

References

- [1] Shahid EM, Jamal J. Production of biodiesel: a technical review. *Renew Sustain Energy Rev* 2011; 15 (9): 4732-45.
- [2] International Energy Agency (IEA). World energy outlook 2007. Available from: http://www.iea.org/textbase/nppdf/free/2007/weo_2007.pdf; 2007 [Cited on 03.03.2016].
- [3] Rabe ELM. Jatropha oil in compression ignition engines, effects on the engine, environment and Tanzania as supplying country. Eindhoven: Eindhoven University of Technology; 2010.
- [4] U.S. Energy Information Administration. International energy outlook 2010. Available from: <http://www.eia.doe.gov/oiaf/ieo/pdf/0484%282010%29.pdf>; 2010 [Cited on 05.03.2016].
- [5] Atabani AE, Badruddin IA, Mekhilef S, Silitonga AS. A review on global fuel economy standards, labels and technologies in the transportation sector. *Renew Sustain Energy Rev* 2011; 15(9):4586–610.
- [6] US Energy Information Administration; International Energy Outlook 2016: http://econometricainc.com/wp-content/uploads/2016/08/EIA_International_Energy_Outlook_2016.pdf; 2016. [Cited on 04.10.2017]
- [7] MoP (Ministry of Petroleum and Natural Gas). Basic statistics; 2009. <http://petroleum.nic.in/petstat.pdf>. [Cited on 09.10.2017]
- [8] Karmakara A, Karmakar S, Mukherjee S. Biodiesel production from neem towards feedstock diversification: Indian perspective; *Renewable and Sustainable Energy Reviews* 16 (2012) 1050-1060.

- [9] Paul V, Kar A. India's biodiesel programme: some critical issues. In: Regional forum on bioenergy sector development. 2008.
- [10] Ahmad AL, Mat Yasin NH, Derek CJC, Lim JK. Microalgae as a sustainable energy source for biodiesel production: a review. *Renew Sustain Energy Rev* 2011;15(1):584-93.
- [11] International Council on Clean Transportation (ICCT). Passenger vehicles. Available from: <http://www.theicct.org/passenger-vehicles/>; 2011 [Cited on 23.03.2017].
- [12] European Environment Agency (EEA). Transport emissions of greenhouse gases by mode. Available from: <http://www.eea.europa.eu/data-andmaps/indicators/transport-emissions-of-greenhouse-gases-3>; 2011 [Cited on 18.07.2017].
- [13] Pew Centre on Global Climate Change. Transportation overview. Available from: <http://www.pewclimate.org/technology/overview/transportation>; 2011 [Cited on 13.10.2016].
- [14] Chang J, Leung DYC, Wu CZ, Yuan ZH. A review on the energy production, consumption, and prospect of renewable energy in China. *Renewable and Sustainable Energy Reviews* 2003; 7:453-68.
- [15] Agnes SF, et al. Renewable energy generation by full-scale biomass gasification system using agricultural and forestal residues. *Practice Periodical of Hazardous, Toxic, Waste Management* 2007; 11:177-83.
- [16] Marchetti JM. Biodiesel production technologies. 1st ed. New York: Nova science publisher, Inc.; 2010.

- [17] Marchetti JM. A summary of the available technologies for biodiesel production based on a comparison of different feedstock's properties. *Process Saf Environ Prot* 2012; 90:157-63.
- [18] Ong HC, Silitonga AS, Masjuki HH, Mahlia TMI, Chong WT, Boosroh MH. Production and comparative fuel properties of biodiesel from non-edible oils: *Jatropha curcas*, *Sterculia foetida* and *Ceiba pentandra*. *Energy Convers Manag* 2013; 73:245-55.
- [19] Zheng L, Li Q, Zhang J, Yu Z. Double the biodiesel yield: rearing black soldier fly larvae, *Hermetia illucens*, on solid residual fraction of restaurant waste after grease extraction for biodiesel production. *Renew Energy* 2012; 41:75-9.
- [20] Da Porto C, Decorti D, Tubaro F. Fatty acid composition and oxidation stability of hemp (*Cannabis sativa* L.) seed oil extracted by supercritical carbon dioxide. *Ind Crop Prod* 2012; 36:401-4.
- [21] Wang R, Hanna MA, Zhou W-W, Bhadury PS, Chen Q, Song B-A, et al. Production and selected fuel properties of biodiesel from promising non- edible oils: *Euphorbia lathyris* L., *Sapium sebiferum* L. and *Jatropha curcas* L. *Bioresour Technol* 2011; 102:1194-9.
- [22] Al-Hamamre Z, Yamin J. Parametric study of the alkalicatalyzed transesterification of waste frying oil for Biodiesel production. *Energy Convers Manag* 2014; 79:246-54.
- [23] Teixeira LSG, Assis JCR, Mendonça DR, Santos ITV, Guimarães PRB, Pontes LAM, et al. Comparison between conventional and ultrasonic preparation of beef tallow biodiesel. *Fuel Process Technol* 2009; 90:1164-6.
- [24] Kwon EE, Jeon E-C, Yi H, Kim S. Transforming duck tallow into biodiesel via noncatalytic transesterification. *ApplEnergy* 2014; 116:20-5.

- [25] Marulanda VF, Anitescu G, Tavlarides LL. Investigations on supercritical transesterification of chicken fat for biodiesel production from low-cost lipid feedstocks. *J Supercrit Fluids* 2010; 54:53-60.
- [26] Robles-Medina A, Gonzalez-Moreno PA, Esteban-Cerdan L, Molina-Grima E. Biocatalysis: towards ever greener biodiesel production. *Biotechnol Adv* 2005; 119:291-9.
- [27] Narayan CM. Vegetable oil as engine fuels-prospect and retrospect. *Proceedings on Recent Trends in Automotive Fuels*, Nagpur, India, 2002.
- [28] Demirbas MF, Balat M, Balat H. Potential contribution of biomass to the sustainable energy development. *Energy Convers Manage* 2009; 50:1746-60.
- [29] Ramadhas AS, Jayaraj S, Lakshmi Narayana Rao K. Experimental investigation on non edible vegetable oil operation in diesel engine for improved performance, National Conference on Advances.
- [30] Czerwinski J. Performance of D.I. Diesel engine with addition of ethanol and rapeseed oil, SAE 940-545, 1994.
- [31] Fukuda H, Kondo A, Noda H. Biodiesel fuel production by transesterification of oils. *J Biosci Bioeng* 2001; 92:405-16.
- [32] Srinivasa Rao P, Gopalakrishnan KV. Esterified oils as fuel in diesel engines, 11th National Conference on I.C. Engines, I.I.T. Madras, India, 1983. 740 A.S. Ramadhas et al./ *Renewable Energy* 29 (2004) 727-742.
- [33] Ma F, Hanna MA. Biodiesel production: a review. *Bioresour Technol* 1999; 70:1-15.
- [34] Demirbas A. Biodiesel production from vegetable oils via catalytic and non-catalytic supercritical methanol transesterification methods. *Prog Energy Combust Sci* 2005; 31:466-87.

- [35] Zabeti M, Daud WMAW, Aroua MK. Activity of solid catalysts for biodiesel production: a review. *Fuel Process Technol* 2009; 90:770-7.
- [36] Avhad MR, Marchetti JM. A review on recent advancement in catalytic materials for biodiesel production. *Renewable and Sustainable Energy Reviews* 2015; 50:696-718.
- [37] Semwal S, Arora AK, Badoni RP, Tuli DK. Biodiesel production using heterogeneous catalysts. *Bioresour Technol* 2011; 102:2151-61.
- [38] Vicente G, Martinez M, Aracil J. Integrated biodiesel production: a comparison of different homogenous systems. *Bioresour Technol* 2004; 92:297-305.
- [39] Palligarnai TV, Briggs M. Biodiesel production current state of the art and challenges. *J Ind Microbiol Biot* 2008; 35:421-30.
- [40] Canakci M, Van Gerpen J. Biodiesel production via acid catalysis. *Trans ASABE* 1999; 42(5):1203-10.
- [41] Atadashi IM, Aroua MK, Abdul Aziz AR, Sulaiman NMN. Production of biodiesel using high free fatty acid feed stocks. *Renew Sust Energy Rev* 2012; 16 (5):3275-85.
- [42] Helwani Z, Othman MR, Aziz N, Kim J, Fernando WJN. Solid catalysis for transesterification of triglycerides with methanol. *Appl Catal A-Gen* 2009; 363:1-10.
- [43] Nurfitri I, Maniam GP, Hindryawati N, Yusoff MM, Ganesan S. Potential of feed stock and catalysts from waste in biodiesel preparation: A review. *Energy Convers Manage* 2013; 74:395-402.
- [44] Chakraborty R, Bepari S, Banerjee A. Application of calcined waste fish (*Labeo rohita*) scale as low-cost heterogeneous catalyst for biodiesel synthesis. *Bioresour Technol* 2011; 102:3610-8.

- [45] Mo X, Lotero E, Lu C, Liu Y, Goodwin Jr JG. A novel sulfonated carbon composite solid acid catalyst for biodiesel synthesis. *Catal Lett* 2008; 123:1-6.
- [46] Furuta S, Matsushashi H, Arata K. Biodiesel fuel production with solid amorphous-zirconia catalysis in fixed bed reactor. *Biomass Bioenerg* 2006; 30:870-3.
- [47] Park YM, Lee DW, Kim DK, Lee JS, Lee KY. The heterogeneous catalyst system for the continuous conversion of free fatty acids in used vegetable oils for the production of biodiesel. *Catal Today* 2008; 131:238-43.
- [48] Keera ST, El Sabagh SM, Taman AR. Transesterification of vegetable oil to biodiesel fuel using alkaline catalyst. *Fuel* 2011; 90:42-7.
- [49] Dias JM, Alvim-Ferraz MCM, Almeida MF. Comparison of the performance of different homogeneous alkali catalysts during transesterification of waste and virgin oils and evaluation of biodiesel quality. *Fuel* 2008; 87:3572-8.
- [50] Uzun BB, Kılıç M, Özbay N, Pütün AE, Pütün E. Biodiesel production from waste frying oils: optimization of reaction parameters and determination of fuel properties. *Energy* 2012; 44:347-51.
- [51] Brito JQA, Silva CS, Almeida JS, Korn MGA, Korn M, Teixeira LSG. Ultrasound-assisted synthesis of ethyl esters from soybean oil via homogeneous catalysis. *Fuel Process Technol* 2012; 95:33-6.
- [52] Farag HA, El-Maghraby A, Taha NA. Optimization of factors affecting esterification of mixed oil with high percentage of free fatty acid. *Fuel Process Technol* 2011; 92:507-510.

- [53] Aranda DAG, Santos RTP, Tapanes NCO, Ramos ALD, Antunes OAC. Acid-catalyzed homogeneous esterification reaction for biodiesel production from palm fatty acids. *Catal Lett* 2007; 122:20-5.
- [54] Marchetti JM, Errazu AF. Esterification of free fatty acids using sulphuric acid as catalyst in the presence of triglycerides. *Biomass Bioenergy* 2008; 32:892-5.
- [55] Suryaputra W, Winata I, Indraswati N, Ismadji S. Wastecapiz (*Amusium cristatum*) shell as a new heterogeneous catalyst for biodiesel production. *Renew Energy* 2013; 50:795-9.
- [56] Correia LM, Saboya RM, Campelo Nde S, Cecilia JA, Rodriguez-Castellon E, Cavalcante Jr CL. Characterization of calcium oxide catalysts from natural sources and their application in the transesterification of sunflower oil. *Bioresour Technol* 2014; 151:207-13.
- [57] Rezaei R, Mohadesi M, Moradi GR. Optimization of biodiesel production using waste mussel shell catalyst. *Fuel* 2013; 109:534-41.
- [58] Jeon H, Kim DJ, Kim SJ, Kim JH. Synthesis of mesoporous MgO catalyst template by a PDMS-PEO comb-like copolymer for biodiesel production. *Fuel Process Technol* 2013; 116:325-31.
- [59] Chen CL, Huang CC, Tran DT, Chang JS. Biodiesel synthesis via heterogeneous catalysis using modified strontium oxides as the catalysts. *Bioresour Technol* 2012; 113:8-13.
- [60] Viola E, Blasi A, Valerio V, Guidi I, Zimbardi F, Braccio G, et al. Biodiesel from fried vegetable oils via transesterification by heterogeneous catalysis. *Catal Today* 2012; 179:185-90.

- [61] Melero JA, Bautista LF, Morales G, Iglesias J, Sánchez-Vázquez R. Biodiesel production from crude palm oil using sulfonic acid-modified mesostructured catalysts. *Chem Eng J* 2010; 161:323-31.
- [62] García-Sancho C, Moreno-Tost R, Mérida-Robles JM, Santamaría-González J, Jiménez-López A, Maireles-Torres P. Niobium-containing MCM-41silica catalysts for biodiesel production. *Appl Catal B: Environ* 2011; 108-109:161-7.
- [63] Xie W, Yang D. Transesterification of soybean oil over WO_3 supported on $AlPO_4$ as a solid acid catalyst. *BioresourTechnol* 2012; 119:60-5.
- [64] Alhassan FH, Yunus R, Rashid U, Sirat K, Islam A, Lee HV, et al. Production of biodiesel from mixed waste vegetable oils using Ferric hydrogen sulphate as an effective reusable heterogeneous solid acid catalyst. *Appl Catal A: Gen* 2013; 456:182-7.
- [65] Sivasamy A, Cheah KY, Fornasiero P, Kemausuor F, Zinoviev S, Miertus S. Catalytic applications in the production of Biodiesel from vegetable oils. *Chem Sus Chem* 2009; 2:278-300.
- [66] Lam MK, Lee KT, and Mohamed AR. Homogeneous, heterogeneous and enzymatic catalysis for transesterification of high free fatty acid oil waste cooking oil to biodiesel: A review. *Biotechnol Adv* 2010; 28:500-18.
- [67] Kuan IC, Lee CC, Tsai BH, Lee SL, Lee WT, Yu CY. Optimizing the production of biodiesel using lipase entrapped in biomimetic silica. *Energies* 2013; 6:2052-64.
- [68] Tan KT, Lee KT, Mohamed AR. Effects of free fatty acids, water content and co-solvent on biodiesel production by supercritical methanol reaction. *J Supercrit Fluids* 2010; 53: 88-91.

- [69] Skarlis S, Kondili E, Kaldellis J. Small-scale biodiesel production economics: a case study focus on Crete Island. *J Clean Prod* 2012; 20 (1):20-6.
- [70] Karmakar A, Karmakar S, Mukherjee S. Properties of various plants and animals feedstocks for biodiesel production. *Bioresource Technol* 2010; 101:7201-10.
- [71] Gopinathan MC, Gopinathan R. Biofuels: opportunities and challenges in India. In *Vitro Cell Dev Biol Plant* 2009; 45:350-71.
- [72] NCAER (National Council of Applied Economic Research); 2009. <http://www.ncaer.org/research03.html>. [Cited on 20.07.2017]
- [73] DOLR 2000: District and Category-Wise Wastelands of India (Year 2000). Available at <http://dolr.nic.in/wasteland.htm>. Accessed on 11th July 2017.
- [74] Subramanian KA, Singal SK, Saxena M, Singhal S. Utilization of liquid biofuels in automotive diesel engines: an Indian perspective. *Biomass Bioenergy* 2005; 29:65-72.
- [75] Murugesan A, Umarani C, Chinnusamy TR, Krishnan M, Subramanian R, Neduzchezhain N. Production and analysis of bio-diesel from non-edible oils-a review. *Renew Sust Energ Rev* 2009; 13 (4):825-34.
- [76] Meher LC, Vidya S, Dharmagadda S, Naik SN. Optimization of alkali catalyzed transesterification of *Pongamia pinnata* oil for production of biodiesel. *Bioresource Technol* 2006; 97: 1392-7.
- [77] Mittelbach M, Remschmidt C. *Biodiesel: the comprehensive handbook*. Graz, Austria: Martin Mittelbach Publisher; 2004. p.24.
- [78] Kureel RS, Singh CB, Gupta AK, Pandey A. *Jatropha: An alternate source for biodiesel*, National Oilseeds & Vegetable Oils Development Board, 2007.

- [79] Kureel RS, Kishore R, Dutt D. Mahua: A Potential Tree Borne Oilseed, National Oilseeds & Vegetable Oils Development Board, 2009.
- [80] Kureel RS, Kishore R, Dutt D. Neem: a tree borne oilseed. National Oilseeds and Vegetable oils Development Board, 2009.
- [81] Kureel RS, Singh CB, Gupta AK. Pandey A. Karanja: a potential source of biodiesel. National Oilseeds and Vegetable oils Development Board, 2008.
- [82] Kureel RS, Gupta AK. Pandey A. Simarouba: a potential tree borne oilseed for edible oil. National Oilseeds and Vegetable oils Development Board, 2009.
- [83] Agricultural Statistics at a glance 2012. Ministry of Agriculture, Govt. of India, 2012: PDES-249.
- [84] 28th Annual Report (2011–12). National Oil seeds and Vegetable Oils Development (NOVOD) Board. Ministry of Agriculture, Govt. of India, 2012.
- [85] Development of a data base on tree borne oil seed in India, Division of Statistics, Directorate of Extension, Indian Council of Forestry Research and Education, Dehradun, India.
- [86] Radhakrishnan P. Tree borne oil seeds as a source of energy for decentralized planning, Government of India, Ministry of Non-Conventional Energy Sources, New Delhi, India. In: National conference on tree borne oil seeds. Coimbatore, Tamil Nadu: PSG College of Technology; 2003.
- [87] Bose PK. Potential of biodiesel in the North East India. Kolkata, India: Presentation at the Department of Mechanical Engineering, Jadavpur University; December 17, 2004.

- [88] Sanford SD, White JM, Shah PS, Wee C, Valverde MA, Meier GR. Feedstock and biodiesel characteristics report. Renewable Energy Group, Inc.; 2009. <http://www.regfuel.com>.
- [89] Carraretto C, Macor A, Mirandola A, Stoppato A, Tonon S. Biodiesel as alternative fuel: Experimental analysis and energetic evaluations. *Energy* 2011; 29:2195–2211.
- [90] Altin R, Cetinkaya S, Yucesu HS. The potential of using vegetable oil fuels as fuel for diesel engine, *Energy conversion and management* 1991; 42:529-538.
- [91] Hazar H, Aydin H; Performance and emission evaluation of a CI engine fueled with preheated raw rapeseed oil (RRO)–diesel blends; *Applied Energy* 87(2010) 786-790.
- [92] HG How, HH Masjuki, MA Kalam, YH Teoh ;An investigation of the engine performance, emissions and combustion characteristics of coconut biodiesel in a high-pressure common-rail diesel engine; *Energy* 69 (2014) 749-759.
- [93] Haik Yousef, Selim Mohamed YE, Abdulrehman Tahir. Combustion of algae oil methyl ester in an indirect injection diesel engine. *Energy*; 2011:36:1827-35.
- [94] Raheman H, and SV Ghadge. Performance of compression ignition engine with mahua (*Madhucaindica*) biodiesel. *Fuel*; 2007:86:2568-2573.
- [95] Laguitton O, C Crua, T Cowell, MR Heikal, MR Gold. The effect of compression ratio on exhaust emissions from a PCCI diesel engine. *Energy Conversion and Management*; 2007:48:2918-2924.
- [96] Kumar S, Chauhan MK, Varun. Numerical modelling of compression ignition engine: A review, *Renewable and Sustainable Energy Reviews* 19 (2013) 517-530.

- [97] Ramos JI. Internal combustion engine modeling. New York: USA: Hemisphere Publishing Corporation (A member of Taylor & Francis Group); 1989.
- [98] MK Gajendra Babu, KA Subramanian. Alternative Transportation Fuels (Utilization in Combustion Engines), CRC Press, Taylor and Francis Group, New York, USA, 2013
- [99] Ramos JI. Internal combustion engine modeling. Hemisphere Publishing Corporation, New York; 1989.
- [100] Khan IM, Greeves G, Probert DM. Prediction of soot and nitric oxide concentrations in Diesel engine exhaust. Air pollution control in transport engines, Institution of Mechanical Engineers, Paper C142/71; 1971. p. 205-17.
- [101] Whitehouse ND, Sareen BK. Prediction of heat release in a quiescent chamber diesel engine allowing for fuel/air mixing. SAE 1974; Paper no. 740084.
- [102] Rakopoulos CD. Influence of ambient temperature and humidity on the performance and emissions of nitric oxide and smoke of high speed diesel engines in the Athens/Greece region. Energy Conversion and Management 1991; 31(5):447-53.
- [103] Kouremenos DA, Rakopoulos CD, Hountalas DT. Computer simulation with experimental validation of the exhaust nitric oxide and soot emissions in divided chamber Diesel engines. In: Proceedings of the ASME-WA meeting, 10(1). San Francisco, CA; AES 1989. p. 15–28.
- [104] Shahed SM, Chiu WS, Lyn WT. A mathematical model of diesel combustion. Combustion in engines, Institution of Mechanical Engineers, Paper C94/75; 1975. p. 119-128.

- [105] Hodgetts D, Shroff HD. More on the formation of nitric oxide in a Diesel engine. Combustion in engines, Institution of Mechanical Engineers; 1975; Paper C95/75. p. 129-138.
- [106] Hiroyasu H, Kadota T, Arai M. Development and use of a spray combustion modeling to predict diesel engine efficiency and pollutant emissions. Bulletin of the Japan Society of Mechanical Engineers 1983; 26 (214): 569-75.
- [107] Kouremenos DA, Rakopolous CD, Karvounis E. Thermodynamic analysis of direct injection diesel engines by multi-zone modelling. In: Proceedings of the ASME-WA meeting, vol. 3(3). Boston, MA: AES; 1987. p. 67-77.
- [108] IEA. World energy outlook 2001. International Energy Agency; 2001. [Cited on 23.07.2017]
- [109] Pimentel D. Handbook of energy utilization in agriculture. Boca Raton, FL: CRC Press; 1980.
- [110] Singh H, Mishra D, Nahar NM. Energy use pattern in production agriculture of a typical village in arid zone India-part I. Energy Conversion Management 2002; 43:2275-2286.
- [111] Balat M. Potential alternatives to edible oils for biodiesel production-a review of current work. Energy Convers Manage 2011; 52(2): 1479-92.
- [112] Chisti Y. Biodiesel from microalgae. Biotechnol Adv 2007; 25(3):294-306.
- [113] Pimentel D. Ethanol fuels: energy security, economics, and the environment. J Agric Environ Ethics 1991; 4:1-13.

- [114] Macedo IC, Leal MRLV, Silva JEAR. Assessment of greenhouse gas emissions in the production and use of fuel ethanol in Brazil. Report for the Secretariat of the Environment. Available from: Brazil: State of São Paulo, (http://www.unica.com.br/i_pages/files/pdf_ingles.pdf); 2004.
- [115] Dai D, Hu Z, Pu G, Li H, Wang CT. Energy efficiency and potentials of cassava fuel ethanol in Guangxi region of China. *Energy Convers Manag* 2006; 47(13-14):1686-99.
- [116] Sheehan J, Camobreco V, Duffield J, Graboski M, Shapouri H. Life-cycle inventory of biodiesel and petroleum diesel for use in an urban bus. Report NREL/SR-580-24089. Golden, CO: National Renewable Energy Laboratory; 1998.
- [117] Ghobadian B. Biodiesel production feasibility study in Iran: a project report jointly carried out by Tarbiat Modares University (TMU), 2010.
- [118] De Souza SP, Pacca S, De Avila MT, Borges JLB, 2010. Greenhouse gas emissions
- [119] Shay EG. Diesel fuel from vegetable oils: status and opportunities. *Biomass Bioenergy* 1993; 4:227-42.
- [120] ASAE, Vegetable oil fuels: Proceedings of the international conference on plant and vegetable; 1982.
- [121] Goering CE, Schwab AW, Daugherty MJ, Pryde EH, Heakin AJ. Fuel properties of eleven oils. *Trans ASAE* 1982; 25: 1472-83.
- [122] Zhang Y, Dube MA, McLean DD, Kates M. Biodiesel production from waste cooking oil: 2. Economic assessment and sensitivity analysis. *Bioresour Technol.* 2003; 90 (3): 229-40.

- [123] Martini N, Shell JS. Plant oils as fuels-present state of science and future development. Berlin: Spinger; 1998. p. 276.
- [124] Ma F, Clement LD, Hanna MA. The effect of mixing on transesterification of beef tallow. *Bioresour Technol.* 1999; 69:289-93.
- [125] Huang J, Wang Y, Qin J, Roskilly AP; Comparative study of performance and emissions of a diesel engine using Chinese Pistache and *Jatropha* biodiesel; *Fuel Processing Technology* 91 (2010) 1761-1767.
- [126] Ganapathy T, Gakkhar RP, Murugesan K; Influence of injection timing on performance, combustion and emission characteristics of *Jatropha* biodiesel engine; *Applied Energy* 88 (2011) 4376-4386.
- [127] Valente OS, Silva MJ, Pasa VMD, Belchior CRP, Sodre JR ;Fuel consumption and emissions from a diesel power generator fuelled with castor oil and soybean biodiesel; *Fuel* 89 (2010) 3637-3642.
- [128] Raheman H, Ghadge SV; Performance of compression ignition engine with mahua (*Madhuca indica*) biodiesel; *Fuel* 86 (2007) 2568-2573.
- [129] Nayak SK, Pattanaik BP; Experimental Investigation on Performance and Emission Characteristics of a Diesel Engine Fuelled with Mahua Biodiesel Using Additive; *Energy Procedia* 54 (2014) 569-579.
- [130] Jaichandar S, Annamalai K; Effects of open combustion chamber geometries on the performance of pongamia biodiesel in a DI diesel engine; *Fuel* 98 (2012) 272-279.
- [131] Dhar A, Agarwal AK ; Effect of Karanja biodiesel blends on particulate emissions from a transportation engine ;*Fuel* 141 (2015) 154-163.
- [132] Dhar A, Kumar A ;Effect of Karanja biodiesel blend on engine wear in a diesel engine; *Fuel* 134 (2014) 81-89.

- [133] Qi DH, Chen H, Geng LM, Bian Y ZH, Ren X CH ; Performance and combustion characteristics of biodiesel-diesel methanol blend fuelled engine; *Applied Energy* 87 (2010) 1679-1686.
- [134] Habibullah M, Masjuki HH, Kalam MA, Fattah IMR, Ashraful AM, Mobarak HM; Biodiesel production and performance evaluation of coconut, palm and their combined blend with diesel in a single-cylinder diesel engine; *Energy Conversion and Management* 87 (2014) 250-257.
- [135] Labecki L, Cairns A, Xia J, Megaritis A, Zhao H, Ganippa LC. Combustion and emission of rapeseed oil blends in diesel engine; *Applied Energy* 95 (2012) 139-146.
- [136] Benjumea P, Agudelo J, Agudelo A. Effect of altitude and palm oil biodiesel fuelling on the performance and combustion characteristics of a HSDI diesel engine; *Fuel* 88 (2009) 725-731.
- [137] Abedin MJ, Masjuki HH, Kalam MA, Sanjid A, Ashrafur Rahman SM, Rizwanul Fattah IM. Performance, emissions, and heat losses of palm and jatropha biodiesel blends in a diesel engine; *Industrial crops and products* 59 (2014) 96-104.
- [138] Ozener O, Yuksek L, Ergenc AT, Ozkan M. Effects of soybean biodiesel on a DI diesel engine performance, emission and combustion characteristics; *Fuel* 115 (2014) 875-883.
- [139] Qi DH, Chen H, Geng LM, ZH. Bian Y. Experimental studies on the combustion characteristics and performance of a direct injection engine fueled with biodiesel/diesel blends; *Energy Conversion and Management* 51 (2010) 2985-2992.
- [140] Ahmed S, Hj. Hassan M, Kalam Md. A, Ashrafur Rahman SM, Abedin Md. J, Shahir A. An experimental investigation of biodiesel production, characterization, engine performance, emission and noise of Brassica juncea methyl ester and its blends; *Journal of Cleaner Production* 79 (2014) 74-81.

- [141] İlkılıç C, Aydın S, Behcet R, Aydın H. Biodiesel from safflower oil and its application in a diesel engine; *Fuel Processing Technology* 92 (2011)356-362.
- [142] Lin L, Ying D, Chaitep S, Vittayapadung S. Biodiesel production from crude rice bran oil and properties as fuel ; *Applied Energy* 86 (2009) 681-688.
- [143] Xue J. Combustion characteristics, engine performances and emissions of waste edible oil biodiesel in diesel engine; *Renewable and Sustainable Energy Reviews*; 23 (2013) 350-365.
- [144] Kannan GR, Karvembu R, Anand R. Effect of metal based additive on performance emission and combustion characteristics of diesel engine fuelled with biodiesel; *Applied Energy* 88 (2011) 3694-3703.
- [145] Reitz RD, Bracco FV. On the dependence of spray angle and other spray parameters on nozzle design and operating conditions, SAE paper, 790494, 1979
- [146] Caresana F. Impact of biodiesel bulk modulus on injection pressure and injection timing. The effect of residual pressure, *Fuel*, 90 (2011), 2, pp. 477-485
- [147] Kumar A, Sharma S. Potential non-edible oil resources as biodiesel feedstock: an Indian perspective. *Renew Sustain Energy Rev* 2011;15(4):1791–800.
- [148] Fazal MA, ASMA Haseeb, Masjuki HH. Biodiesel feasibility study: an evaluation of material compatibility; performance; emission and engine durability. *Renew Sustain Energy Rev* 2011;15(2):1314-24.
- [149] Jain S, Sharma M. Stability of biodiesel and its blends: a review. *Renew Sustain Energy Rev* 2010;14(2):667-78.
- [150] Agarwal AK, Gupta T, Kothari A. Particulate emissions from biodiesel vs diesel fuelled compression ignition engine. *Renew Sustain Energy Rev* 2011;15(6):3278–300.

- [151] Atadashi I, Aroua M, Aziz AA. High quality biodiesel and its diesel engine application: a review. *Renew Sustain Energy Rev* 2010;14 (7):1999–2008.
- [152] Basha SA, Gopal KR, Jebaraj S. A review on biodiesel production, combustion, emissions and performance. *Renew Sustain Energy Rev* 2009;13(6):1628–34.
- [153] Dwivedi G, Jain S, Sharma MP. Impact analysis of biodiesel on engine performance-a review. *Renew Sustain Energy Rev* 2011; 15(9):4633-41.
- [154] Rakopoulos CD, Antonopoulos KA, Rakopoulos DC. Multi-zone modeling of diesel engine fuel spray development with vegetable oil, bio-diesel or diesel fuels; *Energy Convers. Manage.* 2006; 47:1550-1573.
- [155] Sanjay Patil. Thermodynamic modelling for performance analysis of compression ignition engine fuelled with biodiesel and its blends with diesel, *Int. J. Recent Technol. Eng. (IJRTE)* 1 (2013) 134-138.
- [156] Awad S, Varuvel EG, Loubar K, Tazerout M. Single zone combustion modeling of biodiesel from wastes in diesel engine, *Fuel* 106 (2013) 558-568.
- [157] Rakopoulos DC, Rakopoulos CD, Giakoumis EG, Papagiannakis RG, Kyritsis DC. Experimental-stochastic investigation of the combustion cyclic variability in HSDI diesel engine using ethanol-diesel fuel blends, *Fuel* 87 (2008) 1478-1491.
- [158] Ramadhas AS, Jayaraj S and Muraleedharan C. Theoretical modeling and experimental studies on biodiesel-fueled engine, *Renewable Energy*; 2006;31:1813-1826.
- [159] Sivalingam M, Mahapatra SS, Hansdah D, Horak B. Validation of some engine combustion and emission parameters of a bioethanol fuelled DI diesel engine using theoretical modelling, *Alexandria Engineering Journal*; 2015;54:993-1002.

- [160] Descieux D and Feidt M. One zone thermodynamic model simulation of an ignition compression engine, *Applied Thermal Engineering*; 2007:27:1457-1466.
- [161] V Hariram and R Bharathwaaj. Application of zero-dimensional thermodynamic model for predicting combustion parameters of CI engine fuelled with biodiesel-diesel blends, *Alexandria Engineering Journal*; 2016:55:3345-3354.
- [162] Abou Al-Sood MM, Ahmed M and Abdel-Rahim YM. Rapid thermodynamic simulation model for optimum performance of a four-stroke, direct-injection, and variable-compression-ratio diesel engine, *International Journal of Energy and Environmental Engineering*; 2012:3:1-13.
- [163] Shipinski J, Uyehara OA, and Myers PS. Experimental Correlation between Rate-of-Injection and Rate-of-Heat-Release in a Diesel Engine, Paper no. 68-DGP-11, ASME, New York, 1968.
- [164] Sitkei G. Kraftstoffaufbereitung und Verbrennung bei Dieselmotoren, Springer-Verlag, Berlin, 1964.
- [165] Tinaut FV. Contribution al Estudio del Proceso de Combustion in Motores de Encendido por Compression de Inyeccion Directa, Dr. Eng. Thesis, Polytechnic University of Valencia, Valencia, Spain, 1986.
- [166] Watson N, Pilley AD, Marzaouk MA. A combustion correlation for diesel engine simulation, SAE International Congress and Exposition, Detroit, Mich., SAE paper no. 800029, 1980.
- [167] Weibe I. Halbempirische Formel dur die Verbrennungsgeschwindigkeit, in *Kraftstoffaufbereitung und Verbrennung bei Dieselmotoren*, ed. G. Sitkei , pp.156-159, Springer-Verlag, Berlin, 1964.

- [168] Miyamoto N, Chikahisa T, Murayama T and Sawyer R. Description and analysis of diesel engine rate of combustion and performance using Wiebe's functions. SAE International Congress and Exposition, Detroit, Mich., SAE paper no. 850107, 1985.
- [169] Murayama T, Miyamoto N, Yamada T, Kawashima JI and Itow K. A method to improve the solubility and combustion characteristics of alcohol-diesel fuel blends, SAE Congress and Exposition, Detroit, Mich., SAE paper no. 821113, 1982.
- [170] Qi K, Feng L, Leng X, Du B, Long W. Simulation of quasi-dimensional combustion model for predicting diesel engine performance, *Applied Mathematical Modelling* 35 (2011) 930-940.
- [171] Sezer I. Thermodynamic, performance and emission investigation of a diesel engine running on dimethyl ether and diethyl ether, *International Journal of Thermal Sciences* 50 (2011) 1594-1603.
- [172] Gogoi TK , Baruah DC. A cycle simulation model for predicting the performance of a diesel engine fuelled by diesel and biodiesel blends, *Energy* 35 (2010) 1317-1323.
- [173] F. Scappin, S.H. Stefansson, F. Haglind, A. Andreasen, U. Larsen. Validation of a zero-dimensional model for prediction of NO_x and engine performance for electronically controlled marine two-stroke diesel engines, *Appl. Therm. Eng.* 37 (2012) 344-352.
- [174] Rakopoulos CD, Antonopoulos KA, Rakopoulos DC. Development and application of multi-zone model for combustion and pollutants formation in direct injection diesel engine running with vegetable oil or its bio-diesel, *Energy Conversion and Management* 48 (2007) 1881-1901.
- [175] Rakopoulos CD, Antonopoulos KA, Rakopoulos DC, Hountalas DT. Multi-zone modeling of combustion and emissions formation in DI diesel engine operating on ethanol-diesel fuel blends, *Energy Conversion and Management* 49 (2008) 625-643.

- [176] Mrzljak V, Medica V, Bukovac O. Volume agglomeration process in quasi-dimensional direct injection diesel engine numerical model, *Energy* 115 (2016) 658-667.
- [177] Kouremenos DA, Rakopoulos CD, Yfantis EA. A FORTRAN program for calculating the thermodynamic and transport properties of diesel fuel, *Adv. Eng. Software*, 1990, Vol. 12, No. 4.
- [178] Kouremenos DA, Rakopoulos CD, Yfantis EA. A FORTRAN program for calculating the evaporation rates in diesel engine fuel sprays, *Advances in Engineering Software* 15 (1992) 67-71.
- [179] Reiter AJ, Kong SC. Combustion and emissions characteristics of compression-ignition engine using dual ammonia-diesel fuel. *Fuel* 2011; 90:87–97.
- [180] Boretti AA. Stochastic reactor modelling of multi modes combustion with diesel direct injection or hydrogen jet ignition start of combustion. *International Journal of Hydrogen Energy* 2012; 37: 13555-563.
- [181] Komninou NP, Rakopoulos CD. Modeling HCCI combustion of biofuels: a review. *Renewable and Sustainable Energy Reviews* 2012; 16:1588-610.
- [182] Visakhmoorthy S, Tzanetakis T, Haggith D, Sobiesiak A, Wena JZ. Numerical study of a homogeneous charge compression ignition (HCCI) engine fueled with biogas. *Applied Energy* 2012; 92: 437-46.
- [183] Finesso R, Spessa E. Ignition delay prediction of multiple injections in diesel engines, *Fuel* 119 (2014) 170-190.
- [184] Sun X, Liang X, Shu G, Wang Y, Wang Y, Yu H. Effect of different combustion models and alternative fuels on two-stroke marine diesel engine performance, *Applied Thermal Engineering* 115 (2017) 597-606.

- [185] Hu. Song, Hechun Wang, Chuanlei Yang, Yinyan Wang. Burnt fraction sensitivity analysis and 0-D modelling of common rail diesel engine using Wiebe function, *Appl. Therm. Eng.* 115 (25) (2017) 170-177.
- [186] Javed Syed, Rahmath Ulla Baig, Y.V.V. Salem Algarni, Satyanarayana Murthy, Mohammad Masood, Mohammed Inamurrahman. Artificial neural network modeling of a hydrogen dual fueled diesel engine characteristics: an experiment approach, *Int. J. Hydrogen Energy* 2017; 42 (22) 14750-14774.
- [187] Muhammad Hafiz N, Abu Mansor MR, Wan Mahmood WMF. Simulation of the combustion process for a CI hydrogen engine in an argon-oxygen atmosphere, *international journal of hydrogen energy* 2018; 43: 11286-11297.
- [188] Veynante D, Vervisch L. Turbulent combustion modeling. *Prog Energy Combust Sci* 2002; 28(3):193-266.
- [189] Yang V. Modeling of supercritical vaporization, mixing, and combustion processes in liquid-fueled propulsion systems. *Proc Combust Inst* 2000; 28 (1):925-42.
- [190] Dixon-Lewis G. Computer modeling of combustion reactions in flowing systems with transport. In: W. Gardiner (Ed.), *Combustion chemistry*; Springer; US: 1984; p. 21–125.
- [191] Lu X, Han D, Huang Z. Fuel design and management for the control of advanced compression-ignition combustion modes. *Prog Energy Combust Sci* 2011;37(6):741–83.
- [192] Sun J, Caton JA, Jacobs TJ. Oxides of nitrogen emissions from biodiesel-fuelled diesel engines. *Prog Energy Combust Sci* 2010; 36(6):677-95.
- [193] Banapurmath N, Tewari P, Gaitonde V. Experimental investigations on performance and emission characteristics of Honge oil biodiesel (HOME) operated compression ignition engine. *Renew Energy* 2012; 48:193-201.

- [194] Steinberg AM, Driscoll JF, Swaminathan N. Statistics and dynamics of turbulence-flame alignment in premixed combustion. *Combust Flame* 2012; 159(8):2576-88.
- [195] Ranzi E, Frassoldati A, Grana R, Cuoci A, Faravelli T, Kelley A, Law C. Hierarchical and comparative kinetic modeling of laminar flame speeds of hydrocarbon and oxygenated fuels. *Prog Energy Combust Sci* 2012; 38 (4):468-501.
- [196] Klimenko AY, Pope S. The modeling of turbulent reactive flows based on multiple mapping conditioning. *Phys Fluids (1994-present)* 2003; 15 (7):1907-25.
- [197] Achten WMJ., Almeida J, Fobelets V, Bolle E, Mathijs E, Singh VP, Tewari DN, Verhot LV, Muys B. Life cycle assessment of Jatropha biodiesel as transportation fuel in rural India. *Applied Energy* 87 (2010) 3652-3660.
- [198] Siregara K, Tambunanb AH, Irwantoc AK, Wirawand SS, Arakie T. A Comparison of Life Cycle Assessment on Oil Palm (*Elaeis guineensis* Jacq.) and Physic nut (*Jatropha curcas* Linn.) as Feedstock for Biodiesel Production in Indonesia. *Energy Procedia* 2016; 65:170 -179.
- [199] Lokesh AC, Mahesh NS, Gowda B, Kumar R, White P. Neem Biodiesel-A Sustainability Study. *Journal of Biomass to Biofuel*. Volume 1, Year 2015 Journal ISSN: 2368-596.
- [200] Chandrashekar LA, Mahesh NS, Gowda B, Hall W. Life cycle assessment of biodiesel production from pongamia oil in rural Karnataka. *Agric Eng Int: CIGR Journal*, September 2012, Vol. 14, No.3.
- [201] Rajaeifar MA, Ghobadian B, Safa M, Heidari MD. Energy life-cycle assessment and CO₂ emissions analysis of soybean based biodiesel: a case study. *Journal of Cleaner Production* 2014; 66: 233-241.
- [202] Yee KF, Tan KT, Abdullah AZ, Lee KT. Life cycle assessment of palm biodiesel: Revealing facts and benefits for sustainability. *Applied Energy* 2009; 86: S189-S196.

- [203] Kumar S, Singh J, Nanoti SM, Garg MO. A comprehensive life cycle assessment (LCA) of Jatropha biodiesel production in India, *Bioresource Technology* 2012; 110: 723-729.
- [204] Pandey KK, Pragya N, Sahoo PK. Life cycle assessment of small-scale high-input Jatropha biodiesel production in India, *Applied Energy* 88 (2011) 4831-4839.
- [205] Mohammadshirazi A, Akram A, Rafiee S, Kalhor EB. Energy and cost analyses of biodiesel production from waste cooking oil, *Renewable and Sustainable Energy Reviews* 2014; 33: 44-49.
- [206] Omid M, Ghojabeige F, Delshad M, Ahmadi H. Energy use pattern and benchmarking of selected greenhouses in Iran using data envelopment analysis, *Energy Conversion and Management* 2011;52 :153-162.
- [207] Mohammadshirazi A, Akram A, Rafiee S, Avval SHM, Kalhor EB. An analysis of energy use and relation between energy inputs and yield in tangerine production, *Renewable and Sustainable Energy Reviews* 2012; 16: 4515-4521.
- [208] Pleanjai S, Gheewala SH. Full chain energy analysis of biodiesel production from palm oil in Thailand, *Applied Energy* 86 (2009) S209-S214.
- [209] Adesanya VO, Cadena E, Scott SA, Smith AG. Life cycle assessment on microalgal biodiesel production using a hybrid cultivation system, *Bioresource Technology* 2014; 163: 343-355.
- [210] Gnansounou E, Raman JK. Life cycle assessment of algae biodiesel and its co-products, *Applied Energy* 2016; 161:300-308.
- [211] Hong J. Uncertainty propagation in life cycle assessment of biodiesel versus diesel: Global warming and non-renewable energy, *Bioresource Technology* 2012; 113: 3-7.

- [212] Lohan SK, Ramb T, Mukesh S, Ali M , Arya S. Sustainability of biodiesel production as vehicular fuel in Indian perspective, *Renewable and Sustainable Energy Reviews* 2013; 25: 251-259.
- [213] Girard P, Fallot A. Review of existing and emerging technologies for the production of biofuels in developing countries. *Energy Sustain Dev*; 2006:10:92-108.
- [214] Alamu O, Waheed M, Jekayinfa S. Biodiesel production from Nigerian palm kernel oil: effect of KOH concentration on yield. *Energy Sustain Dev*; 2007:11:77-82.
- [215] Noiroj K, Intarapong P, Luengnaruemitchai A, Jai-In S. A comparative study of KOH/Al₂O₃ and KOH/NaY catalysts for biodiesel production via transesterification from palm oil. *Renew Energy*; 2009:34:1145-1150.
- [216] Whitehouse ND and Sareen BK. Prediction of heat release in quiescent chamber diesel engine allowing for fuel/air mixing, SAE International Congress and Exposition, Detroit, Mich, SAE 1974 paper number 740054.
- [217] Kumar K, Babu MKG, Gaur RR and Garg RD. A thermodynamic simulation model for four stroke medium speed diesel engine, SAE International Congress and Exposition, Detroit, Mich., SAE 1984 paper number 840516.
- [218] D Mehrnoosh, HA Asghar and MA Asghar. Thermodynamic model for prediction of performance and emission characteristics of SI engine fueled by gasoline and natural gas with experimental verification, *Journal of Mechanical Science and Technology*, 26 (2012), 2213-2225.
- [219] JH Horlock and DE Witerbone. "Thermodynamics and gas dynamics of Internal Combustion Engine. Voll. II" Oxford: Clarendon press 1986.

[220] WJD Annand. Heat Transfer in the cylinders of Reciprocating I.C Engines. Proceedings of the Institution of Mechanical Engineers 1963; 177: 973-90.

[221] Tirkey JV, Gupta HN, Shukla SK. Integrated Gas Dynamic and Thermodynamic Computational Modeling of Multi-cylinder 4-stroke SI engine using Gasoline as a fuel, International journal of Thermal Science 2009; 13: 113-130.

[222] Kumar TA, Chandramouli R, Mohanraj T. A study on the performance and emission characteristics of esterified pinnai oil tested in VCR engine, Ecotoxicology and Environmental Safety 2015; 121: 51-56.

[223] Agarwal AK, Dhar A, Gupta J G, Kim WI, Choi K, Lee CS, Park S. Effect of fuel injection pressure and injection timing of Karanja biodiesel blends on fuel spray, engine performance, emissions and combustion characteristics, Energy Conversion and Management, 2015; 91: 302-314.

[224] B.R. Hosamani, V.V. Katti. Experimental analysis of combustion characteristics of CI DI VCR engine using mixture of two biodiesel blend with diesel, Engineering Science and Technology, an International Journal 2018; 21: 769-777.

[225] Heywood JB. Internal Combustion Engine Fundamental. McGraw-Hill Series in Mechanical Engineering, New York, USA, 1988.

[226] Lavoie GA, Heywood JB and Keck JC. Experimental and theoretical study of nitric oxide formation in internal combustion engines, Combust. Sci. Tech. 1(1970), 313-326.

[227] Dhar A, Agarwal AK. Performance, emissions and combustion characteristics of Karanja biodiesel in a transportation engine, Fuel 2014; 119: 70-80.

- [228] Rajasekar E, Selvi S. Review of combustion characteristics of CI engines fueled with biodiesel, *Renewable and Sustainable Energy Reviews* 2014; 35: 390-399.
- [229] ISO14044, 2006. Environmental Management-Life Cycle Assessment e Requirements and Guidelines. International Organisation for Standardisation (ISO), Geneva.
- [230] Lele S. 2007. The cultivation of *Jatropha curcas*. Available at: [http:// www.svlele.com/ jatropha_plant.htm/](http://www.svlele.com/jatropha_plant.htm/).
- [231] Lele S. 2007. The cultivation of Mahua (*Madhuca Indica*). Available at: [http:// www.svlele.com/mahua.htm/](http://www.svlele.com/mahua.htm/).
- [232] Lele S. 2007. The cultivation of Neem (*Azadirachta Indica*). Available at: <http://www.svlele.com/neem.htm>.
- [233] Agarwal AK and Rajamanoharan K. Experimental investigations of performance and emissions of Karanja oil and its blends in a single cylinder agricultural diesel engine. *Applied Energy* 2009; 86: 106-112.
- [234] R.S. Kureel, Ram Kishore, Dev Dutt. *Jajoba: A Potential Tree Borne Oilseed*, National Oilseeds & Vegetable Oils Development Board, 2008.
- [235] R.S. Kureel, Ram Kishore, Dev Dutt, Ashutosh Pandey. *Tung: A Potential Tree Borne Oilseed*, National Oilseeds & Vegetable Oils Development Board, 2009.
- [236] National Bank for Agriculture and Rural Development https://www.nabard.org/english/plant_coconut.aspx; [Cited on 23.07.2017].

[237] Oil Palm Cultivation Practices: Directorate of Oil Palm Research (Indian Council of Agricultural Research) Pedavegi-534450, West Godavari District, Andhra Pradesh. Website:<http://dopr.gov.in>.

[238] National Bank for Agriculture and Rural Development, https://www.nabard.org/english/plant_oilpalm.aspx; [Cited 24.07.2017].

[239] Maeda H, Hagiwara S, Nabetani H, Sagara Y, Soerawidjaya TH, Tambunan AH, Abdullah K, 2008. Biodiesel fuels from palm oil via the non-catalytic transesterification in a bubble column reactor at atmospheric pressure: a kinetic study. *Renew. Energy* 33, 1629-1636.

[240] Mousavi-Avval SH, Rafiee S, Jafari A, Mohammadi A. Optimization of energy consumption for soybean production using data envelopment analysis (DEA) approach. *Appl. Energy* 2011; 88: 3765-3772.

[241] Canakci M, Topakci M, Akinci I, Ozmerzi A. Energy use pattern of some field crops and vegetable production: case study for Antalya Region, Turkey. *Energy Convers Manage* 2005; 46: 655-66.

[242] Rafiee S, Mousavi Avval SH, Mohammadi A. Modeling and sensitivity analysis of energy inputs for apple production in Iran. *Energy* 2010; 35: 3301-6.

[243] Kitani O. CIGR handbook of agricultural engineering. Energy and biomass engineering, vol. 5. St. Joseph, MI: ASAE Publications; 1999.

[244] Mohammadi A, Omid M. Economical analysis and relation between energy inputs and yield of greenhouse cucumber production in Iran. *Appl Energy* 2010; 87(1):191-6.

- [245] Beheshti Tabar I, Keyhani A, Rafiee S. Energy balance in Iran's agronomy (1990-2006). *Renew Sustain Energy Rev* 2010; 14 (2): 849-55.
- [246] Heidari MD, Omid M, Mohammadi A. Measuring productive efficiency of horticultural greenhouses in Iran: a data envelopment analysis approach. *Expert Syst. Appl.* 2012; 39: 1040-1045.
- [247] Huo H, Wang M, Bloyd C, Putsche V. Life-cycle assessment of energy use and greenhouse gas emissions of soybean-derived biodiesel and renewable fuels. *Environ. Sci. Technol.* 2008; 43: 750-756.
- [248] Sheehan J, Camobreco V, Duffield J, Graboski M, Shapouri H, 1998. Life Cycle Inventory of Biodiesel and Petroleum Diesel for Use in an Urban Bus. Final report. National Renewable Energy Lab., Golden, CO (US) <www.nrel.gov/docs/legosti/fy98/24089.pdf>.
- [249] Kumar M, Dwivedi KN. *Jatroph: Ek parichay*. Kanpur: Chandrashekhar Azad University of Agriculture and Technology Press; 2009.
- [250] Puhan S, Vedaraman N, Ram BVB, Sankarnarayanan G, Jeychandran K. Mahua oil (*Madhuca Indica* seed oil) methyl ester as biodiesel-preparation and emission characteristics. *Biomass Bioenergy* 2005; 28: 87-93.
- [251] Ragit SS, Mohapatra SK, Kundu K, Gill P. Optimization of Neem methyl ester from transesterification process and fuel characterization as a diesel substitute. *Biomass Bioenergy* 2011; 35(3): 1138-44.
- [252] Haas MJ. Improving the economics of biodiesel production through the use of low value lipids as feedstocks: vegetable oil soapstock. *Fuel Process Technol* 2005; 86: 1087-96.

- [253] How HG, Masjuki HH, Kalam MA, Teoh YH. An investigation of the engine performance, emissions and combustion characteristics of coconut biodiesel in a high pressure common-rail diesel engine, *Energy* 2014; 69: 749-759.
- [254] Karmakar A, Karmakar S, Mukherjee S. Biodiesel production from neem towards feedstock diversification: Indian perspective, *Renewable and Sustainable Energy Reviews* 16 (2012) 1050– 1060.
- [255] Ragit SS, Mohapatra SK, Kundu K. Performance and emission evaluation of a diesel engine fuelled with methyl ester of neem oil and filtered neem oil. *J Sci Ind Res* 2010; 69: 62–6.
- [256] Yusup S, Khan M. Basic properties of crude rubber seed oil and crude palm oil blend as a potential feedstock for biodiesel production with enhanced cold flow characteristics. *Biomass Bioenergy* 2010; 34(10):1523–6.
- [257] Queiroz AG, Franc L, Ponte MX. The life cycle assessment of biodiesel from palm oil (“dende”) in the Amazon. *Bio mass and bio energy* 2012; 36: 50-59.
- [258] Cho HJ, Kim JK, Ahmed F, Yeo YK. Life-cycle greenhouse gas emissions and energy balances of a biodiesel production from palm fatty acid distillate (PFAD), *Applied Energy* 2013; 111: 479-488.
- [259] Naik M, Meher LC, Naik SN, Das LM. Production of biodiesel from high free fatty acid Karanja (*Pongamia pinnata*) oil, *biomass and bioenergy* 2008; 32: 354-357.
- [260] Shehata MS, Razek SMA. Experimental investigation of diesel engine performance and emission characteristics using jojoba/diesel blend and sunflower oil, *Fuel* 2011; 90: 886-897.

[261] Shang Q, Jiang W, Lu H, Liang B. Properties of Tung oil biodiesel and its blends with 0[#] diesel, *Bioresource Technology* 2010; 101: 826–828.

[262] Gadhawe SL, Ragit SS. Optimization of Tung Oil Methyl Ester from Transesterification Process and Fuel Characterization as Diesel Substitute, *International Journal of Latest Trends in Engineering and Technology (IJLTET)*, ISSN: 2278-621X, vol. 7 issue 2 July 2016, page no. 116-120.

[263] Uttar Pradesh Minimum Wage with effect from April 1, 2018 to September 30, 2018. <https://paycheck.in/salary/minimumwages/uttar-pradesh>; [Cited on 31.07.2018].

[264] Indian oil (The Energy of India). https://www.iocl.com/Product_PreviousPrice/Diesel_PreviousPriceDynamic.aspx; [Cited on 25.06.2018].

[265] Adinath Petrochems, <http://www.adinathpetro.com/productlist.asp>; [Cited on 27.07.2018].

[266] Ministry of chemical and fertilizers, Government of India, <http://fert.nic.in/>; [Cited on 27.07.2018].

[267] Historic inflation India-CPI inflation. <https://www.inflation.eu/inflation-rates/india/historic-inflation/cpi-inflation-india.aspx>; [Cited on 30.07.2018].

[268] Liaquat AM, Masjuki HH, Kalam MA, Rizwanul Fattah IM, Hazrat MA, Mofijur M, Shahabuddin M. Effect of coconut biodiesel blends fuels on engine performance and emission characteristics . *Procedia engineering*; 2013;56: 583-590.

[269] Muralidharan K, Vasudevan D. Performance, emission and combustion characteristics of variable compression ratio engine using methyl-ester of waste cooking oil and diesel blends. *Applied energy*; 2011;88:3959-3968.

[270] T Mohanraj and K Murugu Mohan Kumar. Operating characteristics of a variable compression ratio engine using esterified tamanu oil, *International Journal of Green Energy* 2013; 10: 285-301.

[271] K. Anbumani and Ajit Pal Singh, "Performance of Mustard and Neem Oil Blends With Diesel Fuel in C.I. Engine", *ARPJ Journal of Engineering and Applied Sciences*, Vol. 5, No. 4, April 2010, pp.14-20.

[272] Jiang J-J, Tan C-S. Biodiesel production from coconut oil in supercritical methanol in the presence of co-solvent. *J Taiwan Inst Chem Eng* 2012; 43:102-7.

[273] Kumar A, Shukla SK, Tirkey JV. Performance and Emission Characteristics of Coconut Biodiesel and Diesel Blends on VCR Engine. *International Journal of Innovative Research in Engineering & Management (IJIREM)*, 2016; 3: 381-390.

[274] T. Venkateswara Rao , G. Prabhakar Rao , and K. Hema Chandra Reddy, "Experimental Investigation of Pongamia, Jatropha and Neem Methyl Esters as Biodiesel on C.I. Engine", *Jordan Journal of Mechanical and Industrial Engineering*, Volume 2, Number 2, Jun. 2008, ISSN 1995-6665, Pages 117-122.

[275] Singh B & Shukla SK. Experimental analysis of combustion characteristics on a variable compression ratio engine fuelled with biodiesel (castor oil) and diesel blends, *Biofuels*, 2016; 7: 471-477.

[276] DH Qi, H Chen, LM Geng, Y ZH. Bian. Experimental studies on the combustion characteristics and performance of a direct injection engine fueled with biodiesel/diesel blends. *Energy Conversion and Management* 2010; 51: 2985-2992.

- [277] Song J, Cheenkachorn K, Wang J, Perez J, Boehman AL, Young PJ. Effect of oxygenated fuel on combustion and emissions in a light-duty turbo diesel engine. *Energy Fuel*; 2002;16: 294-301.
- [278] Orkun Ozener, Levent Yuksek, Alp Tekin Ergenc, Muammer Ozkan. Effects of soybean biodiesel on a DI diesel engine performance, emission and combustion characteristics, *Fuel*; 2014;115:875-883.
- [279] Urillo S, Miguez JL, Porteiro J, Granada E, Moran JC. Performance and exhaust emissions in the use of biodiesel in outboard diesel engines. *Fuel* 2007; 86:1765-71.
- [280] Nabi N, Akhter S, Shahadat MZ. Improvement of engine emissions with conventional diesel fuel and diesel–biodiesel blends. *Bioresour Technol*; 2006;97:372-8.
- [281] Beatrice C, Bertoli C, D' Alessio J, Del Giacomo N, Lazzaro M, Massoli P. Experimental characterization of combustion behaviour of new diesel fuels for low emission engines. *Combust Sci Technol* 1996; 120:335-55.
- [282] Ozsezen AN, Canakci M. Determination of performance and combustion characteristics of a diesel engine fuelled with canola and waste palm oil methyl esters. *Energy Convers Manage*, 2011; 52:108-16.
- [283] Tesfa B, Mishra R, Zhang C, Gu F, Ball AD. Combustion and performance characteristics of CI (compression ignition) engine running with biodiesel, *Energy* 2013; 51: 101-115.
- [284] Meng X, Chen G, Wang Y. Biodiesel production from waste cooking oil via alkali catalyst and its engine test. *Fuel Processing Technology* 2008; 89 (9): 851-7.

- [285] Puhan S, Vedaraman N, Sankaranarayanan G, Ram BVB. Performance and emission study of Mahua oil (madhucaindica oil) ethyl ester in a 4-stroke natural aspirated direct injection diesel engine, *Renew Energy* 2005; 30: 1269-78.
- [286] Gnanasekaran S, N Saravanan, Ilangkumaran M. Influence of injection timing on performance, emission and combustion characteristics of a DI diesel engine running on fish oil biodiesel, *Energy* 2016; 116: 1218-1229.
- [287] Sayin Cenk, Ilhan Murat, Canakci Mustafa, Gumus Metin. Effect of injection timing on the exhaust emissions of a diesel engine using diesel-methanol blends, *Renew Energy* 2009; 34: 1261-9.
- [288] Ozcan H and Yamin JAA. Performance and emission characteristics of LPG powered four stroke SI engine under variable stroke length and compression ratio, *Energy Conversion and Management* 2008; 49: 1193-1201.
- [289] Yamin JAA, and Dado MH. Performance simulation of a four-stroke engine with variable stroke-length and compression ratio, *Applied Energy* 2004; 77: 447-463.
- [290] Yadav AK, Khan ME, Pal A. Kaner biodiesel production through hybrid reactor and its performance testing on a CI engine at different compression ratios, *Egyptian Journal of Petroleum* 2017; 26: 525-532.
- [291] Nagaraja S, Sooryaprakash K, Sudhakaran R. Investigate the Effect of Compression Ratio over the Performance and Emission Characteristics of Variable Compression Ratio Engine Fueled with Preheated Palm Oil -Diesel Blends, *Procedia Earth and Planetary Science* 2015;11:393-401.
- [292] Gupta HN. *Fundamental of internal combustion engines*, India, 2006.

[293] Chon DM, Heywood JB. Performance scaling of spark-ignition engines: Correlation and historical analysis of production engine data. SAE Paper 2000-01-0565, 2000; pp 1-12.

[294] Filipi ZS, Assains DN. The effect of the stroke-to-bore ratio on combustion, heat transfer and efficiency of a homogeneous charge spark ignition engine of given displacement. *Int. J. Engine Res.* 2000, 1 (2), 191-208.

[295] Siewert RM. Engine combustion at large bore-to-stroke ratios. *SAE Transactions* 1978; 87: 3637–51.