

## **Solid substrate fermentation of oil cake biomass using thermophilic *Bacillus licheniformis* KF583728 for biodiesel production**

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India is a global leader in production oilseeds with a current target of 40.2 million metric tons and export of worth \$1.5 billion for the year 2015-16 which generates huge amount of oil cake biomass. This inexpensive energy and nutrition rich biomass from oil processing industries provides ample scope of biotechnological applications with special reference to biodiesel production through solid state fermentation using lipase. In the present study we have investigated the potential of four different oilcakes of local oil refineries from seeds of olive, sesame, peanut and mustard as substrates for biodiesel production using lipase obtained from thermophilic bacteria *Bacillus licheniformis* KF583728 isolated from Taptapani hot spring of Odisha, India. Several process parameters were optimized aiming at highest biodiesel synthesis mediated by lipase production. Maximum lipase activity (58.18 IU/g) was observed for olive oil cake under favorable conditions such as pH 8.0, temperature 50<sup>0</sup>C, moisture content 50% and inoculum concentration 2X10<sup>6</sup> cells per 1ml of broth. Supplementation of broth with maltose as carbon and NaNO<sub>3</sub> as nitrogen sources enhanced microbial growth and hence influenced the lipase production to the highest (Maltose: 76.2, 60, 42.2 and 33.3 IU/g and NaNO<sub>3</sub>: 77.1, 62, 44 and 34.5 IU/g) using olive cake, sesame cake, peanut cake and mustard cake respectively under optimized conditions. Rhamnolipids biosurfactants were found induce the highest in lipase production of 146 IU/g for olive, 107 IU/g for sesame, 89 IU/g for peanut and 67 IU/g for mustard as compared to chemical surfactant tween20, tween80 and triton100. This is first report on biotechnological application of lipase from Taptapani hot spring using waste biomass as low cost substrate for production of biodiesel.