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Isolation hydrocarbonoclastic bacterial of consortium for degradation of petroleum hydrocarbons in contaminated soils

Erika Elizabeth Barbosa Mireles¹ and **Ulrico Javier Lopez Chuken²**
Universidad Autónoma de Nuevo León, México

Contamination of water and soil by hydrocarbons has increased in recent years. Hydrocarbons are widely known to be extremely polluting with toxic, carcinogenic and mutagenic potential for humans while concern increases due to the difficulty to removing these compounds from the environment. This type of environmental contingencies arise direct effects on biota, since oil contains toxic chemicals that cause damage to plants, animals and humans but mainly on populations of microorganisms which represent an important part of the ecosystem and are key processes biogeochemicals. As an alternative to this problem bioremediation born; environmental technology as its main advantage is its versatility as it is a natural process of environmental self-sanitation and can adapt to the needs of each site. The denominated “hydrocarbonoclastic bacteria” are categorized according to the carbon source used when they are able to grow with alternative carbon sources. A number of these bacteria may yet be undiscovered and this bacterial can be used with the bioaugmentation technical to enhance the rate of remediation of contaminated natural systems by adding specific microorganisms to the system in this work used the “bacterial hydrocarbonoclastic”. Mexico is known for being one of world’s biggest oil producers and within its territory a number of natural oil seeps are found. In sites with these characteristics are known to exist hydrocarbonoclastic bacterial which have the distinctive ability to survive with hydrocarbons alone as carbon source (food) and facilitate mineralization by forming organic compounds more labile by breaking bonds. Due to the unique characteristics of these microorganisms, their use in soil environmental reclamation programs could be assumed.

barbosaerika591@gmail.com

Solid biofuels made of plant biomass as a resource of renewable green energy

Michael Ioelovich
Designer Energy Ltd, Israel

Considerable attention in recent years has been given to plant biomass as energy source which in contrast to the fossil sources is continuously renewed in nature. In this paper the use of the non-edible plant biomass for production of various kinds of biofuels is considered. To generate energy, the plant biomass either can be burned directly or it can be used after its conversion into solid biochar, liquid biofuels or biogas. A comparative analysis of energetic potential of various kinds of biofuels revealed that the most efficient way to produce renewable energy is a direct burning of the plant biomass in a pelletized form while the burning of such amount of the solid, liquid or gaseous biofuel which can be obtained from the plant material gives a much smaller energetic effect. New pelletizing technology of the powdered biomass together with high-energetic organic binders was proposed. As a result, the modified pellets acquire improved fuel parameters: Net combustion energy of 28-30 MJ/kg and an energetic density of 23-25 GJ/m³. The energetic characteristics of modified pellets are significantly higher than common pellets but these are close to energetic characteristics of average-quality coal. Furthermore, unlike the coal, the modified pellets have reduced emission of particles, zero emission of sulfur oxides and neutral emission of carbon dioxide.

bd895892@zahav.net.il