

# 17<sup>th</sup> World Convention on Waste Recycling and Reuse

April 18-19, 2022 | Webinar

Md Amanullah, Adv Recycling Waste Manag 2022, Volume 07

## Recycling and reusing of waste cooking oils to develop value added green products for oil and gas field applications

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**W**aste cooking oils (WCOs) are the used oils that are not edible and usually discarded illegally by households and restaurants, food frying and food processing facilities, catering industries, etc after the end of their edible life cycle. Even, though WCOs are ecofriendly, biodegradable and virtually non-toxic, disposal of huge amount of WCOs in the sinks, drainage systems, canals, rivers, water ways, ecosystems, landfills, etc can cause numerous ecological, environmental and municipal problems due to the oxygen and light depletion effect on aquatic lives, blockage of drainage and waterways and the eutrophication effect of excessive minerals and nutrients of the disposal or accumulates sites. Eutrophication is the result of high nutrient-induced increase in phytoplankton productivity, micro-organisms heightening and algal growth in waterways, landfills, drainage systems, marshes, canals, lakes, water reserves, etc. Hence, recycling and reusing of WCO for development of various green additives and value-added products for different industrial applications could solve the illegal disposal problems and associated environmental issues of WCOs. Moreover, the synthesis and development of green additives will safeguard the global environments and ecosystems by providing a sustainable source of ecofriendly additives for various industrial applications. This paper describes the synthesis, development and formulation of several green additives and products by recycling the WCOs for reusing for oil and gas industry applications to explore and exploit hydrocarbon resources without any damage and degradation to terrestrial, coastal and marine environments, eco-systems and non-hydrocarbon resources.

The green products and additives were developed by physical pretreatment and transesterification of waste cooking oils using methanol and a basic catalyst. The developed products are ecofriendly lubricants for water-based muds, a base fluid for Eco-OBM formulation and an ecofriendly spotting fluid to rescue a stuck pipe in case of a pipe sticking event while drilling.

Experimental results of the WBM (water-based mud) lubricants indicate excellent lubrication potential to enhance the water-based mud lubricity and reduce the coefficient of friction (COF). The ecofriendly base fluid developed by transesterification of WCO has rheological profile and plastic viscosity similar to mineral oil-based base-stocks and thus demonstrates its suitability for an Eco-OBM development to safeguard the global environment. An ecofriendly spotting fluid developed using the WCO-based feedstock also showed superior debonding of adhesive bonds created between the metal surface of a spherical foot embedded into a mud cake and thus demonstrated its potential to provide higher ease of recovery of a stuck pipe in a real borehole environment compared to a traditional spotting fluid used for comparative assessment of the debonding performance of spotting fluids. The results clearly demonstrate the potential of recycling and reusing of WCOs for various green additives and products development for different industrial applications including the vibrant oil and gas industry to meet the global energy demand without any detrimental impact on terrestrial, coastal and marine environments and ecosystems.

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## Biography

Dr. Md. Amanullah has MS in Mechanical Engineering from Moscow Oil and Gas Institute, Ph.D. in Petroleum Engineering from Imperial College, London and Post-doctoral research at University of Texas at Austin. He has more than 30 years academic, research, consulting, experience in various organizations of the world. He is currently working as a Product and Technology Development Adviser in UITS, in Dammam, Saudi Arabia. Previously he worked as a Sr. Petroleum Engineering Consultant, Saudi Aramco and Principal Research Scientist, CSIRO, Australia. He filed in excess of 200 patents, 102 already granted. Published more than 120 conference and journal papers and received several national, regional and international awards

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**Received:** October 06, 2021; **Accepted:** October 08, 2021; **Published:** April 20, 2022

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