017. Emission Factors of Black Carbon (BC) From Rice Straw Open Burning Specific to District Cianjur, West Java, Indonesia. International Journal of GEOMATE, Aug, 2017, Vol.13, Issue 36, pp.126-130.

Hays, M.D., Fine, P.M., Geron, C.D., Kleeman, M.J., Gullett, B.K.. 2005. Open burning of agricultural biomass: physical and chemical properties of particle-phase emissions. *Atmospheric Environment* 39, 6747e6764.

He, M., Zheng, J., Yin, S., Zhang, Y. 2011. Trends, temporal and spatial characteristics, and uncertainties in biomass burning emissions in the Pearl River Delta, China. *Atmospheric Environment* 45, 4051-4059.

Hinds, W.C. (1999). *Aerosol Technology*, 2nd ed., Wiley-Interscience, New York.

Hoek, Gerard., Hanna Boogaard, Anne Knol, Jeroen de Hartog, Pauline Slottje, Jon G Ayres, Paul Borm, Bert Brunekreef, Ken Donaldson, Francesco Forastiere, Stephen Holgate, Wolfgang G Kreyling, Benoit Nemery, Juha Pekkanen, Vicki Stone, H-Erich Wichmann, Jeroen van der Sluijs. 2010. Concentration response functions for ultrafine particles and all-cause mortality and hospital admissions: results of a European expert panel elicitation. *Environmental Science and Technology*, Vol. 44, No. 1, (January 2010), pp. 476-482, ISSN 0013-936X.

Ibald-Mulli, A., Wichmann, H.E., Kreyling, W., Peters, A. 2002. Epidemiological evidence on health effects of ultrafine particles. *Journal of Aerosol Medicine: Deposition, Clearance, and Effects in the Lung*, Vol. 15, No. 2, (June 2002), pp. 189–201, ISSN 0894-2684.

International Rice Research Institute (IRRI) 2013. *Rice Almanac*,4th Edition: Source Book for One of the Most Important Eco-nomic Activities on Earth. International Rice Research Insti-tute (Los Banos) p.283

Johnston, Helinor J., William Mueller, Susanne Steinle, Sotiris Vardoulakis, Kraichat Tantrakarnapa, Miranda Loh, John W. Cherrie. 2019. How Harmful Is Particulate Matter Emitted from Biomass Burning? A Thailand Perspective. Current Pollution Reports (2019) 5:353–377.

Kanokkanjana, K, S. Garivait. 2013. Alternative Rice Straw Management Practices to Reduce Field Open Burning in Thailand. International Journal of Environmental Science and Development, Vol. 4, No. 2, April 2013.

Kate, Adams., Daniel S. Greenbaum, Rashid Shaikh, Annemoon M. van Erp, Armistead G. Russell. 2015. Particulate matter components, sources, and health: Systematic approaches to testing effects. Journal of the Air & Waste Management Association, 65(5):544–558, 2015.

Khan, Said Akbar., Said Muhammad, Saima Nazir, Farzana Altaf Shah. 2020. Heavy metals bounded to particulate matter in the residential and industrial sites of Islamabad, Pakistan: Implications for non-cancer and cancer risks. Environmental Technology & Innovation 19 (2020) 100822.

Kim Oanh NT., et al. 2006. Particulate air pollution in six Asian cities: spatial and temporal distributions, and associated sources. Atmos Environ 40:3367–3380.

Kim Oanh NT., Bich Thuy, Danutawat Tipayarom, Bhai Raja Manandhar, Pongkiatkul Prapat, Christopher D. Simpson, L.J. Sally Liu. 2011. Characterization of particulate matter emission from open burning of rice straw. Atmospheric Environment 45 (2011) 493-502.

Kim Oanh NT., Didin Agustian Permadi, Nguyen Phan Dong, and Dang Anh Nguyet. 2018. Emission of Toxic Air Pollutants and Greenhouse Gases from Crop Residue Open Burning in Southeast Asia. https://doi.org/10.1007/978-3-319-67474-2_3.

Kim Oanh, NT., Didin Agustian Permadi, Philip K. Hopke, Kirk R. Smith, Nguyen Phan Dong, Anh Nguyet Dang. 2018. Annual emissions of air toxics emitted from crop residue open burning in Southeast Asia over the period of 2010–2015. Atmospheric Environment 187 (2018) 163-173. <https://doi.org/10.1016/j.atmosenv.2018.05.061>.

Korkmaz, S., Zeynep C. 2021. An Overview: The Effects of Particulate Matters, An Important Atmospheric Pollutant, on the Spread of Covid19. Department of Environmental Engineering, Faculty of Engineering, Ataturk University, Erzurum 25240, Turkey. Jurnal Kesehatan Lingkungan Vol. 13 No.3 July 2021 (159-165).

Lestari, Puji., Fathi Muthmainnah, Didin Agustian Permadi. 2020. Characterization of carbonaceous compounds emitted from Indonesian surface and sub surface peat burning. Atmospheric Pollution Research: Vol. 11, Issue 9. <https://doi.org/10.1016/j.apr.2020.06.001>.

Li, Huiming., Xin Qian, Qin'geng Wang. 2013. Heavy Metals in Atmospheric Particulate Matter: A Comprehensive Understanding Is Needed for Monitoring and Risk Mitigation. State Key Laboratory of Pollution Control and Resources Reuse, School of the Environment, Nanjing University.

Li, C., Hu, Y., Chen, J., Ma, Z., Ye, X., Yang, X., Wang, L., Wang, X., Mellouki, A., 2016. Physiochemical properties of carbonaceous aerosol from agricultural residue burning: density, volatility, and hygroscopicity. *Atmos. Environ.* 140, 94–105. <https://doi.org/10.1016/j.atmosenv.2016.05.052>.

Lusini, I., Pallozzi, E., Corona, P., Ciccioli, P., Calfapietra, C., 2014. Novel application of a combustion chamber for experimental assessment of biomass burning emission. *Atmos. Environ.* 94, 117–125. <https://doi.org/10.1016/j.atmosenv.2014.05.016>.

Liu Z, Huang Q, Liu X, Li P, Naseer MR, Che Y, Dai Y, Luo X, Liu D, Song L, Jiang B, Peng X and Yu C. 2021. Magnesium Fertilization Affected Rice Yields in Magnesium Sufficient Soil in Heilongjiang Province, Northeast China. *Front. Plant Sci.* 12:645806. doi: 10.3389/fpls.2021.645806.

Makarim AK, Sumanto S. 2007. Rice straw: management and utilization. Research and Development Center of Agriculture. Ministry of Agriculture. Bogor, Indonesia.

- Morgan, Jody., Bell, Robin., Jones, Alison L. 2020. Endogenous doesn't always mean innocuous: a scoping review of iron toxicity by inhalation. doi: 10.1080/10937404.2020.1731896. E-pub 2020 Feb 27.
- Mukono HJ. 2006. Prinsip Dasar Kesehatan Lingkungan Surabaya: Airlangga University Press; 2006.
- Neuman, W. L. 2014. Social Research Methods: Qualitative and Quantitative Approaches, 7 th edition (7th ed.). England: Pearson New International.
- Ni, H., Han, Y., Cao, J., Chen, L.-W.A., Tian, J., Wang, X., Chow, J.C., Watson, J.G., Wang, Q., Wang, P., Li, H., Huang, R.-J., Emission Characteristics of Carbonaceous Particles and Trace Gases from Open Burning of Crop Residue in China, Atmospheric Environment (2015), doi: 10.1016/j.atmosenv.2015.05.007.
- NJ Health (New Jersey Department of Health). 2008. Hazardous Substance Fact Sheet: Lithium.
- Nurhayati MP, Dewi Ratna. 2021. Pengantar Nutri Tanaman. Surakarta: UNISRI Press.
- Oberdörster, G., J N Finkelstein, C Johnston, R Gelein, C Cox, R Baggs, A C Elder. 2000. Acute Pulmonary Effects of Ultrafine Particles in Rats and Mice. Research Report 96. Boston, MA: Health Effects Institute.
- Penttinen, P., K.L. Timonen, P. Tiittanen, A. Mirme, J. Ruuskanen, J. Pekkanen. 2001a. Ultrafine particles in urban air and respiratory health among adult asthmatics. European Respiratory Journal, Vol. 17, No. 3, (March 2001), pp. 428-435, ISSN 0903-1936.
- Penttinen, P., K L Timonen, P Tiittanen, A Mirme, J Ruuskanen, J Pekkanen. 2001b. Number concentration and size of particles in urban air: Effects on spirometric lung function in adult asthmatic subjects. Environmental Health Perspectives, Vol. 109, No. 4, (April 2001), pp. 319-323, ISSN 0091-6765.

Permadi, Didin Agustian., Kim Oanh, Nguyen Thi. 2012. Assessment of biomass open burning emissions in Indonesia and potential climate forcing impact. *Atmospheric Environment* (2012) 1-9.

Permadi, Didin Agustian., Kim Oanh, Nguyen Thi. 2013. Assessment of biomass open burning emissions in Indonesia and potential climate forcing impact. *Atmos Environ* 78:250–258.

Peters A., H E Wichmann, T Tuch, J Heinrich, J Heyder. 1997. Respiratory effects are associated with the number of ultrafine particles. *American Journal of Respiratory and Critical Care Medicine*, Vol. 155, No.4, (April 1997), pp. 1376-83, ISSN 1073-449X.

Pinto, E., Almeida, A., Ferreira, I M P L V O. 2016. Essential and non-essential/toxic elements in rice available in the Portuguese and Spanish markets. *J. Food Compos. Anal.* 48, 81–87. <https://doi.org/10.1016/j.jfca.2016.02.008>.

Pizzorno, Joseph. 2017. Particulate Matter Is a Surprisingly Common Contributor to Disease. *Integrative Medicine* Vol. 16, No. 4 August 2017.

Plum, Laura M., Lothar Rink, Hajo Haaase. The Essential Toxin: Impact of Zinc on Human Health. *Int. J. Environ. Res. Public Health* 2010, 7, 1342-1365; doi:10.3390/ijerph7041342.

Reddington, C.L., Spracklen, D.V., Artaxo, P., Ridley, D.A., Rizzo, L.V., Arana, A., 2016. Analysis of particulate emissions from tropical biomass burning using a global aerosol model and long-term surface observations. *Atmos. Chem. Phys.* 16, 11083–11106. <https://doi.org/10.5194/acp-16-11083-2016>.

Rezkita, Shahnaz. 2020. Analisis Tingkat Konsentrasi *Particulate Matter* 10 (PM₁₀) Pada Kawasan Bumi Tamalanrea Permai (BTP) Makassar. Departemen Teknik Lingkungan Fakultas Teknik. Makassar: Universitas Hasanuddin.

Rout, Gyana R., Sunita Sahoo. 2015. Role of Iron in Plant Growth and Metabolism. *Reviews in Agricultural Science*, 3:1-24, 2015. doi: 10.7831/ras.3.1.

- Samae, Hisam., Surajit Tekasakul, Perapong Tekasakul, Masami Furuuchi. 2021. Emission factors of ultrafine particulate matter (PM) and particle-bound polycyclic aromatic hydrocarbons from biomass combustion for source apportionment. *Chemosphere* 262. <https://doi.org/10.1016/j.chemosphere.2020.127846>.
- Sanchis E, M. Ferrer, S. Calvet, C. Coscollà, V. Yusà, M. Cambra-López. 2014. Gaseous and particulate emission profiles during controlled rice straw burning. <http://dx.doi.org/10.1016/j.atmosenv.2014.07.062>.
- Santosa, Sri Juara., Tomoaki Okuda, Shigeru Tanaka. 2008. Air Pollution and Urban Air Quality Management in Indonesia. *Clean 2008*, 36 (5 – 6), 466 – 475. DOI: 10.1002/clen.200800038.
- Sarkar, I.U., Isalm, N., Jahan, A., Islam, A., Biswas, J.C. 2017. Rice straw as a source of potassium for wetland rice cultivation. *Geol. Ecol. Landsc.* 1–6. <https://doi.org/10.1080/24749508.2017.1361145>, 0.
- Sasongko WR, Wishnu IMW, Yohannes GB. 2004. Livestock farming systems technology application for goat in a dry land village, Sambelia. Research and Development Center of Ministry of Agriculture. <http://ntb.litbang.deptan.go.id/ind/2004/NP/penerapan teknologi.doc>
- Sillapapiromsuk, S., Chantara, S., Tengjaroenkul, U., Prasitwattanaseree, S., Prapamontol, T., 2013. Determination of PM₁₀ and its ion composition emitted S. Chantara et al. / *Chemosphere* 224 (2019) 407e416 415 from biomass burning in the chamber for estimation of open burning emissions. *Chemosphere* 93, 1912e1919.
- Singh, Gurraj., Munish Kumar Gupta, Santan Chauraisya, Vishal S. Sharma, Danil Yu Pimenov. 2021. Rice straw burning: a review on its global prevalence and the sustainable alternatives for its effective mitigation. Springer: Environmental Science and Pollution Research.
- Slezakova, Klara., Simone Morais, Maria do Carmo Pereira. 2013. Atmospheric Nanoparticles and Their Impacts on Public Health. LEPAE, Departamento de

Engenharia Química, Faculdade de Engenharia, Universidade do Porto, Portuga.

SNI 7119-4:2017. Udara Ambien – Bagian 4. Badan Standarisasi Nasional.

Streets, D., Yarber, K., Woo, J.H., Carmichael, G., 2003. Biomass burning in Asia: Annual and seasonal estimates and atmospheric emissions. *Global Biogeochemical Cycles* 17(4), 1099.

Terzano, C., Di Stefano, F., Conti, V., Graziani, E. & Petroianni, A. 2010. Air pollution ultrafine particles: Toxicity beyond the lung. *European Review for Medical and Pharmacological Sciences*, Vol. 14, No. 10, (October 2010), pp. 809-821, ISSN 1128-3602.

Tian, J., Cao, J., Han, Y., Ni, H., Chen, L.-W., Wang, X., Huang, R., Moosmueller, H., Watson, J., 2015. A biomass combustion chamber: design, evaluation, and a case study of wheat straw combustion emission tests. *Aerosol Air Qual. Res.* 2104–2114. <https://doi.org/10.4209/aaqr.2015.03.0167>.

Topi, Ronkko., Hilkka Timonen. 2019. Overview of Sources and Characteristics of Nanoparticles in Urban Traffic-Influenced Areas. *Journal of Alzheimer's Disease* 72 (2019) 15–28.

Torigoe, Katsumi., S Hasegawa, O Numata, S Yazaki, M Matsunaga, N Boku, M Hiura, H Ino. 2000. Influence of emission from rice straw burning on bronchial asthma in children. *Pediatrics International* (2000) 42, 143–150.

Vassilev, S., Vassileva, C., Baxter, D. 2014. Trace element concentrations and associations in some biomass ashes. *Fuel* 129, 292–313.

Wiriya, W., Chantara, S., Sillapapiromsuk, S., Lin, N.H. 2016. Emission profiles of PM10-bound polycyclic aromatic hydrocarbons from biomass burning determined in chamber for assessment of air pollutants from open burning. *Aerosol Air Qual. Res.*

World Health Organization (WHO) Europe. 2013. *Health Effects of Particulate Matter*. Europe: WHO Regional Office for Europe.

Yadav, Ishwar C., Devi Ningomban L. 2018. Biomass Burning, Regional Air Quality, and Climate Change. Encyclopedia of Environmental Health, 2nd Edition.

Yang, N. and Sun, H. 2011. Bismuth: Environmental Pollution and Health Effects. Encyclopedia of Environmental Health. 2011: 414–420.

Yuan, Y., Wu, Y., Ge, X., Nie, D., Wang, M., Zhou, H., Chen, M., 2019. In vitro toxicity evaluation of heavy metals in urban air particulate matter on human lung epithelial cells. Sci. Total Environ. 678, 301–308. <https://doi.org/10.1016/j.scitotenv.2019.04.431>.

Zhai, Guangyu., Kuan Zhang, Guorong Chai. 2021. Lag effects of size-fractionated particulate matter pollution on outpatient visits for respiratory diseases in Lanzhou, China. Annals of Agricultural and Environmental Medicine 2021, Vol 28, No 1, 131–141.

Zhao, H., Yu, H., Yuan, X., Piao, R., Li, H., Wang, X., & Cui, Z. 2015. Degradation of Lignocelluloses in Rice Straw by BMC-9, a Composite Microbial System. Journal of Microbiology and Biotechnology, 24(5), 585–591. <https://doi.org/10.4014/jmb.1509.09043>.

Zhang, H., Hu, D., Chen, J., Ye, X., Wang, S.X., Hao, J.M., Wang, L., Zhang, R., An, Z., 2011. Particle size distribution and polycyclic aromatic hydrocarbons emissions from agricultural crop residue burning. Environ. Sci. Technol. 45, 5477–5482. <https://doi.org/10.1021/es1037904>.

Zhang, Y., Min Shao, Yun Lin, Shengji Luan, Ning Mao, Wentai Chen, Ming Wang. 2012. Emission inventory of carbonaceous pollutants from biomass burning in the Pearl River Delta Region, China, Atmospheric Environment (2012), <http://dx.doi.org/10.1016/j.atmosenv.2012.05.055>.