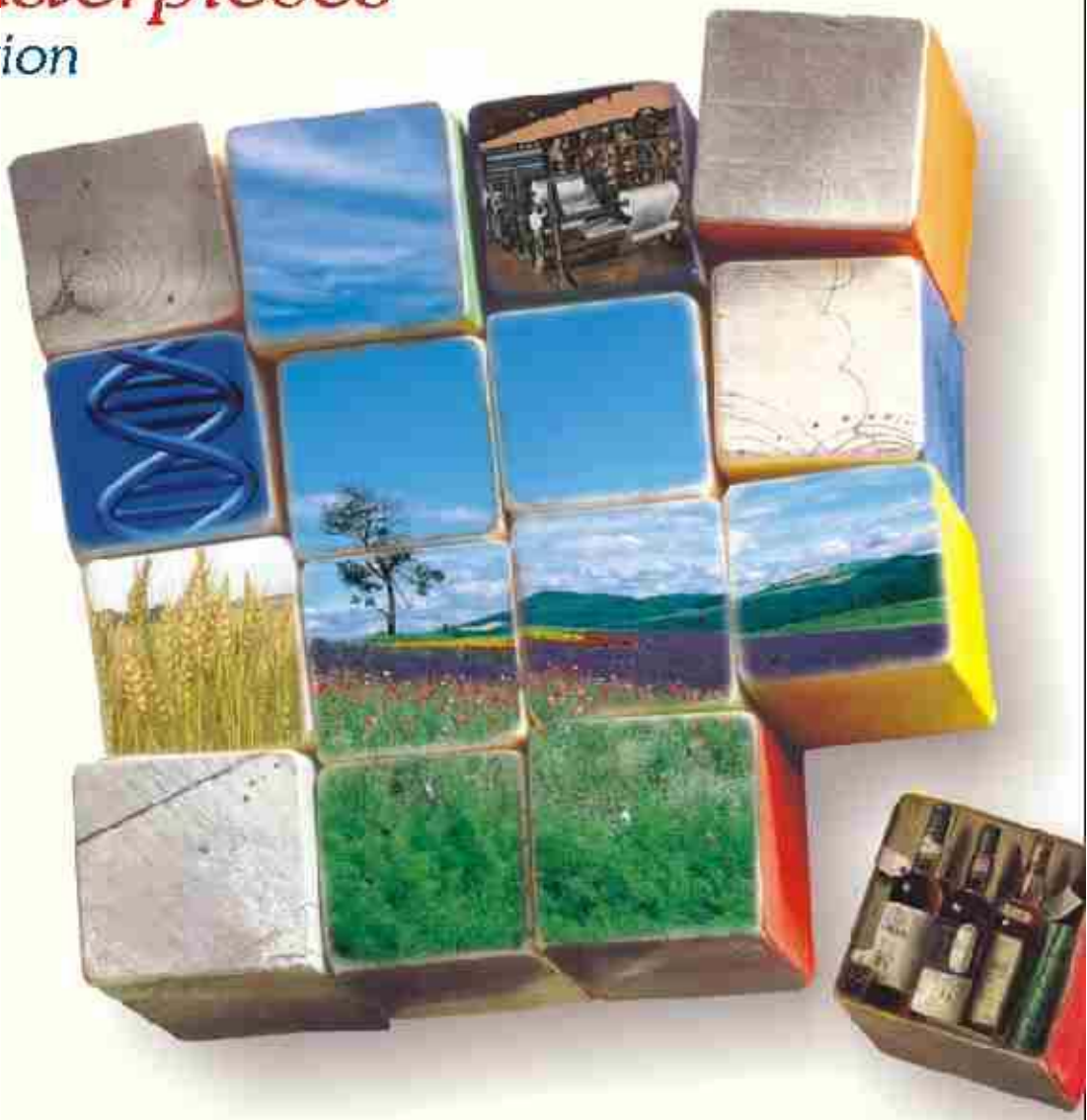
Sept.- Oct. '06 Issue

ENZYME WORLD

Bringing together
the masterpieces
of our creation



Bi-monthly In-house Newsletter from

ADVANCED
ENZYME TECHNOLOGIES LTD
Where ENZYME is Life
(An ISO 9001 : 2000 Company)

CONTENT



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FROM THE DESK OF MANAGING DIRECTOR

Dear Friends,

Welcome to the 5th issue of **ENZYME WORLD!**

Enzymes are secreted by Living Cells which includes Microbes as well. Industrial Enzymology is nothing but first finding out or creating high output Microbes who are capable of producing exceedingly high quantity + specific activities of desired ENZYME. Having found out or selected or created such BUG, you then carry on fermentation in Ascetic condition to get high output of enzyme. Removal of Enzyme (either Extra-cellular or Intra-cellular) becomes another critical process. Purification of Enzyme with very high microbial purity becomes equally challenging since Enzyme is a protein molecule & it is a very easy food for any Microbe too.

Now, on the other side; in this universe, there is clear cut co-existence on each other - someone's food is a waste from some another! Our own human body has over 400 species of microbes which live within our body. Most of them help us in living HEALTHY. These life supporting microbes are called - PRO-BIOTIC. These microbes do secrete various useful products - Enzymes, Co-Enzymes such as Vitamins, Metello-proteins, Anti-biotics, Acids, and Acid Buffers, Anti-Oxidants, etc. They are very much part of our ENZYME SYSTEM. The same is also true for all plants & animal life!

There are two broader types of Microbes in our body - Life Supportive or Life Distructive (we call them Pathogens or disease causing bacterias). There are some very clear cut choices in supportive food mechanism for these Microbes too which is called PRE-BIOTICS. Most Probiotics grow better with PRE-BIOTICS such as Fruit Sugars. And Pathogenic bacterias grow better with our Refined Sugar.

Using correct type of PRE-BIOTIC, PROBIOTICS, and ENZYME combinations; we can truely remain healthy much longer + avoid diseases + get well soon too from any Disease! My Scientists under able guidance of World Renowned Enzymologist & Pharmacist **Mr. Vic Rathi** are developing exciting products to help the whole humanity.

Most people think that Enzyme means Digestion! But ENZYME means every process of LIFE! The very first act even when we walk faster is - production of C-Reactive Proteins (Inflammation). Hence Anti-Inflammatory Enzymes are extremely important for our healthy living or extended stamina or extension of healthy life span. Similarly, there are number of IMMUNO-MODULATORY Enzymes which are very critical in our life to help us live healthy such as Super Oxide Dismutase, Lactase, Catalase, Peroxidases, etc.

Under guidance of our Chairman **Mr. Vic Rathi**; big strides are being made in treatment of CANCER, CARDIO-VASCULAR DISEASES, DIABATES, & many more diseases.

Our other wing of Scientist under guidance & supervision of **Mr. Dipak Roda** are creating similar combinations in Pre-biotics, Pro-biotics, and ENZYMES for use in whole Process Industrial applications.

AETL has bagged the very first PATENT for Lime & Sulphide Free (Chemical Free) LEATHER PROCESSING USING ENZYMES. Similar work is under way for several industrial segments - Pulp & Paper, Brewing, Distillary, Bio-fuels, Grain Processing, etc.

I would welcome your contribution in our this endeavor-ECO-SAFE SOLUTIONS for whole humanity.

JAI GURUDEV

C. L. Rathi

Managing Director

Enzymes and Your Health

Enzymes & Nutrition

Enzymes are protein molecules that are responsible for many chemical reactions including digesting food, building bones repairing unhealthy tissues, purifying blood and aiding in detoxification. Enzymes have even shown promise with many degenerative diseases by reducing inflammation and protecting against further damage. There are three types of enzymes. Dietary, digestive and metabolic enzymes. Dietary enzymes are found in all natural unprocessed foods and aid in the digestion and breakdown of that food.

Digestive enzymes are produced by the pancreas and secreted into the stomach and small intestine where they aid the food enzymes in digestion. Dietary enzymes ease the need for digestive enzymes by pre-digesting foods as they sit in the upper portion of the stomach. By the time the pre-digested foods reach the lower stomach, where digestive enzymes take over, and fewer internally produced enzymes are required to finish off digestion.

Metabolic enzymes are produced by the liver and control most chemical reactions within cells, including cellular respiration, detoxification and energy production and pH balance of healthy tissue.

Systemic Enzymes are the workhorses of the body because they act as catalysts that start and stop chemical reactions such as immune functions, digestions, and hormone balance. Unlike digestive enzymes, systemic enzymes must pass through the stomach so that the enzymes can be released into the blood stream.

Vitamins, Minerals and Enzymes: Vitamins are defined as mineral catalysts. A catalyst is something that has to be present for a chemical reaction to take place. And by definition, the primary and most important function of a vitamin is to promote mineral metabolism and utilization in the human body. Remember that a vitamin and Minerals cannot work without the appropriate enzymes present.

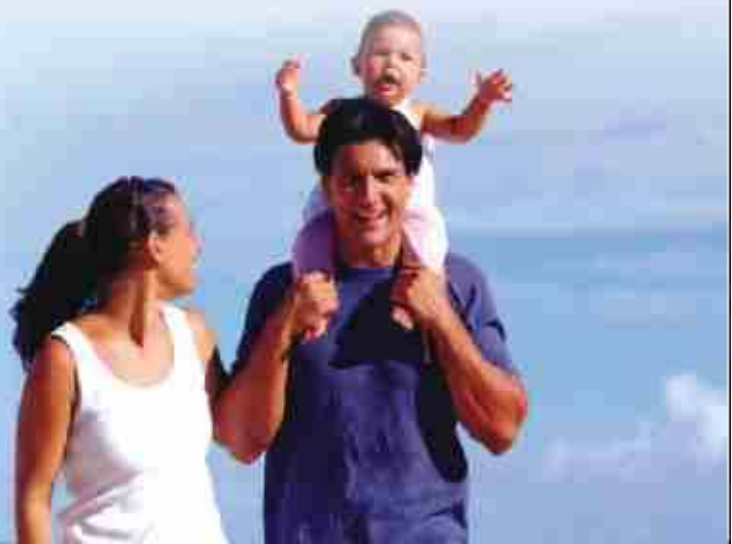
In natural whole foods, a vitamin is found as a complex, organized mechanism serving a catalytic function in relationship to other minerals and nutrients. Any attempt to separate the vitamin from its natural synergistic food factors and enzymes will destroy its natural and intended function.

A vitamin is a complex biological "wheel within wheels" consisting of enzymes, co-enzymes, antioxidants and trace mineral activators. The Enzymes found within a vitamin complex contain amino acids and trace minerals. All living cells do not only need these nutrients but they are always found in any natural assemblage of vitamin concentrates. Without their trace mineral activators, they are rendered inactive. Synthetic vitamins are void of these trace mineral activators and enzymes.

The Concept of Enzyme Nutrition:

The benefits of supplemental plant enzymes on your health and blood have been documented in numerous research studies. Most of the excitement and knowledge of this vital nutritional factor stems back to the work of biochemist, Dr. Edward Howell whose extensive, pioneer study in the enzyme concept began more than 50 years ago. His work and that of other noted researchers has shown the benefits of supplemental plant enzymes on various conditions of the body, particularly as they relate to the digestion and assimilation of foods.

Recent research has been increasingly more specific, focusing on different types and sources of plant enzymes, including various protease, lipase, carbohydrase, and cellulase preparations. Both in vitro and controlled in vivo studies using internal and parenteral routes have examined the effectiveness of these enzymes in a wide range of conditions including maldigestion, malabsorption, pancreatic insufficiency, steanorrhea, celiac disease, lactose intolerance, arterial obstruction and thrombotic disease. Reports from doctors across the nation indicate that plant enzymes are being used in an even broader spectrum of clinical conditions.



Data from various studies and clinical applications verify the efficacy of plant enzymes for a broad spectrum of conditions. For those interested in longevity, vitality, superior health, overcoming health challenges or losing weight, the topic of enzyme nutrition should be of interest to you.

Enzymes are needed for every chemical action and reaction of the body. Without enzymes, life could not exist. Our organs, tissues and cells are all critically dependent on an orderly, integrated succession of enzyme reactions.

Four factors are required for an active enzyme system. They are:

Minerals	Amino acids
Vitamins	Unsaturated fatty acids

Enzymes, The Corner Stone to rebuilding health:

Simply stated, minerals, vitamins and hormones cannot function properly without enzymes being present. (Example) Experts estimate that over 10,000 enzyme reactions require the mineral Zinc to work properly. Enzymes, also cannot function if the cells are too acidic and if they are exposed to heat. Like a light bulb that needs the power of electricity in order to illuminate, vitamins and minerals need the chemical reactions of enzymes in order to perform their vital functions.

Dr. Edward Howell, M.D., who studied enzymes and health for more than 50 years, says: "Without the Life energy of enzymes, we would be nothing more than a pile of Lifeless chemical substances -- vitamins, minerals, water and proteins. In both maintaining health and in healing, enzymes and only enzymes do the actual work. They are what we call in metabolism, the body's natural life force."

The cellular energy is the very core of every enzyme's active function. In other words, they are electro magnetically charged, which is separate and distinct from caloric energy, released from food by enzymatic action. Enzymes are involved in sight, thought, touch, hearing, digestion of our foods, the way we age and even moving our limbs. If enzymes were lost, all the functions of our body would fail, including that of immunity.

Compiled by:
Ms. Asha Shah
R & D Executive

Proteolytic Enzymes for Inflammation

What is Inflammation?

Inflammation is the body's attempt to restore homeostasis; it is the initial reaction to injury and the first step in the healing process.

Wound healing cannot occur if the inflammatory response is fully inhibited. Tissue injury provides the initial stimulus for activation of inflammatory mechanisms and results in the cellular release of vasoactive substances such as histamine, bradykinin, and serotonin. The circulatory effects are vasodilation and increased blood flow to the affected site; increased vascular permeability, which facilitates diapedesis of immune cells from the circulation to the tissues; and tenderness or pain. The clotting system is activated in an attempt to "plug up" the injury. Increased blood flow and capillary permeability lead to local interstitial edema and swelling. Leukocyte migration occurs as phagocytes are attracted to the affected site, and dying leukocytes release pyrogens that stimulate the hypothalamus to induce a state of fever.

Current Medication

The most popular medication for inflammatory conditions is NSAIDs (Non-Steroidal Anti-Inflammatory Drugs) such as OTC (over-the-counter) aspirin, ibuprofen, ketoprofen and naproxen sodium. **NSAIDs** are among the most widely used drugs for Inflammation. Their effects are mediated through inhibition of the biosynthesis of prostaglandins E1. A common side effect from this medication is gastric ulcers. Serious adverse reaction such as blood dyscrasias, kidney damage, and cardiovascular effects has been reported. NSAIDs offer temporary, symptomatic relief from swelling, inflammation and accompanying pain without treating the underlying condition.

Alternative Natural products

For thousands of years, natural products have played an important role throughout the world in treating and preventing human diseases. Natural product medicines have come from various source materials including terrestrial plants, terrestrial microorganisms, marine organisms, and terrestrial vertebrates and invertebrates.

Now a days proteolytic enzymes have been widely used as anti-inflammatory agents. Reduction of inflammation and edema is ascribed to the dissolution of soft fibrin and to the clearance of proteinaceous debris found in inflammatory exudates.

What are Enzymes?

Enzymes act as catalysts in living cells. Enzymes have immense catalytic power. Enzymes accelerate biochemical reactions in living cells by factors of at least a million. They speed up biochemical processes. They control almost all biochemical reactions of all organisms in a very specific manner. Enzymes are highly specific both in the reaction catalyzed and in their choice of reactants, which are called substrates. Formation of an enzyme-substrate complex is the first step in enzymatic catalysis.

Serratiopeptidase- The Natural anti-inflammatory enzyme

Unlike NSAIDs, serratiopeptidase is free of the serious side effects which include stomach upset and ulceration, kidney problems and psychiatric reactions. Serratiopeptidase is a peptidase isolated from patented Serratia sp E15 and is also found in the gut of the Japanese silkworm. This enzyme has been shown to act as an anti-inflammatory and a pain-blocker, much like aspirin, ibuprofen and other NSAIDs. In other words, this enzyme is proving to be a superior alternative to the NSAIDs traditionally used to treat RA and OA. Its uses have also been extended to the treatment of chronic sinusitis and postoperative inflammation, and it may

even help inhibit plaque build-up in arteries, preventing atherosclerosis.

Serratiopeptidase is a powerful treatment for pain and inflammation. It reduces inflammation in three ways: it breaks down the insoluble protein by-products of blood coagulation known as fibrin; it thins the fluids formed from inflammation and injury as well as facilitating their drainage which speeds the tissue repair process; it alleviates pain by inhibiting the release of specific pain-inducing amines called bradykinin. Serratiopeptidase digests or breaks down protein debris from toxins and inflammation. The healing activity of this enzyme is impressive and includes digesting non-living tissue such as scar tissue, blood clots, cysts, mucus, arterial plaque and inflammation in all forms without any harmful side effects. Since living tissue is not its substrate, it poses no harm to healthy tissue and cells.

However other peptidases such as trypsin may be acting not as anti-inflammatory agent but rather as accelerants of the inflammatory process, thereby shortening its duration.

Bromelain & Papain

Both Bromelain and Papain are plant derived proteolytic enzymes. Bromelain, also known as bromelin, is a protein-digesting enzyme extracted from the flesh and stem of the pineapple plant, Ananas comosus. Papain, is a proteolytic enzyme isolated from the papaya plant, Carica papaya. Bromelain is most notable for its effectiveness in the reduction of inflammation and decreasing swelling, but the scope of its benefits continues to increase. As a natural anti-inflammatory enzyme, bromelain has many uses. Arthritis patients may reduce the swelling that causes joint pain by taking bromelain. Bromelain may also be helpful for the pain, numbness, tingling, aching, and loss of motor and sensory function in the fingers resulting from carpal tunnel syndrome (CTS).The benefit of bromelain occurs over a broad range of

doses, and even small amounts may be beneficial to anyone at risk to thrombotic heart attack or stroke. Papain has been shown to be effective in preventing burn wound infection and helping remove dead cells.

Therapeutic Uses:

The most obvious use of proteolytic enzymes is to assist digestion. However, proteolytic enzymes plus other substances, such as the bioflavonoids rutin can also be absorbed into the body whole and may help reduce inflammation and pain, Several studies found that plant proteolytic enzymes also aids in recovery from the pain and inflammation caused by surgery, neck pain, osteoarthritis, and post-herpetic neuralgia and sports injuries.

Compiled by:
Ms. Asha Shah
R & D Executive

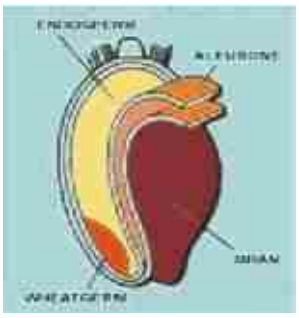
ExtractSEB WB: Biobleaching Enzyme for Wheat

INTRODUCTION:

Advanced Enzyme Technologies Ltd. has come out with unique World wide patented product named as **ExtractSEB WB**, A Boon to Wheat Flour Market.

ExtractSEB WB is a scientifically developed patented enzyme blend which has inhibitory effect on the action of poly phenol oxidase. **ExtractSEB WB**, when added to whole wheat at the time of tempering, it inhibits the poly phenol oxidase activity and thus helps to prevent enzymatic browning, improves whiteness and water absorption in the resultant product.

A Grain of Wheat



WHY BROWNING IN WHOLE WHEAT:

Whole wheat contains poly phenol oxidase (PPO). PPO is bifunctional oxidase containing catecholase and cresolase activity. PPO undergoes oxidation and results in browning. This browning discoloration limits the shelf life as well as the acceptance of the product. It reduces the nutritional value of the product also.

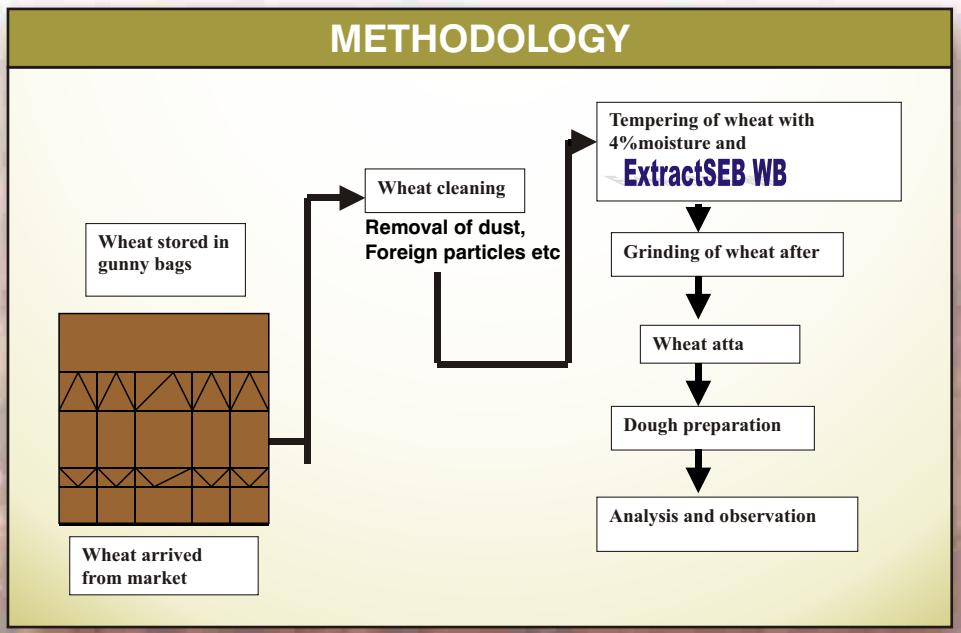
MECHANISM OF ENZYMATIC BROWNING:

Enzymatic browning is the discoloration that results when monophenolic compounds of plants or shellfish in the presence of atmospheric oxygen and poly phenol oxidase (PPO), are hydroxylated to ortho phenols, and the latter are oxidized to ortho quinines. The quinine condenses and reacts nonenzymatically with other phenolic compounds to produce dark brown, black or red pigment of intermediate structure. Thus browning occurs in whole wheat.

BROWNING INHIBITION BY ExtractSEB WB

The mechanism of **ExtractSEB WB** can be exploited for the control of undesirable enzyme activities to inhibit browning effect by Substrate and/or product modification other than the target enzymes. This can also be done by direct inactivation of target enzyme. Or otherwise inactivation of secondary reaction of highly reactive products.

METHODOLOGY



USAGE APPLICATION OF ExtractSEB WB:

BENEFITS OF USING ExtractSEB WB:

- Inhibits the poly phenol oxidase activity
- Improves the whiteness of dough
- Increases the water absorption of the flour
- Makes chapatis, rotis softer for longer time with improved shelf life
- Improves digestibility of the final product

QUALITY SPECIFICATIONS:

EXTRACTSEB WB is manufactured under a quality management system consistent with International Quality System Standard ISO 9002.purity specifications comply with FAO/WHO JECFA, FCC and IFOAM recommended standards for food grade enzymes.

STORAGE:

EXTRACTSEB WB should be stored in a cool, dry place. Storage in unopened containers, at or below 5° C, helps to maintain maximum activity if stored over long periods.

Ms. Ahila Sriram
Exe-Appl. Dev.- Bakery Div.

Role of Microbial Enzymes in Pulp and Paper Processing

Paper manufacture is one of the largest industries in the World. Several decades ago researchers realized that because paper is composed of natural polymers - cellulose, hemicelluloses, and lignin - microbial enzymes and organisms might be useful in its processing. Only in the last decade, however, have microbial enzymes been used commercially in the pulp and paper industry, and microorganisms, though long employed in waste treatment, are only now beginning to be used in other processing steps.

During the past ten years the number of possible applications of enzymes in pulp and paper manufacture has grown steadily, and several have become, or are approaching, commercial use. These include enzymatic bleaching with xylanases, pitch removal with lipases, and freeness enhancement with cellulases and hemicellulases. Others such as contaminant removal and fibrillation of recycled fibers by cellulases could be commercial soon.

Paper processing	Enzymes Utilised	Function
Bleaching Chemical Pulps (Biobleaching)	Xylanases, Laccases,Mn peroxidases, Lignin peroxidases	Decreases the amount of Harmful bleach chemical required to attain targeted brightness.
Deinking of recycled fibres (Biodeinking)	Cellulases,Lipases	Enhance Contaminant Removal like inks, resin, stickies
Pretreatment of wood chips with fungal cultures (Biopulping)	Laccases, Lignin peroxidases, Mn peroxidase	Improves the papermaking properties
Fibrillation and Strength Enhancement	Cellulases	Enhance fibrillation, thereby improving the strength of paper by increasing fiber-fiber contact
Drainage	Cellulases	Improve the drainage rates of recycled fibers
Pitch Control	Lipases	Reduce pitch problems by lowering the triglyceride content of wood pulp
Stickies Control	Esterases	Hydrolyzing the polyvinyl acetate to the less sticky polyvinyl alcohol
Slime Control	Amylase in combination with Lipase and Protease	Remove slime and control the growth of bacteria in paper machine systems

Biobleaching Enzymes: They can be divided in two separate categories.

(I) Lignin Modifying Enzymes: These Enzymes do not remove the lignin directly; they just make the lignin accessible to bleaching chemicals in the subsequent bleaching steps.

Biobleaching using Xylanases is one of the most suitable biological applications to be used in the pulp and paper industry. Xylanases are being used, primarily, for the removal of the lignincarbohydrate complex (LCC) that is generated in the kraft process and acts as physical barriers to the entry of bleaching chemicals. Xylanases act on Xylan, hemicellulase portion of wood. It causes the partial depolymerisation (Hydrolysis) of xylan and breaks the â 1-4 linkage between the xylan and lignin. A prerequisite in the pulp and paper industry is the use of Cellulase free Xylanases that ensure minimal damage to the pulp fibres and also generate rayon grade or superior quality dissolving pulps. Therefore Advanced Enzyme Technologies Ltd. (ATL) has developed a series of biobleaching Xylanase formulations SEBRITE BBseries exclusively for the Paper Industry.

Advantages of SEBRITE BB:

- Improvement in Brightness %
- Reduction in elemental chlorine dosage
- Reduction in Hypochlorite dosage
- Reduction in Post Color No
- Slight Improvement in Strength properties
- Reduction in BOD/COD ratio
- Reduction In AOX (Absorbable Organic Halogens)

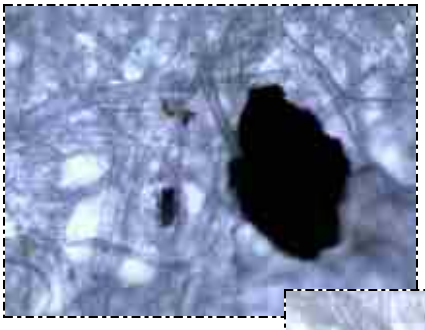
(II) Ligninolytic Enzymes: These are the lignin degrading enzymes which include Laccases,Lignin peroxidases, Mn peroxidases .They are more effective than lignin modifying enzymes as they cause 3-4 units reduction in Kappa No.

Laccases are mostly extracellular glyco-proteins and are multinuclear enzymes with molecular weights between 60 and 80 kDa Laccase only attacks the phenolic subunits of lignin, leading to Cá oxidation, Cá-Câ cleavage and aryl-alkyl cleavage are able to reduce one molecule of dioxygen to two molecules of water while performing one-electron oxidation of a wide range of aromatic compounds, which includes polyphenols,methoxy-substituted monophenols and aromatic amines.

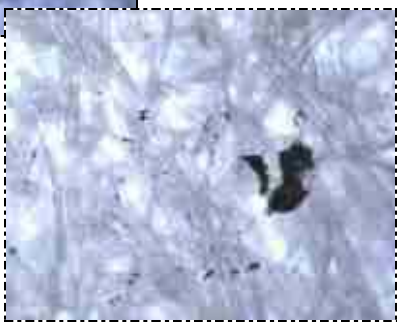
The substrate range of laccase can be extended to non-phenolic subunits of lignin by the inclusion of a mediator such as 2, 2'-azinobis-(3-ethylbenzthiazoline-6-sulfonate). The mediator functions as an electron carrier that is able to diffuse into the secondary wall of wood fibres and react directly with the lignin, while the relatively large size of the laccase prevents it from diffusing into the cell walls.

Biodeinking Enzymes:

The recycling industry is in search of new technologies, which can improve the quality, reduce the production cost and can be accommodated easily into the existing process design. Recent research with enzymes showed that enzymatic deinking is an alternative solution. Regardless of ink type or printing process, enzyme treatment tends to reduce ink particle size, it has been reported that reduction in particle size varied with pulping time in the presence of enzyme, the overall reduction was greater than that noted in conventional deinking.



Ink Particle Size (Conventional Deinking)



Ink Particle Size (Enzymatic Deinking)

Enzymes have been found promising in the deinking of polymeric inks of mixed office waste (MOW). These enzymes are added in the pulper in small dosage and deinking takes place at neutral pH, resulting in lower chemical consumption, avoidance of some de inking chemicals and hence lower environmental impact. These enzymes also contribute to improve strength properties of the paper as they as electively attack the printing ink and not the fibre.

Cellulase binding can disrupt the fiber surface to an extent sufficient to release ink during pulping. It is also reported that Cellulase peel fibrils from fiber surfaces, thereby freeing ink particles for dispersal in suspension. Enzymatic treatment of non impact-printed paper has been reported to remove binding material from ink particles, thereby making the particle hydrophobic and facilitating separation during floatation. AETL has developed a series of Deinking Cellulase formulations SEBRITE DI series exclusively for the Recycled Paper Industry. This is a specially developed enzyme blend for effective De-inking of Paper pulp.

Advantages of SEBRITE DI:

- Removes toner inks
- Improves effluent quality by using less chemicals
- Increases pulp drainage for papermaking
- Cost less than chemical deinking
- Saves electrical energy during processing

Biopulping Enzymes:

One of the biggest energy expenditures in paper making comes from removal of the brown lignin from the wood so that the white cellulose is all that's left to make paper. What if paper companies could use the enzymes of a white rot fungus to remove the lignin? This could result in a savings in both energy and time and avoid pollutive wastes being dumped out of the mills. The enzymatic incubation induces strongly enhances lignin water-extractability after the alkaline cooking phase indicating the occurrence of hydroxylation and demethylation reactions. Such aromatic ring functionalisation probably is due to laccase, lignin peroxidase and Mn-dependent peroxidase. AETL has developed biopulping Enzyme formulation SEBRITE BP for the Paper Industry.

Advantages of SEBRITE BP:

Improves the papermaking properties
The amounts of alkali is reduced
Results in higher pulp yields
Lower polluting load in wastewater
Energy savings

Compiled by:
Mr. Piyush Verma
R & D Consultant

Recent Concept to Probiotics and Enzymes Applications

Microorganisms play a vital role directly or indirectly in our life. , it may be beneficial or harmful for human being. Towards one of beneficial uses, of microorganisms is its it usedapplication and use for industrial purposes to produce antibiotics and/ or drugs. By administration of antibiotics/ drugs for microbial infections and other diseases, patients get antibiotics/ drugs induced digestive disorders and side effects. These problems magnetizeattract the scientists to searchexplore a new approach for the treatment which reduces the risk of digestive tract disorder in host animals.

Although Metchnikoff gives the concept of Probiotics in the beginning of 19th century, but recently scientists are in a passiontrend to use friendly microorganisms (Probiotics) as a separate individually or in its combination (Like, Bacterial species *Lactobacillus sporogenes, Lactobacillus acidophilus, Lactobacillus plantarum, Bifidobacterium, and Yeast species Saccharomyces boulardii and Saccharomyces cerevisiae* etc.) along with the core drugs of related illness to reduce digestive disorders and health improvement in host animals. When live microorganisms are administered in an effective amounts or numbers in host and they confer health benefit on the host by maintaining the intestinal macrobiotic known as Probiotics. The term Probiotic was derived from the Greek, meaning "for life." An expert panel commissioned by FAO and WHO defined probiotics as "Live microorganisms which when administered in adequate amounts confer a health benefit on the host." This is the definition that should be used, and probiotics should not be referred to as bio-therapeutic agents.

Probiotics are of increasing use against intestinal disorders such as antibiotics based diarrhea and inflammatory bowel disease. They act as nonpathogenic stimuli within the gut to regain immunologic quiescence. Probiotics are also of great significance importance to subjects suffering from sufferers of environmental illnesses by reducing the number and severity of food and allergens based allergies. Microbial probiotics have been reported to have many beneficial effects when they are used in animal feeds; these effects include competitive exclusion of pathogens and improved digestion and absorption of nutrients.

Although probiotics play a key role in human/animal nutrition, their modes of action have not been resolute yet. But several mechanisms for instance; producing antimicrobial substances, stimulating mucus secretion strengthening gut barriers function, competing for adhesion sites, stimulating specific and non specific immune responses; by which probiotics mediate their anti infection effects have been suggested.

Similarly, Enzymes, are protein molecules which those catalyze the specific chemical reactions in living things, and also used in numerous industrial processes. In 1926, Nobel Prize winner James B Sumner succeeded to isolate the crystalline form of enzymes Urease, which convert Urea into carbon-dioxide and ammonia. Four years later American biochemist John Northrop was able to isolate and crystallized form of pepsin and trypsin from digestive system that breakdown the proteins. In our body, enzymes catalyze the specific metabolic chemical reactions, for instance; when we take the food, our body produces various enzymes through the salivary gland, stomach and small intestine, like proteases, amylase and lipase act on the proteins carbohydrate and fats respectively and breakdown it into digestible form. Some time many people lacking the enzymes due to the inadequate diets, over-refined foods, environmental toxins and poor health, resulting symptoms of indigestion heartburn , gas and bloating are developed. Therefore doctors have are to turned to promote digestive enzyme products to improve good digestion and enhance nutrients assimilation of nutrients in the intestine. Thus various pharmaceuticals companies are deeply involved in manufacturing of diverse digestive enzymes (amylase, protease, lipase, papain, bromelain, serratiopeptidase and pancreatin cellulase etc) products. From the Pharmaceuticals points of views, a great benefit can be derived in enzymes application as enzymes are because originally it is a proteins nature (sequence of amino acids) isolated from the natural sources, no possibility of nuisance chemicals entity involvement in its usage. Hence its applications are too very safe to use as digestive aid.

With the above concept, we concluded that if only we use probiotics are used used only, this couldn't fulfill make up the deficient metabolic enzymes requirements, which patients acquired by the patients during treatment. In this condition, if combination of both probiotics and enzymes, available in the market it wouldill definitely improve therapeutic system as well as maintain the health status of patients.

With this understanding pharmaceuticals companies have an opportunity to increase the probiotic application along with the enzyme combination, for which that lot of commercial organizations are trying to develop new products and challenging with each other. Therefore aA group of research scientists at Advanced Enzyme Technologies Ltd., an ISO 9001:2000, and one of the reputed and leading companies of enzyme production in India, have geared-up to launch a novel stable formulation of probiotics along with the enzymes which provide the long-term stability to the dynamic microorganism in formulation as well as fulfill enzymatic requirements for human health benefits.

Contributed by:
Dr. Jai Shanker Arya- *R & D Scientist* &
Shilpa Risbud- *Technical Manager R&D*

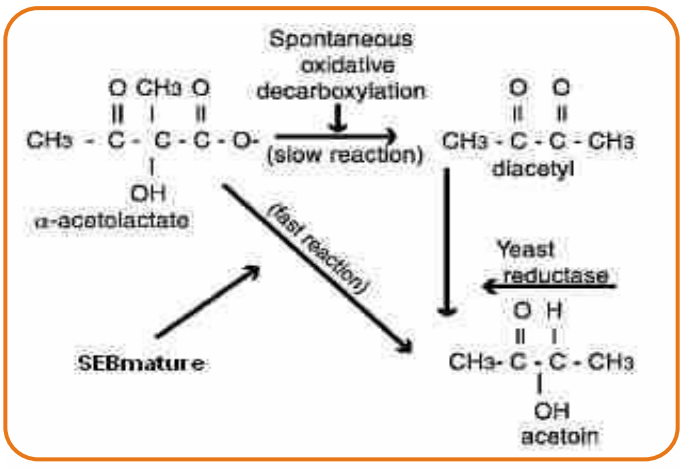
SEBMature: Brewers' Choice for Maturation

For centuries, a great secret has been revealed to man - the bubbly elixir known as BEER. The natural ingredients undergo a series of simple yet fascinating processes to convert them into one of the world's most popular beverages. It is not coincidental that alcoholic beverages have been given the distinctive appellation "spirits", alluding to the fact that these beverages seem to magically emerge from the natural ingredients, as if they have been assisted by spirits.

The different steps of **beer** making are **malting, roasting, brewing, fermenting & maturation.**

However maturation is the one of the most important step in the Beer-making process simply because beer aroma and flavor profile depends on this step. Also since it is the most time consuming step and ties up capital in the stored beer, beer maturation is the bottleneck in beer production.

Beer maturation mostly involves removal of Diacetyl. Diacetyl is by-product produced early in the fermentation, and then most of it is reabsorbed by the yeast and reduced to flavorless compounds later on. However different Yeast strains differ markedly in their diacetyl reduction ability. Diacetyl resembles butter or butterscotch, the flavor threshold for diacetyl is about 0.15mg/L.



The precursor of diacetyl is alpha-acetolactate. This hydroxyl acid precursors is produced as intermediate in the biosynthesis of the amino acid valine. Once in beer, the amino acid spontaneously undergoes oxidative decarboxylation to yield the diketones. The diketones then pass back into the yeast cell where they are reduced, to acetoin and butanediol which are much less intense in taste and aroma.

Since beer maturation very often is the bottleneck for brewers, understanding this need for accelerated maturation **Advanced Enzyme Technologies Ltd.**, with its dedicated Research and Development and technical Expertise team has developed **SEBMature** a technology based on Enzymatic principles to accelerate beer maturation.

SEBMature is a microbial **alpha-acetolactate decarboxylase (ADLC)** derived through fermentation of specific micro-organisms in a controlled environment.

The addition of the **SEBMature** to pitched wort is a simple and effective technology to limit the amount of diacetyl formed during fermentation and to reduce maturation time to minimum. Acetolactate decarboxylase transforms acetolactate directly to acetoin without the formation of diacetyl as an intermediate.

Advantages of using SEBMature:

- Maturation time can be shortened significantly,
- Increase in beer production capacity
- No change in flavor, color and aroma of the final beer.

Breweries in India and also around the world are looking out for such products to increase their productivity without affecting the quality of beer. SEBMature offers these advantages and hence has a great market potential.

Compiled by:
Mr. Surendra Rao
Business Head - Grains

WELCOME TO THE AETL FAMILY

Mr. Manoj Nair
Executive - Technical Services
DOJ - 3rd July'06

Mr. Biswanath Adhikary
Business Development Executive
(Baking Services)
DOJ - 3rd July'06

Mr. Pavan Kumar
Regional Sales Manager
(Baking Services)
DOJ - 10th July'06

Mr. Sanjay Baing
Consultant (Accounts)
DOJ - 10th August'06

Mr. Pradeep More
Asst. Manager - Admin.
Services
DOJ - 12th July'06

Mrs. Asha Shah
Executive - R & D
DOJ - 20th July'06

Mr. Mehul Mehta
Trainee R & D
DOJ - 26th June'06

Mrs. Suvarna Sonole
Front Office Executive
DOJ13th July'06

"KNIT SHOW" at Tirupur, Tamil Nadu

Advanced Enzyme Technologies Ltd. (AETL) had participated in "KNIT SHOW", a 6th edition of textile exhibition at Tirupur, Tamil Nadu on August 3-6, 2006. More than 700 exhibitors had showcased their products in KNIT SHOW. Visitors from Chennai, Banglore, Kerala and other parts of the country had visited the exhibition.

At AETL, we showcased all textile enzymes and also enzyme treated swatches at our stall. We got tremendous response from the visitors and shown interest in our products. AETL got very good exposure from the exhibition and got to understand the market of Southern India since Tirupur is going to be a hub for textile industry.

AETL stall with the visitors at Knit Show

Mr. Sachin Matkar, Biz. Dev. Manager-Textile discussing business with visitors and Mr. Imtiyaz Momin, Process Dev. Executive-Textile explaining products

Mr. Sachin Matkar and Mr. Imtiyaz Momin posing for a click

Making the Difference

Be Thankful

Be thankful that you don't already have everything you desire.
If you did, what would there be to look forward to?
Be thankful when you don't know something,
for it gives you the opportunity to learn.

Be thankful for the difficult times.
During those times you grow.
Be thankful for your limitations,
because they give you opportunities for improvement.
Be thankful for each new challenge,
because it will build your strength and character.

Be thankful for your mistakes. They will teach you valuable lessons.
Be thankful when you're tired and weary,
because it means you've made a difference.

It's easy to be thankful for the good things.
A life of rich fulfillment comes to those who are also thankful for the setbacks.
Gratitude can turn a negative into a positive.
Find a way to be thankful for your troubles,
and they can become your blessings.

Sourced by:
Jalpa Mehta
Asst. Manager-Corp. Comm.

ENGINEER Vs MANAGEMENT

A woman in a hot air balloon realized she was lost.

She reduced altitude and spotted a man below. She descended a bit more and shouted, "Excuse me, can you help me? I promised a friend I would meet him an hour ago but I don't know where I am."

The man below replied, "You're in a hot air balloon hovering approximately 30 feet above the ground. You're between 40 and 41 degrees north latitude and between 59 and 60 degrees west longitude."

"You must be an engineer," said the balloonist.

"I am", replied the man. "How did you know?"

"Well, answered the balloonist, "everything you told me is technically correct, but I've no idea what to make of your information, and the fact is I'm still lost. Frankly, you've not been much help at all. If anything you've delayed my trip even more."

The man below responded, "You must be in management."

"I am," replied the balloonist, "but how did you know?"

"Well," said the man, "You don't know where you are or where you're going. You have risen to where you are due to a large quantity of hot air. You made a promise which you've no idea how to keep, and you expect people beneath you to solve your problems."

Ms. Purnima Iyengar
Appl. Dev. Executive

TRY OUT EASY HOME REMEDIES!!!

HEADACHE:

Crush onion and apply the paste on the head.

Roast some ajwain dry on the tawa and tie it in a muslin cloth and sniff frequently

SOUND SLEEP:

Consume plenty of curd. Also massage head with curd before washing.

A cup of warm milk sweetened with honey should be taken every day night

BETTER EYE SIGHT:

Boil 2 tablespoons fenugreek leaves along with 1/2 cup moong dhal and 10 onions and eat regularly.

Eating 4-5 tender curry leaves everyday.

REDUCE CHOLESTEROL:

Regularly taking crushed 2-3 garlic cloves.

Finely diced small onion and mix it with 1 cup butter milk along with 1/4 teaspoon of black pepper powder and drink.

COUGH AND ITCHING THROAT:

Mix equal parts of ginger juice and honey and have it 2-3 times in a day

Ms. Ahila Sriram
Exe-Appl. Dev.- Bakery Div.

Happy Birthday to You!

Name	DOB	Name	DOB
September		**October**	
Mr. Suresh A. Kamodkar	Sept 02	Mr. M.S. Darade	Oct 15
Mr. Vincent Dias	Sept 02	Dr. A.K. Gupta	Oct 18
Mr. Sakharam Remze	Sept 03	Mr. R.S. Ingale	Oct 27
Mr. Hemant Tripathi	Sept 04	Mr. Hemant Kamlaskar	Oct 28
Mrs. Vaishali Patil	Sept 10	Mr. C.L. Rathi	Oct 30
Mr. S.Y. Ghotekar	Sept 12	Mr. Sachin D. Choudhary	Oct 30
Mr. B.B. Shekhare	Sept 13		
Mr. Dwivedi Gopal Kishore	Sept 19		

Why do Onions make us cry?

It is not the strong odor of the onion that makes us cry, but the gas that the onion releases when we sever this member of the lily family.

The onion itself contains oil, which contains sulfur, an irritant to both our noses and to our eyes. Cutting an onion arouses a gas contained within the onion, propanethiol S-oxide, which then couples with the enzymes in the onion to emit a passive sulfur compound. When this upwardly mobile gas encounters the water produced by the tear ducts in our eyelids, it produces sulfuric acid.

In response to the caustic acid, our eyes automatically blink, and produce tears which irrigate the eye, and which flush out the sulfuric acid.

Another reflex to rid the eyes of a foreign substance, that of rubbing our eyes with our hands, often exacerbates the situation, because our hands are coated with the caustic, sulfuric acid producing oil from cutting the onion, which we then rub directly into our eyes.

Much to our chagrin, the only remedy for ridding the onion of its pungent, irritating oil is to boil it, not to slice it or dice it.

Enzyme World Quiz

1 Which is the longest bone in the human body?

A Stapes b Spine
c Femur d Cervix

2 Which planet has the biggest satellite?

a Saturn b Jupiter
c Uranus d Pluto

3 What is the scientific name for study of handwriting?

a Cryptology b Graphology
c Cryptographology d Cryptography

4 What is the study of earthquakes called?

a Meteriology b Selsmology
c Geology d Quakology

5 Where is the headquarters of the International Red Cross Society?

a Geneva b Washington D.C.
C New York d Sydney

6 What is the name of the deepest known spot in the ocean?

a Great Barrier Reef b Sector 71
c K2 d Challenger Deep

7 By what name is Earth's satellite known?

a Ariel b Deimos
c Luna d Calypso

8 Which vegetable belongs to the same family as parsley and corriander?

a Swede b Carrot
c Cabbage d Cress

9 What is the most senior rank in the British Army ?

a General b Captain
c Lieutenant General d Field Marshall

10 Selenology is the study of which of the following ?

a Sun b Moon
c Stars d Earth

Correct Answers Of Last Issue Quiz

1	a	Venezuela
2	d	1 yen
3	a	Kansai Airport
4	a	Dharamsala, India
5	b	Rohtang Pass
6	b	Suez Canal
7	b	40
8	b	Mars
9	d	Hair
10	c	Coal

Last Quiz Winner: Name: *Mr. Manan Patel* *Ahmedabad*

Dear Readers, Win exciting prize by giving answers to 10 easy questions ! Please, submit your answers to **nainesh@enzymeindia.com**. Winner is chosen by lucky draw randomly from the correct entries.

All the best !

Entertainment

Why are you outstanding?

Santa Singh got his promotion and Become an officer in Punjab Government. To keep up with his status, he decided to speak only in English to all his subordinates. One morning, his peon peeped through the door to see if his boss was busy. Santa Singh noticed him and shouted, 'Why are you outstanding! Please income.'

Banta Singh in and TC !!

The collector asked Banta Singh for his rail ticket. Banta Singh searched his pockets but could not find it. 'Never mind,' reassured the collector, ' I will take your word that you bought your ticket.'

'That is very kind of you,' replied Banta Singh, 'but if I don't find it, I want to know where to get off.'

Banta Singh and Lassi !!

Santa Singh : 'Look Banta, what type of glasses they have made.
The top is closed. How can you fill lassi in it ?'
Banta Singh : 'Yes, that's funny. And even if you make a hole at the top, how will the lassi stay in the glass when the bottom is open?'

Forgetting Problem !!

Sardarji (to doctor) : 'Doctor, I have a problem.'
Doctor : 'What's your problem?'
Sardarji : 'I keep forgetting things.'
Doctor : 'Since when do you have this problem?'
Sardarji : 'What problem?'

Too obedient !!

Banta owned a large factory. He issued orders that only married men would be employed. When his friend Santa asked him the reason, Banta replied, 'Married men are more obedient.'