

Regeneration of Used Lube Oil by using Solvent Extraction Method

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Abstract: *Regenerated or recycle of oil is economical process and reduce the environmental pollution produce from the used lube oil. Regenerated of used oil with solvent extraction shows the yield up to 90 % which is more than the oil regenerated from the different acid. In the solvent extraction we need separate column for solvent recovery. The major benefit of solvent extraction process gives higher yield and high quality product compares with acid treatment process and also reduce the sludge generation problem that produce by acid method. That will be reduce the degree and nature of contamination, environmental/health risks associated with disposal. With help of Activated charcoal/alumina or silica gel can removes the color and various impurities presents in the recycled used oil by using different acids. The major drawback to the acid/clay method is difficulty of removal of clay sludge. MEK are 62%, 68% and 72% at feed to solvent ration 1:2, 1:4 and 1:6 settling time 24 hr., extraction 30-40 mins at temperature of 35-45 OC. As per analysis the optimum feed to solvent ration will be 1:4 in which yield of oil and its properties are satisfactory for further use of oil. As per analysis with MEK solvent regenerated oil gives highest yield or recovery of lube oil from waste oil. As per analysis the optimum feed to solvent ration will be 1:4 in which yield of oil and its properties are satisfactory for further use of oil. Solvent extraction process cost reducing, less sludge producing and high yield process. All there solvents have better yield and high recoverability by simple distillation process. By experimental analysis it's clear that the solvent extraction process for regeneration of lube oil is easy, simple, cost effective and low sludge producing. Additionally use of alumina or silica gel are beneficial for removal of impurities and color from regenerated oil.*

Keywords: Used Lube Oil Regeneration, Solvent Extraction, MEK, Silica or Alumina Gel

REFERENCES

- [1]. Bakare O. A. and Udonne J. D., Recycling of Used Lubricating Oil Using Three Samples of Acids and Clay as a Method of Treatment , Department of Chemical and Polymer Engineering, Lagos State University, Nigeria, International Archive of Applied Sciences and Technology IAAST; Vol 4 [2] June 2013.
- [2]. Deepa Priya N, Sakeer Hussain M and Saravanan K , Studies on Reuse of Re-Refined Used Automotive Lubricating Oil Department of Chemical Engineering, Kongu Engineering College, Perundurai - 638052, Tamilnadu , INDIA, Research Journal of Engineering Sciences, Vol. 3(6), 8-14, June (2014), ISSN 2278 – 9472.
- [3]. Khot Sain, Hallale Sivakumar and Zare Kirti Bhushan, Comparison between Different Methods of Waste Oil Recovery , Assistant Professor, D.Y. Patil Institute of Engineering, Management and Research, Akurdi, Pune, India, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 5, Issue 11, ISSN(Online) : 2319-8753, November 2016.
- [4]. Khan F and Kamal A., Effect of Extraction and Adsorption on Re-refining of Used Lubricating Oil Department of Applied Chemistry & Chemical Technology and Department of Chemical Tech./Eng., University of Karachi, 75270, Karachi – Pakistan, Oil & Gas Science and Technology – Rev. IFP, Vol. 64 - 2009.
- [5]. Merai Yash P, Re-refining of used lubricating oil, International Journal of Scientific & Engineering Research, Volume 6, Issue 3, March-2015, ISSN 2229-5518.

- [6]. Mohammed Ibrahim Hassan and Salah Eldeen F. Hegazi, Recycling of Waste Engine Oils Using Different Acids as Washing Agents, Department of Chemical Engineering, Jazan University, Jazan, Saudi Arabia and Department of Chemical Engineering, ElimamElmahdi University, Kosti, Sudan, International Journal of Oil, Gas and Coal Engineering 2017; 5(5): 69-74.
- [7]. Mujidat Omolara, Araromi, and Dauda Olurotimi, Regeneration of Used Lubricating Engine Oil by Solvent Extraction Process Department of Chemical Engineering, Faculty of Engineering, Ladoke Akintola University of Technology P.M.B. 4000,Ogbomoso, Nigeria, International Journal of Energy and Environmental Research Vol.3,No.1, ISSN 2055-0197,pp.1-12, March 2015.
- [8]. Muhammed Ibrahim Panhwar, Rafique Akthar Kazi and Hassan Ali Durrani, Re-Refining of Waste Lubricating Oil by Solvent Extraction, Professor Department of Mechanical Engineering, Professor, Institute of Petroleum and Natural Gas Engineering and Ph.D. Scholar, Department of Mechanical Engineering, Mehran University Research Journal Of Engineering & Technology, Volume 30, No. 2, ISSN 0254-7821, April, 2011.
- [9]. Negash Tadele, Refining of Used Motor Oil using Solvent Extraction, Addis Ababa University School of Graduate Institute of Technology School of Chemical And Bio Engineering Process Engineering Stream.
- [10]. Prof. Elizabeth Joseph, Gauri Pai, Ajinkya Modak, Yash Awatramani and Prajakta Pawar, Design of a Batch process for Re-refining of used Lube oil using Composite Solvent Technique Thadomal Shahani Engineering College, Mumbai University, International Journal of Latest Engineering Research and Applications (IJLERA) ISSN: 2455-7137 Volume – 01, Issue – 05, August – 2016.
- [11]. Re-Refining Of Used Lubricating Oils, VII-Energy B-Re-Refining Used Oils-1.
- [12]. Sandeep Kumar Tiwari, Gagnesh Sharma and Anamika Paul, Re-refining of Waste Lubricating Oil using different Acid Department of Chemical Engineering, Galgotias University Greater Noida, Journal of Basic and Applied Engineering Research p-ISSN: 2350-0077; e-ISSN: 2350-0255; Volume 3, Issue 2; January-March, 2016, pp. 162-165.
- [13]. SterpuAncaelena and Dumitru Anca, Regeneration of Used Engine Lubrication Oil by Solvent Extraction, the Solvent Influence on Oil Ratio, Ovidius University of Constanta, the annals of Dunarea De Jos, University of Galati. Fascicle IX. Metallurgy and Materials Science N0 . 1 – 2013, ISSN 1453 – 083X.
- [14]. SrisudaNitheththam and Emma Asnachinda, Recovery of Waste Engine Oil by Solvent Extraction Method, Effects of Waste Engine Oil to Solvents and Mixed Solvents Ratio, Department of Chemical Engineering, Faculty of Engineering, Burapha University, Chon Buri, Thailand, The 8th International Thai Institute of Chemical Engineering and Applied Chemistry Conference 2018.
- [15]. Shoaib Abeer and Eman A. Emam, Re-refining of Used Lube Oil, II- by Solvent/Clay and Acid/Clay-Percolation Processes, Department of Refining Engineering and Petrochemicals, Faculty of Petroleum and Mining Engineering, Suez Canal University, Suez, Egypt, ARPN Journal of Science and Technology, VOL. 2, NO. 11, ISSN 2225-7217, Dec 2012.
- [16]. Seham A. Shaban , Hussien A. El Sayeda and M. M. Dardir, Spent Oil Management and its Recycling by Hydrotreating Catalyst for Oil Well Drilling Fluid, Refining Department and Production Department, Egyptian Petroleum Research Institute, Nasr City, CAIRO, EGYPT, Int. J. Chem. Sci.: 13(4) , 1911-1934 ISSN 0972-768X, 2015.
- [17]. Sayed K. Attia, Afaf R. Tama and Doaa I. Osman, Recycling of used engine oil by different solvent, Egyptian Petroleum Research Institute, Analysis and Evaluation Department, Cairo,Egyptian Journal of Petroleum 2017.
- [18]. Shaymaa M. A. Mahmood and Yasser I. Abdulaziz, Recovery of Base Oil from Spent Automobile Oil Using Elementary and Binary Solvent Extraction, Chemical Eng. Dept., College of Engineering, Al-Nahrain University/ Baghdad – Iraq, Al-Nahrain University, College of Engineering Journal (NUCEJ) Vol.91 No.2, 6192, pp.370 – 384.
- [19]. Y. O. Zubair, and J. A. Okolie, Improving the Viscosity Index of Used Lubricating Oil by Solvent Extraction Department of Chemical Engineering, Federal University of Technology Minna Nigeria 2Michael Okpara University of Agriculture, Umudike Nigeria, International Research Journal of Engineering and Technology

