

# Advanced Enzyme Technologies: Tapping on the Power of Enzymes for a Healthy Life

In conversation with Mr. C. L. Rathi, Chairman and MD, Advanced Enzymes Technologies Ltd, South East Asia's largest enzyme manufacturing plant. A stalwart in the field of enzymes, Mr. Rathi has been called upon for many special assignments by the government and the industry alike.



### What are Enzymes?

Enzymes are biological catalysts in the form of globular proteins that drive chemical reactions in the cells of living organisms. As such, they have evolved – along with cells – under the conditions found on planet Earth to satisfy the metabolic demands of an extensive range of cell types.

"Enzymes themselves are eco-friendly. They are a solution to cut down CO<sub>2</sub> emissions. Enzymes are part of the solution. They are like bio-energy as they do not cause any pollution; in fact they could be a way to solve our environmental problems. Industries all over the world are changing rapidly. Processes that are normally divided into three or more steps can now be clubbed together using enzymes.

Enzymes are expected to be the choice for global industries in the coming future. These are the reasons for the shift of industries from chemicals to enzymes.

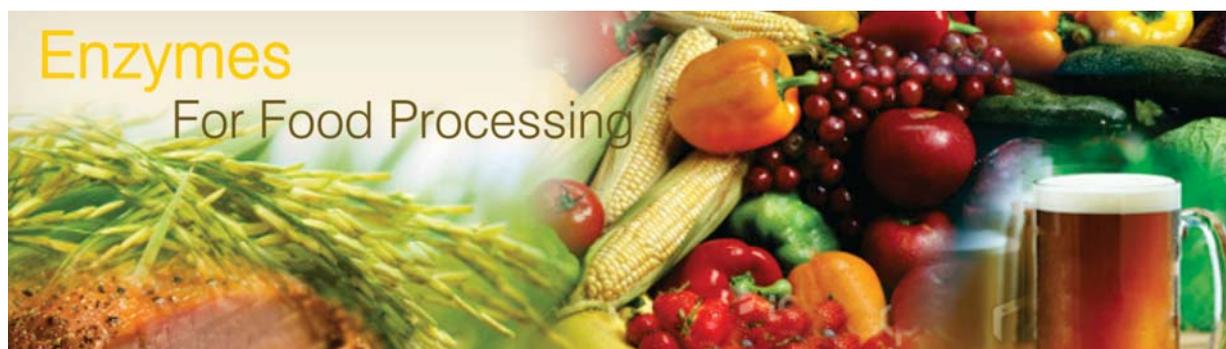
Enzymes are very target specific and they operate in

mild temperature and pH conditions, thus saving tremendous energy and treatment cost. Enzymes help manufacturers in achieving the desired quality which in turn reduces the number of further steps. Downstream processing cost for product recovery and purification is low.

High Awareness, information and understanding is required to exploit enzymes to their full potential. Enzymatic solutions can be used in various other industries as well, like food processing, dairy, brewing, bakery, leather, paper, textiles, bio-diesel etc. The list goes on; there is no limit to the usage of enzymes. Moreover, it is assumed that enzymes are expensive but in reality they are economical, speeds up the production process and delivers optimum quality.

### Why are Enzymes important?

Enzymes are the “base” of any form of life! If life exist in any form, all the “actions”- creation, maintenance and destruction are being performed



using only Enzyme Energy!

Only Enzymes have “discrimination” power (called VIVEKA). All other forms of energy do not have any “discriminating power”! Enzymes do not create any “waste” and are the Greenest of all Green Energy.

## Doesn't our body produce enough enzymes on its own?

A healthy body has enough enzymes on its own! For treatment of diseases, all drugs are given to either increase some beneficial enzyme action or decrease some harmful enzyme action created by the disease.

## Can you please elaborate the role of enzymes on the food processing and other industries where it has applications?

The word Enzyme comes from EN-ZYME. That means power of Zyme (yeast). Traditionally various kind of “fermented” and “sprouted” foods have been used in our daily life – yogurt, sprouts, malt from barley, idli, dhokla, etc. Fruits and vegetables do have several benevolent enzymes assisting our life and does not use much of the body's enzyme reserves for assimilation.

Modern food technology and natural product processing can not be done well if we do not use enzymes! Same is the case for various industrial processing, including very high toxic producing industries like Leather, Paper and Pulp, Textile, etc.

The key challenge for the enzyme industry is producing so many needed enzymes at economical costs and creating “easy to use” formulations for user industry. Unfortunately, current industries have been using predominantly ancient energy sources

like – Heat (Thermal), Mechanical, Chemicals (acid, alkali, salts, solvents, etc), Now assisting them and changing the current practices which are not designed “enzyme action friendly”, is a bit of challenge. Yet with a strong determination, we can do that.

One of our patented process and product use almost “instant” high temperature Cotton Bio-scouring in a continuous large integrated textile plant and also it can be used in traditional “jigger” type batch process! Similarly, we did get a patent to produce leather using no chemicals! We have patents for enzymatic growth promoter for any agriculture crop! We also have patent for “Multi Drug Resistant Tuberculosis” using Enzymes to assist high success rate with various drugs.

The opportunities of using enzymes are endless but also very demanding and trying. We took 17 years of research and over 580 commercial trial “failures” to reach Bioscouring of Cotton.

We are working on several food applications and have patent on Biobleaching of Wheat Flour! We have also now patented a process to produce Soy Flour without any harmful NSP since Protein Nutrition is being considered a key area for Children & Animal Farm Goods industry.

## How many enzymes are manufactured for use in the global food industry?

I do not have the exact count yet it could be over 100+. Many new enzymes are being discovered and also “engineered” now

## Does the use of enzymes differ regionwise worldwide and according to food habits or is there a standard usage of enzymes irrespective of food habits?

The answer is Yes and No! The awareness that enzymes are beneficial for human life is higher in “developed” nations than in “developing” ones. Also, enzymologists have to meet the challenges of creating new enzymes plus processes to meet the needs of “developing nations”! Scientists at our Advanced Enzymes R&D have developed unique products based on



enzymes for “instant idli, dhokla, dosa, etc” for the benefit of the common housewife who has little time available to prepare food when she is suddenly swarmed by guests who visit her home without prior intimation.

## What are the different methods used in enzyme production?

Enzymes have been produced by one and all. Industrial enzyme production is more about using two kinds of fermentation – Solid State Fermentation (Bread process), or Liquid Fermentation (Yogurt Process). Several companies also use “sprout” methods to produce malt from grains like barley, sorghum, etc.

## What are the most commonly used enzymes in food production?

Proteases, Carbohydrases, Oxi-Reductase, Lipases, are most commonly used in food production.

Occupational safety concerns have focussed on allergenic properties as it is well established that enzymes are potent inhalative sensitizers and can cause allergic reactions including asthma. Toxic substances including bacterial toxins and mycotoxins might also be present in enzyme isolates and might thus constitute a safety risk to consumers. Can you comment on this?

Proteases have been found to have some issues on “allergic reactions” for people suffering from asthma or breathing disorders since they do have dead proteins in the lungs and proteases do digest them causing “bleeding”. There are a safe list of microorganisms which does not produce any toxins and are mostly used for enzyme production based on years of long research.

## What are the safety regulations in place with regards to enzymes application in food products?

Some people can be allergic to enzyme dust. Hence we always recommend handling with proper dust preventing hoods and gloves etc.

## What has been the driving force behind the worldwide success of Advanced Enzymes and also being credited with the status of a leader in enzyme production?

Innovation has been at the base of our very existence. We have been working with complete ethics in the business where many think that business and ethics does not go together!

We have followed a much focused approach for the past 53 years and huge R&D investment in enzyme research as well as our human resources! We are probably amongst the few companies who give 21 working days to every employee for his/her training along with 10-20% of their gross salary for training as a part of their job!

We have been a Research Driven Company with 8-9% of our revenue being invested consistently for this for the past 20+ years! We also have built South Asia's largest enzyme production facilities to match our rapid growth.

## How many enzyme products has Advanced Enzyme come up with since its inception and what is your clientele globally?

We have over 1000+ products and our products are being sold in over 37 countries directly (58+ countries indirectly). We have over 65% revenue from our international operations. Many top fortune 500 companies patronize us and it has been growing rapidly now as many more are learning about the unique proposition we offer in “customizing” their needs.

## Can you throw some light into your proposed Enzyme Association and its objectives?

The sole purpose is to assist one and all in the use of enzymes for a better quality of life.

## What is the preamble and what do you plan to achieve?

I seldom plan anything! It all happens with God's guidance and grace. ■