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Dust Suppression with Glycerin from Biodiesel Production: A Review

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ABSTRACT

An increasing number of countries and areas in the world suffer from either natural or anthropogenic dust, which results in a serious hazard with respect to the environment and to personal health and safety. This paper reviews and summarizes open literature involving the use of glycerin in dust control applications. Glycerin, a by-product from biodiesel manufacturing, has been evaluated for dust suppressant performance when applied alone as aqueous solutions, or in combinations with surfactants, polymers, or other chemicals. There are reports indicating that glycerin is effective in some dust suppression applications, although details about its use and performance metrics are generally lacking. Recent growth of the biodiesel industry has significantly increased the supply of crude glycerin, making it an economically attractive material for use in dust suppression. This paper also highlights several environmental accidents caused by irresponsible discharges of crude glycerin, and points out the need to understand environmental consequences of glycerin and its impurities when used in dust suppression applications.

KEYWORDS

Dust Suppression; Glycerin; Biodiesel By-Product; Economic/Environmental Impact

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References

- [1] J. P. Engelbrecht and E. Derbyshire, " Airborne Mineral dust," *Elements*, Vol. 6, No. 4, 2010, pp. 241-246. doi:10.2113/gselements.6.4.241
- [2] J. M. Prospero, " Long-Range Transport of Mineral Dust in the Global Atmosphere: Impact of African Dust on the Environment of the Southeastern United States," *Proceeding of the National Academy of Science*, Vol. 96, No. 7, 1999, pp. 3396-3403. doi:10.1073/pnas.96.7.3396
- [3] P. Ginoux, D. Garbuzov and N. C. Hsu, " Identification of Anthropogenic and Natural Dust Sources Using Moderate Resolution Imaging Spectroradiometer Deep Blue level 2 data," *Journal of Geophysical Research*, Vol. 115, 2010, p. D05204. doi: 10.1029/2009JD012398
- [4] D. W. Griffin, " Atmospheric Movement of Microorganism in Clouds of Desert Dust and Implication for Human Health," *Clinical Microbiology Reviews*, Vol. 20, No. 3, 2007, pp. 459-477. doi:10.1128/CMR.00039-06
- [5] B. L. Tran and S. Bhattacharja, " Method for Preventing the Agglomeration or Generation of Dust from a Particulate Material Comprising Coal," *US Patent*, 7,108,800 B2, 2006.
- [6] B. L. Tran and S. Bhattacharja, " Method for Preventing the Agglomeration or Generation of Dust from a Particulate Material Comprising Coal," *US Patent Application Publication*, No. 2006/0284137 A1, 2006.
- [7] K. D. Burnside and J. C. Cranfill, " Dust Control Compositions and Method of Inhibiting Dust," *US Patent Application Publication*, No. 2009/0061102 A1, 2009.

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- [8] J. W. Smith and M. D. Key, "Hydrotropic Additives to Water for Dust Control," US Patent, 7438286, 2009.
- [9] J. C. Cranfill and K. D. Burnside, "Dust Control Compositions Having Reduced Corrosion and Method of Inhibiting Dust and Corrosion," US Patent Application Publication, No. 2009/0061101 A1, 2009.
- [10] B. R. Bhattacharyya and W. J. Roe, "Dust Control," US Patent, 4417992, 1983.
- [11] C. Rath and A. P. Verrall, "Method of Dust Abatement," US Patent Application Publication, No. 2008/055290 A1, 2008.
- [12] J. A. Gillies, J. G. Watson, C. F. Rogers, D. Dubois, J. C. Chow, R. Langston and J. Sweet, "Long-Term Efficiencies of Dust Suppressants to Reduce PM10 Emissions from Unpaved Roads," Journal of the Air & Waste Management Association, Vol. 49, 1999, pp. 3-16.
- [13] S. K. Hoekman, A. W. Gertler, A. Broch, C. Robbins and M. Natarajan, "Biodistillate Transportation Fuels 1. Production and Properties," SAE Technical Paper Series No. 2009-01-2766, 2009.
- [14] M. Gonzalez-Pajuelo, I. Meynial-Salles, F. Mendes, J. C. Andrade, I. Vasconcelos and P. Soucaille, "Metabolic Engineering of Clostridium Acetobutylicum for the Industrial Production of 1,3-Propanediol from Glycerol," Metabolic Engineering, Vol. 7, No. 5-6, 2005, pp. 329-336. doi:10.1016/j.ymben.2005.06.001
- [15] Y. Mu, H. Teng, D. J. Zhang, W. Wang and Z. L. Xiu, "Microbial Production of 1,3-Propanediol by Klebsiella Pneumoniae Using Crude Glycerol from Biodiesel Preparations," Biotechnology Letters, Vol. 28, No. 21, 2006, pp. 1755-1759. doi:10.1007/s10529-006-9154-z
- [16] J. C. Thompson and B. B. He, "Characterization of Crude Glycerol from Biodiesel Production from Multiple Feedstocks," Applied Engineering in Agriculture, Vol. 22, No. 2, 2006, pp. 261-265.
- [17] J. A. Kinast, "Production of Biodiesels from Multiple Feedstocks and Properties of Biodiesels and Biodiesel/ Diesel Blends," NREL/SR-510-31460, 2003.
- [18] R. Grogan, "Mixtures, Compositions and Methods of Suing and Preparing Same," US Patent Application Publication, No. 2009/0269499 A1, 2009.
- [19] J. R. Talamoni, "Dust Suppressant Composition," US Patent, 7658862 B2, 2010.
- [20] B. A. Grisso, R. E. Quinn and R. E. Kalhan, "Method of Using an Aqueous Composition Containing a Water-Soluble or Water-Dispersible Synthetic Polymer and Resultant Compositions Formed Thereof," US Patent, 6372842, 2002.
- [21] D. C. Roe and Z. C. Polizzotti, "Methods for Suppressing Fugitive Dust Emissions," US Patent, 5194174, 1993.
- [22] K. J. Zinkan and L. J. Koenig, "Composition and Method for Dust Control," US Patent, 4801635, 1989.
- [23] M. Ogzewalla, "Dust Control of Solid Granular Materials," US Patent Publication, No. 2009/0178452