Substrate specificity of lipases from four species of Aspergillus towards hydrolysis of homoacid triacylglycerols and vegetable oils in non-aqueous system

ABSTRACT

Among the four species of Aspergillus, Aspergillus oryzea lipase demonstrates high preference towards medium chain triacylglycerols (C10) and discriminates against triunsaturated triacylglycerol (TAG) e.g. triolein. The great discriminating power of its lipase against triolein was shown in comparison with its ability to catalyse the hydrolysis of medium chain (C10) TAG e.g. tricaprin and less shown when hydrolysing saturated long chain TAG i.e. tripalmitin. The discriminating power of these lipases are in this order: triolein > tripalmitin > trilaurin > tricaprin. Similar phenomenon was noted when mycelium-bound lipases of Aspergillus sp. were used to catalyse the hydrolysis of coconut oil, palm olein, olive oil and flaxseed oil. In most cases, relative percentage of monounsaturated fatty acid (C18:1) in non-hydrolysed fractions of oils increased after 12 days of hydrolysis. Hydrolysis of flaxseed and olive oil showed that Aspergillus murarum, Aspergillus oryzea and Aspergillus flavus lipases have high preference towards polyunsaturated fatty acids i.e. linoleic acid (C18:2) in olive oil and linolenic acid (C18:3) in flaxseed oil and no preference for monounsaturated and saturated long chain fatty acids.

Keyword: Aspergillus species; Discriminate; Homoacid triacylglycerols; Lipases; Substrate specificity; Saturated short; Medium and long chain fatty acid