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Enzymes are formed in all livingorganisms where they catalyze and regulate essential chemical reactions neededfor the life of organism (Nisha and Divakaran, 2014).

Enzymes are proteins in nature. Theyare fragile and large molecules. Hence enzymes are completely different from thewell-known organic and inorganic catalysts. Soluble enzymes are regarded as beinginstable and sensitive to process conditions (Biro et al., 2008; Buchholz et al., 2012). Enzymes as biocatalystsEnzymes are biocatalysts which have differentapplications in industrial chemistry (Wohlgemuth, 2010). Thisapplication includes purified enzymes, immobilized enzymes or immobilized cellsas catalysts for the process mentioned above (Schmid et al.

, 2001; Gong et al., 2012). The development of biocatalysts is completely targeted to theprogress of protein expression, metabolic engineering, large-scale genomesequencing and detected evolution (Bornscheuer et al.

, 2012). Biocatalysts have a critical importance forprocesses of industrial, pharmaceutical and biotechnological application (Sanchezand Demain, 2010). The success of enzyme application for any enzymaticprocesses depends on the cost competitiveness as well as the well-establishedchemical methods (Tufvesson et al., 2010). When being compared to chemical catalysts, it is noted that enzymes are more incline to be consequently and are used in performingmolecular transformations which cannot be achievable by ordinary chemicalcatalysis (Liese et al., 2006). Enzymes which are thermostable at hightemperatures are more desirable in industrial applications. The rate ofreaction typically increases every 10°C increase in

temperature thus mostenzymes do not withstand high temperatures over higher than 40°C and they canbe denatured at extreme values of pH (Cornish-Bowden, 2004).

When applied to the industrialbiocatalysts area, enzymes are proven to provide a great success. Variousfactors may affect the application of biocatalysts, such factors are enzymepromiscuity, screening technologies as well as robust computational methods forimproving the properties of enzyme available for the applications (Adrio anddemain, 2014). In fact, the biotechnologicalprocesses have many advantages over well-established chemical processes such ashaving less catalyst waste, increased catalyst efficiency as well as a lower energydemand. They might be around 150 biocatalytic processes that are being appliedin industry (Panke and Wubbolts, 2005).

However, the new development inprotein engineering made it easier to successfully use particular enzymecharacteristics in industrial purpose (Lutz, 2010). According to the fact that enzymesare involved in all aspects of biochemical conversion varying from the simpleenzyme or fermentation conversion leading to the complex techniques in geneticengineering, it is fair to say that enzymes are considered as a focal point ofbiotechnological processes (Ebbs, 2004). Environmental and geneticmanipulations can be used to increase the enzyme levels. Thousand-foldincreases have been observed for catabolic enzymes, and biosynthetic enzymeshave been increased several hundred-fold (Burns and Dick, 2002). Many disadvantages

have been noted inthe processes of different industries such as the production of pharmaceuticalsand chemicals.

These disadvantages may include the need for high temperature, lowcatalytic efficiency, low pH and high pressure. Not to mention that usingorganic solvents produces pollutants and organic waste. Enzymes such asbiocatalysts are more useful for the applications mentioned above because theywork under mild reaction conditions, have a long half-life and they work onunnatural substrates (Johnson, 2013).

Furthermore, enzymes can bechemically-modified or selected genetically for improving some characteristics suchas substrate specificity, stability as well as specific activity. However, somedisadvantages are found in enzymes including the requirement of certainco-factor by enzymes. There are different ways that can be used in order to solvesuch a problem among which using the whole cells as well as recycling ofcofactor (Baici, 2015). Reports show that enzymes isolatedfrom microbes are applied in pharmaceuticals as diagnostic reagents, asreagents for the production of chemicals, food additives, the manufacture ofdetergents, the treatment of industrial wastes and bioremediation (Baxterand Cummings, 2006).