



# DNA barcoding, an effective tool for species identification: a review

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## Abstract

DNA barcoding is a powerful taxonomic tool to identify and discover species. DNA barcoding utilizes one or more standardized short DNA regions for taxon identification. With the emergence of new sequencing techniques, such as Next-generation sequencing (NGS), ONT MinION nanopore sequencing, and Pac Bio sequencing, DNA barcoding has become more accurate, fast, and reliable. Rapid species identification by DNA barcodes has been used in a variety of fields, including forensic science, control of the food supply chain, and disease understanding. The Consortium for Barcode of Life (CBOL) presents various working groups to identify the universal barcode gene, such as COI in metazoans; rbcL, matK, and ITS in plants; ITS in fungi; 16S rRNA gene in bacteria and archaea, and creating a reference DNA barcode library. In this article, an attempt has been made to analyze the various proposed DNA barcode for different organisms, strengths & limitations, recent advancements in DNA barcoding, and methods to speed up the DNA barcode reference library construction. This study concludes that constructing a reference library with high species coverage would be a major step toward identifying species by DNA barcodes. This can be achieved in a short period of time by using advanced sequencing and data analysis methods.

**Keywords** Biodiversity · DNA barcoding · Next-generation sequencing (NGS) · Oxford Nanopore Technologies (ONT)'s MinION™ · PacBio sequencing · Consortium for barcode of life (CBOL)

## Introduction

The existence of life is one of the most unique aspects of Earth, and the diversity of life is the most astonishing feature of life. Biological diversity refers to the variation

among living organisms from all sources comprising terrestrial, marine, and other aquatic ecosystems and ecological complexes of which they are a part; it encompasses diversity within species, between species, and within ecosystems [1]. Biodiversity plays a key role in maintaining

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