Journal of Biotechnology & Biomaterials
ISSN: 2155-952X

Editorial Open Access

# Benefits of Archaea in Biotechnology: Both Present and Future

**Xian Rathod***

*Department of Biotechnology and Genetic Engineering, Jordan University of Science and Technology, Jordan*

## Abstract

The ability of archaea organisms to colonize some of the most hostile settings found in nature allows them to survive in temperatures that are too harsh for most other microbes to tolerate. Because of the stability of its proteins and enzymes can function in harsh environments where other proteins and enzymes can break down. They are the perfect fit for a variety of biotechnological applications simply due to their qualities. The most important uses of biotechnology, both present and future, are discussed in this overview, which is categorized based on the industry in which the application is intended. It also examines the benefits and downsides when employing it.

**Keywords:** Biosafety; Biosecurit; Biotechnology; Biological weapons; Bioterrorism; Biological weap

## Introduction

Of the "Kingdom," Woese et al. proposed the "Domain," an elevated group that divides all living things into three groups: Eukarya, Bacteria, and Archaea. They were produced by comparing 16S rRNA sequences in accordance with molecular criteria. Archaea are prokaryotic organisms with one cell that resemble both eukaryotes and bacteria. Archaea, however, has been defined by number distinctive traits. There are four recognized archaeal superphyla: Asgard's impressive colonize abilities TACK, DPANN, and Euryarchaeota. Always evolving, the published categorization of archaea is always being reviewed. Regardless of taxonomy, there is an alternate method of categorizing archaea based on their lifestyle, environment, and metabolism. This physiological classification's primary drawback is that it is limited to extremophile archaea, which grow in environments that are "extreme" in contrast to the "standard or normal ones" to which the majority of known microorganisms are acclimated. In spite of this, Asgard's incredible colonizing capacity, DPANN, and TACK. Gathered will be applied in this review [1,2]. The main goal of the interdisciplinary science of biotechnology is to create and/or enhance processes that can be beneficial to both the environment and living things. Because of their wide range, biotechnological applications have been classed using a variety of criteria. The most popular grouping scheme is a color-code system, where each color denotes the industry that an application is intended for. All agrees that just a maximum of eleven colors can becomes distinct. Since only eight are tied to archaea, they will be taken into considerations.

### Gray biotechnology

Administration of drugs: Given their outstanding endurance as well as ability to proliferate in polluted settings, archaea offer a significant deal of potential for application in bioremediation processes. Furthermore, as temperature, pH, and salinity are all vital for microbial development, habitats with extreme circumstances hinder the growth of many microorganisms, severely impeding the procedure for bioremediation. Consequently, Archaean representatives are the best person to fill this role. Pollutants are the substrates they utilize to get energy and carbon. Industrial sectors like oil and textile generate saline wastewater, often contaminated with toxic substances, which pose a significant health and environmental threat [3]. As a result of their outstanding endurance and ability to thrive in polluted settings, archaea offer a significant deal of promise for application in bioremediation methods. Additionally, as temperature, pH, and salinity are essential for microbial development, habitats with harsh conditions hinder the growth of many microbes, severely impeding the bioremediation process. Therefore, Archaean representatives are the best people for holding this role. Pollutants are the compounds they employ to get energy and carbon. The salty wastewater generated by these conditions by industry sectors including the textile and oil industries. They are frequently tainted with toxic substances, which gravely damage both the environment and human health [4]. Thus, they have to be endangering both the environment and human health.

### Red biotechnology

Liposomes have are particles that may retain substances within them since they are made of concentric lipid bilayers that are alternated with aqueous compartments. An "archaeosome"—a liposome with unique characteristics—is generated when archaeal lipids from the membrane are used in the production process. Given that the lipids of archaea are less sensitive than those of microorganisms belonging to other Domains, the physical properties of these lipids pass on to the archaeosomes, which exhibit extraordinary resilience in stressed conditions [5]. These qualities have led to proposals for the use of archaeosomes in biotechnological fields. Since the lipids of archaea are more resistant to stress than those of microorganisms adhering to other Domains, the physicochemical features of these lipids are passed to the archaeosomes, which exhibit remarkable resilience in stressed circumstances. These qualities have prompted suggestions for the use of archaeosomes in biotechnological applications.

### White biotechnology

Since the extremophilic archaea generate enzymes and proteins that are active in adverse conditions, their capacity to synthesize them has revolutionized industrial biotechnology. Because these living things thrive in harsh environments, they are perfect candidates for biocatalytic activities. The food, pharmaceutical, paper, leather, and textile areas are

***Corresponding author:** Xian Rathod, Department of Biotechnology and Genetic Engineering, Jordan University of Science and Technology, Jordan, E-mail: Rathodxian7@gmail.com

**Received:** 01-Nov-2023, Manuscript No. jbtbm-23-119500; **Editor assigned:** 03-Nov-2023, PreQC No. btbm-23-119500 (PQ); **Reviewed:** 17-Nov-2023, QC No. jbtbm-23-119500; **Revised:** 22-Nov-2023, Manuscript No: jbtbm-23-119500 (R); **Published:** 29-Nov-2023, DOI: 10.4172/2155-952X.1000355

**Citation:** Rathod X (2023) Benefits of Archaea in Biotechnology: Both Present and Future. J Biotechnol Biomater, 13: 355.

a few that have profited [6]. Nevertheless, relatively few enzymes from Archaea are commercially easily accessible; the majority are bacterial or fungal. However, their ability to survive in settings where bacterial and fungal enzymes are denatured is presently gaining attention. As a result, many archaeal enzymes have previously undergone testing, including lipases, proteases, amylases, and cellulases [7]. Numerous of them are now employed in extensive industrial operations. a number of them are currently employed in extensive industrial operations.

Cosmetics sector; although archaeosomes may have active chemicals and permeate the skin, unlike ordinary liposomes; they can also be employed in the beauty business [8]. They are also excellent choices to employ as molecular vectorization systems in skin care products. Additionally, because they can retain more moisture than hyaluronic acid, which has been used in this kind of sector, the exopolysaccharides (EPS) produced by the haloarchaea Haloterrigena turmenica may find usage in the cosmetics industry. Also, sun creams might contain chemical compounds that shield radiophilic archaea from UV light [9,10].

## Conclusions

Taking into account everything covered in this study, it can be said that bacteria are a resource that biotechnology is only now starting to use, and there are still a lot of unexplored uses. Nonetheless, because of their traits and capacity for harsh conditions, they currently find use in the various fields in which this study is focused. But in order to replace the current established and functioning networks, updates are still required. Maybe new archaea with unexpected traits will be found that will expand their field of study as "omics" and bioinformatics-based technologies grow exploration methods for hostile conditions get better, and a new generation of genes is sequenced.

### References

1. Halverson KM (2005) Anthrax biosensor, protective antigen ion channel asymmetric blockade. J Biol Chem 280: 34056-62.
2. Bayley H, Martin CR (2000) Resistive-pulse sensing-From microbes to molecules. Chem Rev 100: 2575-94.
3. Graham MD (2003). The Coulter principle: Foundation of an industry. J Lab Autom 8: 72-81.
4. Wang C, Zou P, Yang C, Liu L, Cheng L, et al. (2019). Dynamic modifications of biomacromolecules: mechanism and chemical interventions. Sci China Life Sci 62: 1459-1471.
5. Prosdocimi F, Farias ST, José MV (2022) Prebiotic chemical refugia: multifaceted scenario for the formation of biomolecules in primitive Earth. Theory Biosci 141: 339-347.
6. Wanunu M (2012) Nanopores: A journey towards DNA sequencing. Phys Life Rev 125-158.
7. Hazen RM (2006). Mineral surfaces and the prebiotic selection and organization of biomolecules. Am Mineral 91: 1715.
8. Vay LK, Mutschler H (2019) The difficult case of an RNA-only origin of life. Emerg Top Life Sci 3: 469-475.
9. Deblois RW, Bean CP, Wesley RKA (1977) Electrokinetic measurements with submicron particles and pores by resistive pulse technique. J Colloid Interface Sci 61: 323-35.
10. Kasianowicz JJ, Robertson JWF, Chan ER, Reiner JE, Stanford VM (2008). Annual review of analytical chemistry. Annual Reviews 1: 737-66.