



# Biodegradable Bioplastic from High Altitude Bacteria

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## Bioplastic

### Food and energy reserve for microbes

Polyhydroxyalkanoates (PHA) are the bioplastic produced by some bacteria and archaea as a storage source of carbon and energy in response to nutritional limitations especially nitrogen. PHA is a family of biodegradable polyesters synthesized by various microorganisms from a variety of substrate including sugars, fatty acids, CO<sub>2</sub> and methane, etc.

### Biodegradable and potential replacement for conventional plastic

These polyesters have gained interest worldwide because of their biodegradable nature, renewable origin and numerous applications such as in packaging, industrial raw materials and in the biomedical industry. Additionally, PHAs are seen to be the potential replacement of conventional petroleum-based non-biodegradable plastics.

## Source of Bioplastic



Sampling site in Himalaya  
Altitude 4280 meters above sea level

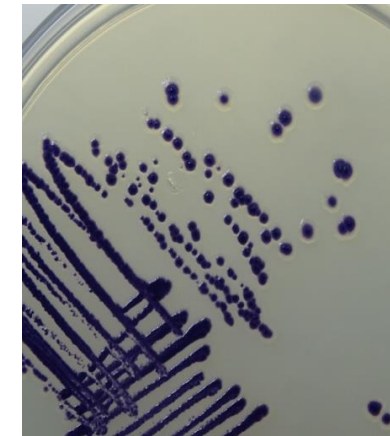


Bioplastic synthesizing Bacterial strain

## Unique features of our bioprocess of Bioplastic production

- Produces bioplastic upto 60% of its dry cell weight.
- Produces valuable violacein pigment.
- Two products i.e. bioplastic and violacein, in a single bioprocess.

## Bioplastic production process



(a) Bacterial culture



(b) Harvested culture broth



(c) extracted crude violacein



(d) extracted bioplastic



(e) Purified bioplastic



(f) Bioplastic film

## Applications of Bioplastic

### Packaging:

PHA finds various applications as plastic materials in packaging, preparing bags, paper coatings etc. Therefore, these polymers are green solution for petrochemical based plastic

### Medical Industry:

PHA have been found very important applications in therapeutics and biomedical industry sector as drug delivery, nano-vehicles carriers, medical devices, suture, surgical mesh, scaffolds for ligament and tendon repair and tissue engineering material .

### Market of PHA:

The market for PHA is projected to grow USD 93.5 million by 2021, at a CAGR of 4.88% from USD 73.6 million in 2016.

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