

Technology Overview

Introducing the World's Most Powerful Live Enzyme Technology

A result of over 18 years of research and development, BiOWiSH™ is a proprietary technology that accelerates enzymatic bio-chemical reactions, up to thousands of times faster than their normal rate.

The speed of BiOWiSH™ is due to the production of small molecule metabolite co-factors that in combination with a broad spectrum of enzymes have been proven to accelerate the breakdown of all non-living organic matter into its final inert compounds. BiOWiSH™ has also been proven to beneficially accelerate metabolic enzyme reactions.

In addition, BiOWiSH™ has anti-bacterial, anti-fungal and toxin neutralization properties which further sets it apart from conventional enzyme technologies.

As a core technology, BiOWiSH™ provides the solution to some of the most complex and pervasive problems facing mankind today such as global food shortage, greenhouse gas emissions and environmental pollution. Our motto: Biological help for the human race™.

BiOWiSH™ is 100% organic, natural, bio-degradable and safe for everyday use in a diverse range of consumer, commercial and industrial products. Its product applications are vast: from environmental management, including wastewater, solid waste, soil and water remediation, industrial emissions, to cropping, animal agriculture, aquaculture, as well as human and animal health.

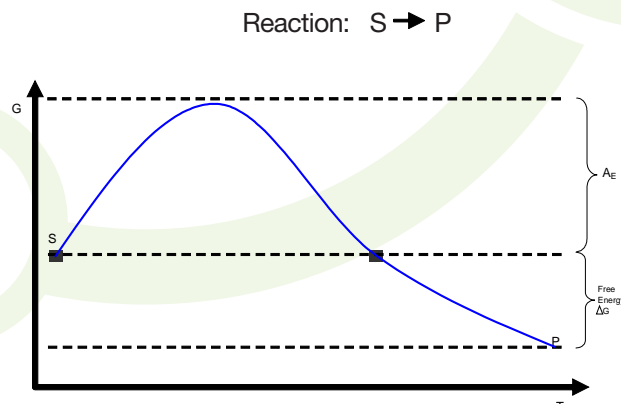
BiOWiSH™ is used extensively and available in Asia, Australia, Europe and now North America.

How does BiOWiSH™ work?

To explain the operation of BiOWiSH™ it is helpful to first understand the role of enzymes in accelerating catabolic transformations of molecules.

For any biological macromolecule there is the potential to transform the molecule into its simpler pre-cursors and transform chemical energy. Such a reaction can be shown in the following diagram (Figure 2) where S = Substrate, P = Product and A_E = Activation Energy and ΔG = Free Energy.

Figure 2.

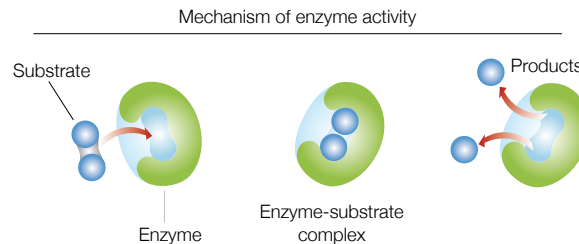


Activation Energy (A_E) is the energy required to trigger a biochemical transformation of the substrate (S) into the product (P) at given ambient conditions. This energy hill is the rate limiting factor for the transformation. Free Energy (ΔG) is the energy released through the transformation.

An enzyme is a catalyst that can accelerate transformation of molecules at up to 10^{17} times faster than they would otherwise occur.

A simple enzymatic reaction can be shown as follows:

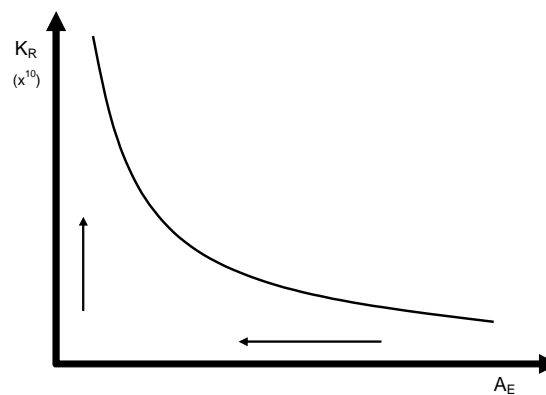
Figure 3.



For a more detailed overview of Enzyme activity and the enzyme / microbe relationship please refer to our Fact Sheet on Enzymes which can be downloaded from our website www.biowishtechnologies.com.

Enzymes achieve their catalytic potential by reducing the Activation Energy which in turn increases the rate of transformation. There is a direct inverse and exponential relationship between activation energy required to complete an enzymatic transformation and the kinetic rate or rate of reaction of any enzyme. This relationship is shown in the figure below.

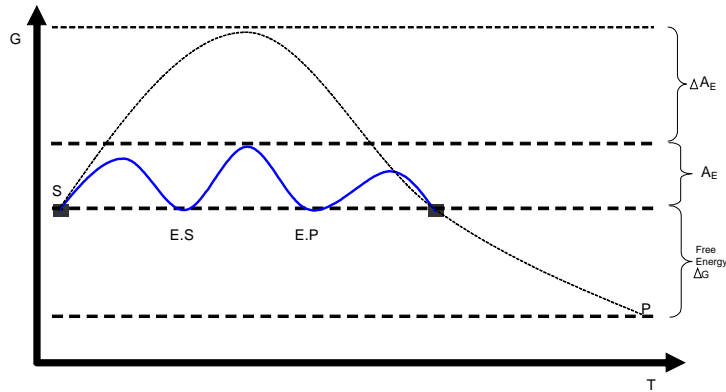
Figure 4.



As shown in Figure 4, a small reduction in the Activation Energy (A_E) produces a large increase in rate of catalysis or the Kinetic Rate of the enzyme (K_R).

In our reaction shown above in Figure 2, the presence of an enzyme specific to this transformation has the effect shown in Figure 5 below.

Figure 5.



The reaction for this transformation is as shown in Figure 3:



In this reaction the change in activation energy (ΔA_E) shows the reduction in energy required to perform the transformation. As indicated in Figure 4 this reduction in activation energy corresponds to an exponential increase in the rate of transformation. This rate increase provided by the enzyme is known as its Kinetic Rate (K_R).

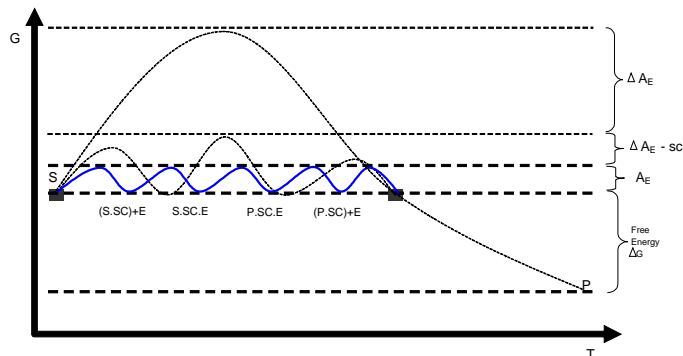
BiOWiSH™ contains a combination of small molecule metabolites, which have the potential to increase the Kinetic Rate potential of any enzyme that is produced by the BiOWiSH™ microbial culture. Whilst not technically correct, these metabolite catalysts could be thought of as a universal Co-Enzyme in that it further accelerates the rate of catalysis that enzymes are able to perform.

It is hypothesized that a form of bond occurs between the metabolite (SC) and the substrate at a receptor site to form a reaction intermediate (SC.S). The chemical bond that occurs is known as Binding Energy and at this point a small amount of additional energy is released that is available to reduce activation energy when the next intermediate compound (E.SC.S) is transformed (into E.SC.P). It is through this additional release of energy with each transformation that these catalysts reduce activation energy and thereby increases the rate of enzymatic transformation.

Figure 6 below shows a transformation in the presence of high-speed BiOWiSH™ enzymes and metabolite cluster (SC) where the reaction becomes:



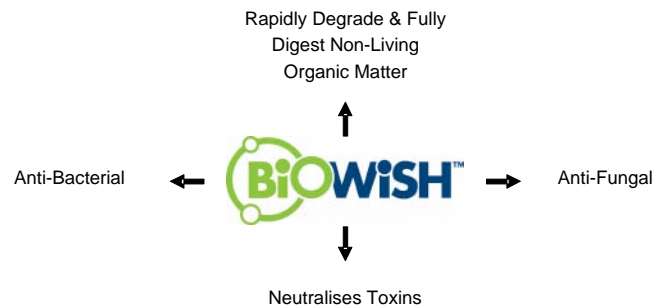
Figure 6.



The additional reduction in activation energy provided by the metabolite catalysts provided by BiOWiSH are shown as $\Delta A_E - SC$.

The result of this is a significant increase in catalytic rate potential and an ability to catalyze reactions in a wider range of environmental conditions than would normally be possible.

BiOWiSH™ Core Capabilities



Degrade & Digest Organic Matter

BiOWiSH™ rapidly degrades the molecular structure of any organic matter into simpler structures through its accelerated catabolic enzymatic activity. It then rapidly digests the full spectrum of organic matter into final inert end products via microbial digestion.

Anti-Bacterial

BiOWiSH™ cultures produce powerful anti-bacterial agents known as Bacteriocins including the Pediocins A and AcH. The bacteriocins produced by BiOWiSH™ are effective on the full range of gram negative and a wide range of pathogenic gram positive bacterium including as *Vibrio cholerae*, *Salmonella* sp., *Pseudomonas* sp., *E.coli*, *Clostridium botulinum*, *Clostridium perfringens*, *Staphylococcus aureus*, *Listeria monocytogenes*. The mode of action is unlikely to build specific resistance and is via membrane destabilization and autolytic action or cytoplasmic leakage leading to cell lysis.

Anti-Fungal

BiOWiSH™ produces a peptide compound known as an Iturin which is a powerful anti-fungal agent. Iturins are also known to eliminate fungi that are the cause of Aflatoxins. BiOWiSH has been tested and proven effective in the control of *Fusarium*, *Collectotricum*, *Rhizoctonia*, *Aspergillus*, and *Phytopthera*. This capability is deployed in cropping, water treatment and human health applications of BiOWiSH™.

Toxin Neutralisation

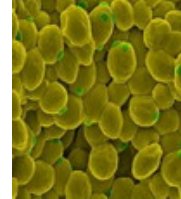
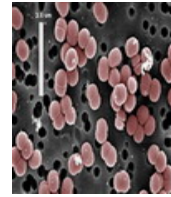
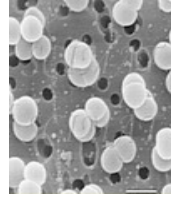
BiOWiSH™ contains Killer Toxins which provide an ability to neutralize a wide range of toxins including aflatoxins, mycotoxins, endotoxins and exotoxins. This capability is deployed in animal health, environmental and human health products.

Key Components of BiOWiSH™

BiOWiSH™ is a revolutionary biotechnology consisting of three beneficial bacteria and two yeasts acting in symbiosis creating enzymes and powerfully working to rapidly digest fats, protein, carbohydrate, cellulose, bad organic odor and waste products. This makes BiOWiSH™ perfect for a wide range of diverse applications.

The five key components are:

- *Pediococcus pentosaceus* Mees (bacteria)
- *Bacillus subtilis* (bacteria)
- *Pediococcus acidilactici* (bacteria)
- *Dekkera anomala* (yeast)
- *Pichia farinosa* (yeast)



For human health and cosmetic applications, further processes sterilize BiOWiSH™ retaining only the pure BiOWiSH™ enzymes and metabolites.

Forms of BiOWiSH™

BiOWiSH™ is available in 3 different forms which we formulate into the range of BiOWiSH™ products.

BiOWiSH™ Powder

The active microbial formulations used in environmental management, cleaning and animal health.

BiOWiSH™ Food Grade

A formulation that is further fermented to contain a high level of enzymes, the small molecule metabolite catalysts and other metabolites but no active microbials.

BiOWiSH™ Cosmetic Grade

BiOWiSH Food Grade with a protective cellulose coating that allows the product to be stored in solution with mechanical activation.

More Information

For more information on how this amazing technology works and to see the wide range of products we have created using the BiOWiSH™ technology, please visit our website www.biowishtechnologies.com

We are constantly developing our range of products and applications using the remarkable properties of our core technology which is both groundbreaking and versatile.

We are also partnering with other product manufacturers to assist them in including BiOWiSH™ in their products.

By making the choice to use one of the core BiOWiSH™ range of products you will soon discover why BiOWiSH™ is one of the most exciting and powerful biotechnologies to emerge this century.

Biological help for the human race



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BiOWiSH™

The World's most powerful Live Enzyme Technology