



ABSTRACT

Algae appear to be an emerging source of biomass for biodiesel that has the potential to completely displace fossil fuel. It is truly renewable, sustainable and environment friendly option of great potential for global energy needs. This study was undertaken to investigate biodiesel potential of some local green algal species. Altogether four algal species *Cladophora oligoclona* Kützing, *Spirogyra intorta* Jao, *S. hyalina* Cleve and *S. dacimina* (Müller) Kützing from Chlorophycota were collected from freshwater ponds, channels and tanks of Lahore and Gujranwala. When analyzed for biodiesel production capacity *Cladophora oligoclona* Kützing showed high quantity of biodiesel (1.25ml) whereas *Spirogyra dacimina* (Müller) Kützing became the least efficient (1.14ml). *Spirogyra dacimina* (Müller) Kützing left 88.4% biomass after lipids extraction and sediments (15.04gm), greater among all experimental algal species. pH of biodiesel of all experimental algal species fall in the range of 7.6-7.9. Density range was 0.896-0.885g/cm³ which is within the standard range of biofuels given by EN 14214 and ISO 15607. A variety of saturated and unsaturated fatty acids as methyl esters were detected by GC-MS technique from algal biodiesel and analyzed both qualitatively and quantitatively. Total 23 different fatty acids (FAs) methyl esters have been detected including 14 saturated fatty acids (SFAs) methyl esters and 9 unsaturated fatty acids (USFs) methyl esters. The USFs methyl esters comprised of 4 monounsaturated fatty acids (MUSFs) methyl esters, 2 diunsaturated fatty acids (DUSFs) methyl esters and 3 triunsaturated fatty acid (TUSFs) methyl esters. *Spirogyra hyalina* Cleve displayed 11 saturated fatty acids methyl esters and *Cladophora oligoclona* Kützing showed 6 unsaturated fatty acids methyl esters, these were the highest number of SFAs and USFs methyl esters respectively among all algal species. *Spirogyra dacimina* (Müller) Kützing has more relative percentage of saturated fatty acids methyl esters (92.397%) than has the others. Monounsaturated (10.576%), Diunsaturated (9.641%) and Triunsaturated fatty acid methyl esters (9.952%) fatty acid methyl esters percentage was more in *Cladophora oligoclona* Kützing. As *Cladophora oligoclona* Kützing produced highest quantity of biodiesel, displayed reasonable quantity of saturated and unsaturated fatty acids methyl esters and density of biodiesel also in standard range, it can easily be concluded that *Cladophora oligoclona* Kützing is an efficient source of biodiesel among the sample species.