



**VISVESVARAYA TECHNOLOGICAL UNIVERSITY
BELGAUM - 590 010**

PROJECT WORK

**“UTILIZATION OF CRUDE GLYCEROL OBTAINED FROM WASTE
FISH OIL IN THE PRODUCTION OF 1,3-PROPANEDIOL”**

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Abstract

With rapidly increasing environment concern, the stakes are exceedingly high for the search of a greener substitute for various petrochemical products including fuels. However, the potential of the greener substitute requires attention to both safety as well as economical issues. For every 100 gallons of biodiesel produced, 5-10 gallons of the less glamorous crude glycerol are left behind with a sparking debate about the best uses of this waste. This impure form of glycerol must either be disposed off or sold off to market for a minimal amount due to the impurities it contains such as free fatty acids, water, methanol and salt content. Currently, most of it is simply incinerated. In this present context, glycerol which promises to be a good substrate is used for microbial production of 1,3-propanediol that changes the perception of glycerol as being an industrial waste. In this respect, more than 200 bacterial strains were screened out to identify their ability to convert glycerol to 1,3-propanediol anaerobically. Some of the organisms that are used in the production of 1,3-propanediol are *Klebsiella pneumoniae*, *Clostridium butyricum*, engineered *Escherichia coli*, and *Saccharomyces cerevisiae*. One of the potent strain which produces 1,3-propanediol is *Citrobacter freundii* which is an anaerobic bacteria. The crude glycerol obtained as a byproduct in the biodiesel production is used as a substrate to produce 1,3-propanediol in batch fermentation. 1,3-propanediol is a clear, odorless, colorless and harmless liquid that is miscible both in solvent and water and it is mainly used as a building block in the production of polymers, polyesters, as a solvent, antifreeze, wood paint and also used in various other industrial applications. Hence, in this context we are using waste fish oil in the production of biodiesel and thus obtained crude glycerol as a byproduct which can be utilized in the production of 1,3-propanediol. Further the benefits and opportunities associated with biodiesel production can be efficiently reaped by capitalizing upon the value added products that this waste glycerol can generate.