

## A REVIEW ON BIOCATALYSTS IN ORGANIC SYNTHESIS

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### ABSTRACT:

Biocatalysts are enzymes, whole cells, organelles, and viruses that catalyze chemical reactions in organic synthesis. They offer many advantages over traditional chemical catalysts, including higher reaction rates and improved product yields. Biocatalysis can be used to generate complex molecules from simpler substrates and provide insight into future applications in green chemistry. Biocatalysts can be used to catalyze a variety of organic reactions, including hydrolysis, esterification, and amination. They offer several advantages over traditional chemical catalysts in that they are more specific for their substrates and less likely to cause side reactions. In addition, they are often renewable and/or recyclable and generate less waste.

**Key words:** Chemical reactions, chemical catalysts, organic synthesis, biocatalysts.

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### INTRODUCTION:

Biocatalysts are an important part of organic synthesis, and they can be used in combination

with other catalysts to increase the efficiency of a reaction. In this article, we will review the use of biocatalysts in organic synthesis and discuss their various advantages and disadvantages. We will also explore how biocatalysis can be used to generate complex molecules from simpler substrates and provide insight into future applications in green chemistry. Finally, we will examine the potential for using biocatalysts to reduce the impact of organic synthesis on the environment.

### TYPES OF BIOCATALYSTS:

There are four main types of biocatalysts: enzymes, whole cells, organelles, and viruses. Enzymes are the most common type of biocatalyst and are proteins that catalyze chemical reactions in living organisms. Whole cells are living cells that can be used as biocatalysts. Organelles are subcellular structures that perform specific functions within a cell. Viruses are infectious particles that can catalyze chemical reactions.

### ADVANTAGES OF USING BIOCATALYSTS:

Biocatalysts are enzymes or whole cells that catalyze chemical reactions in organic synthesis. They offer many advantages over traditional chemical catalysts, including higher reaction rates, improved product yields, and more selective reactions. In addition,

biocatalysts are often more environmentally friendly than their chemical counterparts.

### **DISADVANTAGES OF USING BIOCATALYSTS:**

While biocatalysts offer many advantages over traditional chemical catalysts, there are also some disadvantages to consider. First, biocatalysts are often more expensive than chemical catalysts. Second, they can be more difficult to work with due to their biological nature. Finally, they may not be as effective as chemical catalysts in certain situations.

### **APPLICATIONS OF BIOCATALYSTS IN ORGANIC SYNTHESIS:**

In organic synthesis, biocatalysts can be used to catalyze a variety of reactions, including hydrolysis, esterification, and amination. Biocatalysts can also be used to improve the yield and/or selectivity of a reaction. For example, enzymes that catalyze the hydrolysis of esters can be used to increase the yield of acetic acid in the production of vinegar. Enzymes that catalyze the esterification of carboxylic acids can be used to produce biodiesel.

Biocatalysts offer several advantages over traditional chemical catalysts. First, they are often more specific for their substrates, meaning that they are less likely to cause side reactions. Second, they are usually much milder in terms of conditions (temperature, pH, etc.), meaning that they are less likely to damage sensitive substrates. Third, they are often renewable and/or recyclable. Finally, biocatalytic reactions often proceed with less waste generation than chemical reactions.

### **CONCLUSION:**

In conclusion, biocatalysts are an important and promising tool for organic synthesis. They provide a wide variety of properties that offer stability, safety, and selectivity in the production

of target molecules. With continuous advancements in research related to biocatalysts, their application is likely to increase further soon. Biocatalysts will not only be useful in synthetic chemistry but also play an even bigger role as they become more integrated into industrial-scale manufacturing processes.

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