

Play on biotechnology with enzymes expertise...

Incorporated by second generation enzymologists, the Rathi brothers in 1989, Advanced Enzyme Technologies (AET) is one of the largest Indian enzyme companies with a product basket of 400+ proprietary products developed from 68 indigenous enzymes, probiotics. It offers these products to 700+ customers across 45 countries worldwide. AET develops enzymes mainly through microbial sources, using environment-friendly biotechnology processes. We initiate coverage on AET to capture opportunities in this integrated B2B enzymes player with plans to expand into B2C for areas like nutraceuticals and probiotics.

Oligopolistic environment, vast addressable market to the fore

Globally, growth of the enzymes market piggybacks on a diverse spectrum of customer base. This, together with limited number of meaningful players, has created a conducive business environment for existing players in the space. Note that enzymes as cost to percentage of sales is not material, yet its efficacy is very important to end product including constituency of the end product in terms of its taste, appearance, aroma and, thus, quality perception of the products leading to significant supplier stickiness. With a revenue bandwidth of just ₹ 440 crore (~US\$60 million) AET remains a marginal player in the global enzymes landscape that is estimated at ~US\$10 billion and poised to grow at 6-7% CAGR as more and more applications across usage industries incorporate enzymatic technologies. Despite being a smaller player, AET's product basket of >400 products is testimony to its proven capabilities.

Specialised business model with high entry barriers

One of the biggest challenges facing new companies looking to enter the enzyme industry is to offer continuous and differentiated solutions as per the client's requirement that demands real time R&D capability and flexibility in manufacturing. Large manufacturing capacities, proven capabilities, experienced promoters, customer stickiness, fairly consistent track record, ability to develop new products in-house and quest for unique acquisitions are some differentiators for AET. Revenues have grown at a CAGR of 11% to ₹ 444 crore during FY16-20 through the organic and inorganic route.

Valuation & Outlook

AET is poised to capture the growing opportunities in the enzymes and probiotics space backed by proven capabilities and stable financials that have been fairly consistent, thanks to a mix of organic and inorganic growth strategy employed by the management. Strong margins and healthy return ratios reflect the pricing power and balance sheet strength of the company. Going ahead, the management intends to augment its R&D capability for better facilitation and strengthening of in-house R&D capability, which bodes well in the long run in its quest to improve scalability and a possible foray into more complex enzymes. We ascribe a target price of ₹ 425 based on 25x FY23E EPS of ₹ 17.

Key Financial Summary (₹ crore)

(₹ Crore)	FY20	FY21E	FY22E	FY23E	CAGR FY21-23E (%)
Net Sales	444.0	473.1	529.9	585.8	11.3
EBITDA	202.3	221.8	245.8	272.7	10.9
EBITDA Margins (%)	45.6	46.9	46.4	46.5	
Adj. Profit	129.3	146.6	168.2	189.7	13.7
Adj. EPS (₹)	11.6	13.1	15.1	17.0	
PE (x)	28.6	25.3	22.0	19.5	
RoE (%)	15.4	15.0	14.8	14.4	
RoCE (%)	19.6	20.0	20.0	19.7	

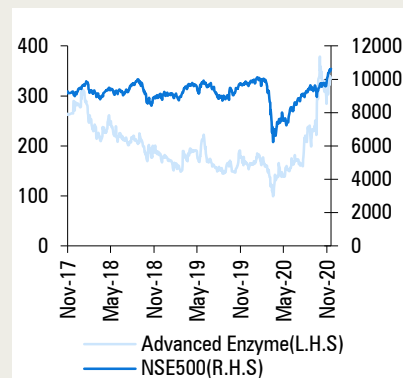
Source: ICICI Direct Research; Company



Particulars

Particular	Amount
Market Capitalisation	₹3704 crore
Debt (FY 20)	₹25 crore
Cash (FY 20)	₹83 crore
E V	₹3646 crore
52 week H/L	385/91
Equity capital	₹22 crore
Face value	₹2 crore

Price Performance



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Company Background

Incorporated by second generation enzymologists, the Rathi brothers in 1989, Advanced Enzyme Technologies (AET) is one of the largest research driven Indian enzyme companies with a product basket of 400+ proprietary products developed from 68 indigenous enzymes and probiotics. Broadly, the business can be divided into three segments - 1) human healthcare, 2) animal healthcare and 3) industrial processing. It manufactures enzymes by using natural resources such as plants, fungal, bacterial and animal sources, using environment-friendly biotechnology processes. It offers these products to 700+ customers across 45 countries worldwide.

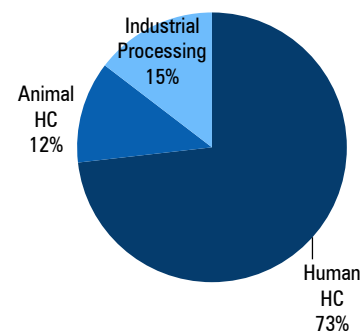
The company owns seven manufacturing facilities and six R&D facilities in India and California, US. Five of the manufacturing facilities are in India. They consist of three integrated fermentations, recovery and formulation facilities at Sinnar (Nashik, Maharashtra), Pithampur (Indore, Madhya Pradesh) and Maddipadu (Andhra Pradesh – JC Biotech), one extraction and recovery facility at Satpur (Nashik, Maharashtra) and one satellite blending, mixing and formulation facility at Vashind (Thane, Maharashtra). The company also owns two blending, mixing and formulation facilities for providing customised enzyme blends and proprietary enzyme solutions at Chino (California) through its step down subsidiary Cal India Foods International (doing business as specialty enzymes and biotechnologies), which primarily caters to the US and South American markets. R&D facilities are located at Thane, Sinnar, Monheim am Rhein, Germany (Evovx Technologies) and Chino, California.

Exhibit 1: Manufacturing facilities

Manufacturing Units	Key Products Manufactured	Capacity
Unit-I, Nashik	Serratiopeptidase, Cellulase, Xylanase, Lipase, Fungal Amylase, Pectinase, Protease, Lipase, Beta Glucanase, Lactase	120 cubic meters
Unit-II, Nashik	Papain, Bile salts	36 metric tons per annum
Unit-III, Pithampur	Serratiopeptidase, Cellulase, Xylanase, Lipase, Fungal Amylase, Pectinase, Protease, Lipase, Beta Glucanase, Lactase	240 cubic meters
Unit-IV, Thane	Biograin Series, Aciplex Series	2000 metric tons per annum
JC Biotech Pvt Ltd at AP	Serratiopeptidase, Algal DHA, an Omega 3 Fatty Acid	150 cubic meters
Unit I, II at SEB, California, US	Custom Enzyme Blends, Lactase, Peptizyme, Xylanase	6500 metric tons per annum

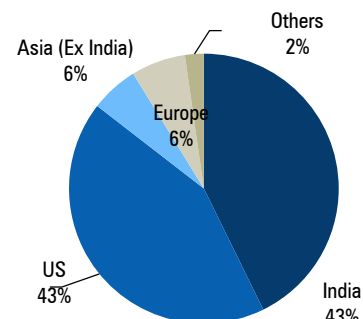
Source: ICICI Direct Research, Company

Revenue Bifurcation



Source: ICICI Direct Research, Company

Geographical bifurcation



Source: ICICI Direct Research, Company

Introduction to Enzymes

Microorganisms such as bacteria, yeast, etc, have been employed for centuries to produce bread, wine, vinegar, idli batter, curd and other common products without understanding at the micro-level as how to bring about such a change. These are all examples of natural enzymes. Enzymes are natural protein molecules produced by all living organisms, functioning as highly specialised catalysts for accelerating the pace of chemical reactions. Enzymes are not living creatures but essential for many living beings' metabolic processes. Enzymes are widely accepted as the origin of the fermentation process. The word "Enzyme" is derived from Greek: "en" (in) and "zyme" (ferment).

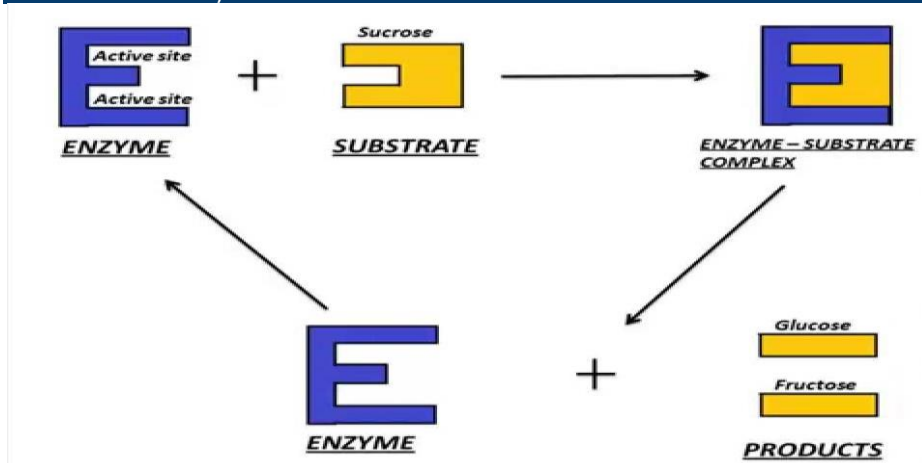
Enzymes are classified by the type of reaction they catalyse and the substance (called a substrate) they act upon. The scientific custom is to attach the suffix "ase" to the name of the principle substrate upon which the enzyme acts. Enzymes function in a mild environment, similar to the body environment of a living organism. Enzymes function in such a way that they selectively catalyse specific reactions (reaction specificity) and specific materials (substrate specificity).

For years, enzymes have been traditionally extracted from microorganisms (bacteria, yeast and fungi), plant materials and animal organs such as animal bile. Recently, however, with the emergence of modified genetic engineering, some companies have developed production processes for producing the required quantity of enzymes in select production hosts such as microorganisms and transgenic plants.

Plant-based enzymes are sourced from plants. For instance, bromelain is derived from pineapple and papain from papaya. Prominent enzymes found in plants include amylase, protease, cellulase and lipase. Amylase assists the human body with the breakdown and consequent absorption of starch and carbohydrates. Protease helps break down proteins that are present in fish, meat, eggs, poultry, nuts and cheese. The presence of cellulase in plant-based sources is significant as it does not occur naturally in the human body whereas lipases assist in the digestion of fats.

Enzymes can substitute normal chemical reactions, lower the overall energy consumption and reduce the amount of wastage i.e. the process can be made more "natural" by employing enzymes rather than "artificial" by using chemicals.

Exhibit 2: How enzymes function



Source: ICICI Direct Research

Enzymes are currently employed in a diverse array of applications that range from the manipulation of DNA in biotechnology research, to improving the softness of fabrics in the textile industry. Based on the usage of enzymes, the global enzyme market can be broadly classified into two segments, viz. industrial and specialty. The industrial enzyme markets includes food & beverages, cleaning products (detergents), biofuel production, animal feed,

textiles, leather, pulp & paper, starch processing, etc. The specialty enzyme markets include pharmaceutical, research and biotechnology, diagnostics and biocatalysts. The industrial enzymes are used in high volume and low value-added applications whereas specialty enzymes are used in low volume and high value-added applications.

Currently, there are over 4,000 different kinds of enzymes whose actions have been researched, utilised and safely administered for use in a variety of industries.

Product Insights

This classification provides break-up on the basis of the enzyme function. For example:

1) Proteases: They break down proteins (used in industries like detergent, leather, animal feed, food & beverage, pharmaceuticals, etc)

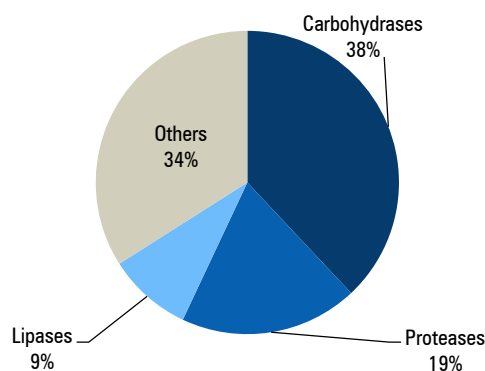
2) Cellulases: They break down cellulose (used in industries such as paper & pulp manufacturing, coffee production, grain processing, textile, animal feed, etc)

3) Lipases: They break down fats (lipids) into glycerol and fatty acid (used in biofuels production, biocatalysis, industries such as leather, dairy and cheese, etc)

4) Carbohydrases: They break down starch into simple sugars (used in industries like food & beverage, animal feed, cleaning agent, bio-fuel, etc)

5) Polymerases & nucleases: They replicate/break down DNA material (used in research & biotechnology, diagnostic segments)

Exhibit 3: Indian enzymes estimated product type bifurcation



Source: ICICI Direct Research, Company

Business segments

Human healthcare (pharma, nutraceuticals and probiotics)

The company provides proprietary enzyme products, probiotics and customised enzyme solutions to various pharmaceutical and nutraceutical companies in the US, India, Europe and other countries. While pharma comprises 40% of the human healthcare portfolio, nutraceuticals account for remaining 60%.

In pharma, the company provides proprietary enzyme products and customised enzyme solutions to various pharmaceutical and nutraceutical companies in India, the US, Europe and rest of Asia. Customers use these enzymes as active ingredients in their pharmaceutical and nutraceutical formulations. Some of its key customers include Sanofi India, Alkem Labs, Emcure Pharma and Torrent Pharma.

In nutraceuticals, which are mainly US focused, the company provided enzymatic solutions to players which are dietary supplements, functional foods such as breakfast cereals, sports drinks, etc.

AET has also developed technologies for production and application of several probiotics that are live microorganisms, when administered in sufficient amount, confer health benefits to human and animals. Probiotics have now become an integral part of several therapies for digestive disorders and newer applications for treatment of several other diseases are being developed. In terms of segmentation probiotics are categorised as horizontal segment which encompasses both pharma and nutraceuticals.

Exhibit 4: Few examples of human healthcare enzymes catered to by AET (current, past)

Product / Enzyme	Type of Enzyme	Source	Application
Bacterial Alpha Amylase	Carbohydrase	Bacteria	Starch degrading Enzyme
Peptizyme SP®	Protease	Bacteria	Natural Anti-Inflammatory Enzyme used in conditions like surgery, trauma surgery, dentistry and other conditions associated with pain
Serratiopeptidase	Protease	Bacteria	Natural Anti-Inflammatory Enzyme with Major applications in Surgery, Trauma Surgery, Dentistry And Other Conditions associated with pain
Fungal Diastase	Carbohydrase	Fungi	Natural pro-digestive Enzyme, used in disturbances of Gastro-intestinal functions and prevention of mal-absorption of food
Fungal Lactase	Carbohydrase	Fungi	Unique digestive Enzyme used in the treatment of lactose intolerance
Papain	Protease	Plant	Natural protein digestant with excellent fibrinolytic properties
Pepsin	Protease	Dry Glands	Natural protein digestant used in indications like loss of appetite, diarrhea and much more
Bile salts	Salt	Bile Paste	Natural fat emulsifier & stimulant for secretion of fat digesting enzymes
Trypsin Chymotrypsin Mix	Protease	Dry Glands	Natural blend of Enzymes for acute & chronic pain / inflammation
Hemicellulase	Carbohydrase	Fungi	Digestive aid enzyme used in digestion of cellulose and hemicellulosic material including fibres
Fungal Lipase	Lipase	Fungi	Digestion of fats over a wide range of pH
Pancreatin	Protease	Dry Glands	Natural digestant for carbohydrates, proteins and fats

Source: ICICI Direct Research, Company

Animal Healthcare

The company provides enzyme based nutritional supplements for animal nutrition, mainly catering to poultry and swine. The product offering enables animals to maximise the nutrients they absorb from the feed, thus helping in reducing feed costs, minimising animal waste production and accordingly helping to reduce environmental pollution. Similarly, enzymes increase the digestibility of modern animal feeds, which improves feed: gain ratios for ruminants and monogastric animals alike. Some key customers in this business vertical are Godrej Agrovet, Sneha Farms, Suguna Poultry Farms and Acme Labs.

Like in human healthcare, the company has also developed probiotics for animal healthcare, which has beneficial metabolites and competitive exclusion widely used in animal healthcare. AET has developed and assessed efficacy of probiotic formulations useful in animal healthcare.

Exhibit 5: Few examples of animal healthcare enzymes catered to by AET (current, past)

Key Product / Enzyme Description	Description
Alpha Amylase	To hydrolyze starch and to enhance digestibility of the feed
Beta Glucanase	To hydrolyze undigestible glucans and to negate their anti-nutritive effect
Mannanase	To hydrolyze undigestible mannans and to negate their anti-nutritive effect
Alpha Galactosidase	To hydrolyze undigestible galactans and to negate their anti-nutritive effect
Cellulase	To hydrolyze undigestible celluloses and to negate their anti-nutritive effect
Xylanase	To hydrolyze undigestible xylans and to negate their anti-nutritive effect
Pectinase	To hydrolyze undigestible pectins and to negate their anti-nutritive effect
Protease	To hydrolyze proteins and peptides and improve their digestibility
Phytase	To hydrolyze phytates and the release bound phosphorus and other minerals

Source: ICICI Direct Research, Company

Industrial processing: food

The company provides proprietary enzyme based products and solutions for food processing industries like baking, malting & brewing, dairy & cheese, fruit & vegetable processing, natural product extraction starch and alcohol.

In food application, enzymes help in improving production efficiency and yields, increase the consistency, stability and quality of the final product, reduce overheads for the same output or increase production at the same level of overheads. It also helps in reducing effluents.

Exhibit 6: Few examples of food enzymes catered to by AET (current, past)

Product / Enzyme Description	Application
Pectinase	To hydrolyze pectins in fruit juice processing, grain processing and all other natural materials processing
Cellulase	To hydrolyze cellulose in fruit juice processing, grain processing and all other natural materials processing
Xylanase	To hydrolyze xylans in fruit juice processing, grain processing and all other natural materials processing
Mannanase	To hydrolyze mannans in fruit juice processing, grain processing and all other natural materials processing
Beta Glucanase	To hydrolyze glucans in fruit juice processing, grain processing and all other natural materials processing
Alpha Galactosidase	To hydrolyze galactans in fruit juice processing, grain processing and all other natural materials

Source: ICICI Direct Research, Company

Industrial processing: non-food

The company offers solutions for a variety of industries such as textiles, leather, detergent and pulp & paper. The products offered reduce the effluent load and thereby help clients comply with pollution norms reducing the overall process cost.

Enzymes have the potential to bring about a green technology revolution in hundreds of industrial processes that rely excessively on traditional chemicals and solvents. The biological enzymatic solutions offered by the company improve the efficiency of industrial processes by saving energy, water and other raw materials, while reducing waste and effluent load, thereby helping to comply with pollution norms while reducing the overall process cost.

Exhibit 7: Few examples of industrial enzymes catered to by AET (current, past)

Product / Enzyme	Application
Cellulase	To hydrolyze cellulosic matter and to aid bio-polishing applications in Textile Processing
Xylanase	To hydrolyze xylans in paper bleaching applications in Paper and Pulp Processing
Protease	To hydrolyze tough-to-digest proteins in bio-washing of garments and in soaking, dehairing & bating of leather products

Source: ICICI Direct Research, Company

Investment Rationale

Oligopolistic environment, vast addressable market to the fore

Globally the growth of the enzymes market piggybacks on diverse spectrum of customer base. This, together with a limited number of meaningful players has created a conducive business environment for existing players in the space. Note that enzymes as cost to percentage of sales is not material, yet its efficacy is very important to end product including constituency of the end product in terms of its taste, appearance and aroma and thus on quality perception of the products leading to significant supplier stickiness. With a revenue bandwidth of just ₹ 440 crore (~US\$60 million) AET remains a marginal player in the global enzymes landscape, which is estimated to be ~US\$10 billion. The market has been dominated by the likes of Novozymes, Danisco, DSM, BASF, etc. which together account for ~75% of the market. Despite being a smaller player, the company's product basket of 400 products is testimony to its proven capabilities in this complex field with oligopolistic business environment. Even considering a normal growth rate of 5-8% in the residual addressable market of US\$2.5 billion, a sizable opportunity beckons for the company.

Specialised business model with high entry barriers

Manufacturing of enzymes, enzyme based products and solutions requires specialised knowledge of enzymes as well as requirements of end-user industries for which such products and solutions can be utilised. One of the biggest challenges being faced by new companies looking to enter the enzyme industry is to offer continuous and differentiated solutions as per the client's requirement that demand real time R&D capability and flexibility in manufacturing. Factors like technical and specialised nature of the business, reliance on R&D and dearth of qualified professionals with experience in enzyme and biotechnology industry are some entry barriers. This is why there are few meaningful players in the enzyme industry ecosystem and the top players account for a significant portion of the global market share. Large manufacturing capacities, proven capabilities, experienced promoters, customer stickiness, fairly consistent track record, ability to develop new products in-house and quest for unique acquisitions are some differentiators for the company. Revenues have grown at 11% CAGR to ₹ 444 crore in FY16-20 through the organic and inorganic route.

Moreover, since the company also caters to pharmaceutical companies that operate under highly regulated and controlled environment, adherence to stringent and restrictive norms in relation to quality standards is implied in the scheme of things.

Integrated player with presence across enzyme chain, geographies

AET is an integrated company with a presence across the enzyme value chain, covering the entire range of activities from R&D, commercial-scale manufacturing, to marketing of enzyme products and customised enzyme solutions. This also allows it to cater to its clients' unique and specific requirements, and provide them customised value-added solutions, which further enhances the business profile and strengthens clientele relationships. Over the last five years, the company has enhanced fermentation capacity from 360 cubic metre to ~510 cubic metre. AET intends to set trends in the R&D areas mainly for the formulation for new applications and will continue to significantly invest to build its portfolio in focus applications and industries. Over the last five years, the company has been spending ~4-5% of sales on R&D.

Exhibit 8: Integrated R&D and development capabilities

Proteomics & Applied Microbiology	Process Development & Optimization	Application Development	Laboratory Services
<ul style="list-style-type: none"> ▪ Purification & Characterisation of enzymes ▪ Generate data for filing regulatory dossiers ▪ Develop newer & improved microbial systems 	<ul style="list-style-type: none"> ▪ Upscaling fermentation ▪ Enhance efficiency of downstream processes ▪ Improve recovery & purification yields 	<ul style="list-style-type: none"> ▪ Develop innovative enzyme solutions for various food & non-food processing industries ▪ Lab support for nutritional applications 	<ul style="list-style-type: none"> ▪ Custom application development ▪ Testing services for customers

Source: ICICI Direct Research, Company

Global snapshot: market size, growth potential of various segments

Since we assess AET from a global perspective, it becomes imperative to discuss global enzymes market size in brief along with the growth prospects of sub-segments. Standalone players such as Novozymes, DuPont Danisco, Amano Enzyme, Novus International and diversified players like BASF and DSM dominate the global market space.

The global enzymes market is estimated to reach ~US\$15 billion by 2025 from ~US\$10 billion in 2019, at an expected CAGR of ~7% (Source: AET Annual report FY20). This is likely to be driven by major breakthroughs in enzymes research and development, introduction of genetically-engineered enzymes, advancements in green chemistry and enzymes engineering. Whether it is the demand for bio fuel or use of enzymes in pharma and nutraceuticals to optimise the compound effect or to improve the animal health by improving feed quality or manufacturing of detergents using enzymes that can reduce water usage, enzymatic biotechnology is likely to play an important role in various user industries.

The specialty enzymes market which encompasses pharmaceuticals and diagnostics and biocatalysts is valued at ~US\$4 billion in 2019. It is likely to reach ~\$6 billion by 2025, at a CAGR of ~7%. Biological catalysts in pharmaceutical and diagnostics are in demand, which is the main growth factor of specialty enzymes. Technological enhancements for the optimisation of pharmaceutical production and improvement of quality have also contributed in increasing the use of these enzymes. The market is expected to grow further on the back of multi-functional advantage of the enzymes and introduction of modern technology to reduce the dependability on chemical catalysts.

The industrial enzymes market, which comprises food & non-food (including animal feed and other industrials) enzymes segments, is valued at US\$5.5 billion in 2019 and is expected to grow at 6.5% CAGR to US\$8.75 billion by 2025. In food, factors such as rising demand of processed food and increased awareness about nutrition-rich foods have contributed towards growth. Food enzymes are important in breaking down various complex molecules present in the food to simpler molecules that are easy to digest. Growing demand for nutraceutical products has opened up a significant opportunity for the food enzyme industry. Many nutraceutical as well as pharma companies are working to incorporate nutritional values in fortified and functional food products, which are driving the need for food enzymes. The US is the largest market share for food enzymes because of consistent demand for processed food and the overall progress of the food and beverage industry in that country. That said, the highest CAGR has been reported in the Asia Pacific region, owing to the rapid increase in demand for enzymes and high population.

Animal feed industrial enzymes application segment is anticipated to grow at a decent pace due to growing concern surrounding animal health and demand for more nutrients in their feeds. On the basis of livestock, the poultry segment is primed for highest growth in terms of value. According to Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization (FAO) Agricultural Outlook 2017-26, the worldwide meat production is likely to rise sharply in the next decade. As per FAO estimates, the production of poultry for meat is likely to account for more than half the production of all additional meat by 2025.

In the non-food, non-animal feed industrial enzymes segment, the enzymes usage has been boosted by developments in enzyme engineering and green chemistry, coupled with the increasing use of genetically engineered enzymes. The multifunctional benefits of these enzymes for numerous applications and introduction of new technology to reduce the consumption of chemicals are growth factors for industrial enzymes.

Delving down growth potential of key segments for AET

Human Healthcare segment:

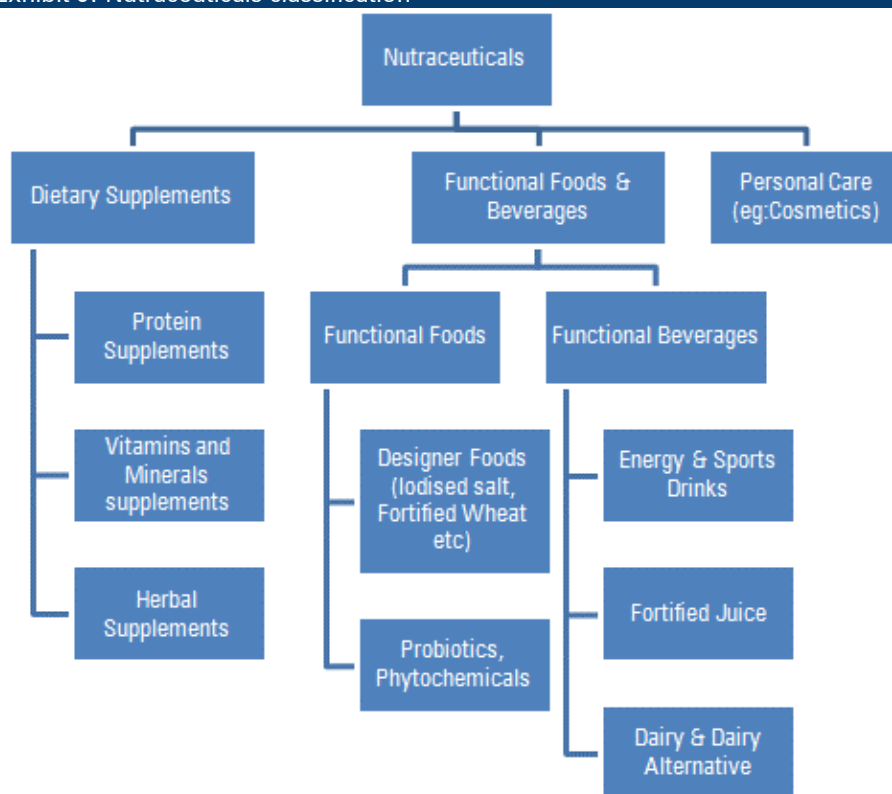
Human healthcare (human HC) segment contributed 75% (₹ 321 crore) to net revenues in FY20. The human HC segment can be divided into nutraceuticals (~60% i.e. ₹ 193 crore) and pharmaceuticals (~40% i.e. ₹ 128 crore).

In a way the incremental enzymes usage in the nutraceuticals segment globally, augurs well for AET as nutraceutical enzymes account for ~45% of overall net revenues. While pharma has been an extensively discussed and followed segment, we try to give some brief on nutraceuticals as a primer.

Globally, nutraceuticals have no generally accepted definition or standards. They are generally considered food or beverages that provide health and medicinal benefits through natural, organic ingredients. This class encompasses food supplements such as vitamins, minerals, probiotics, non-nutrient ingredients such as glucosamine (relieves joint pain), MSM (relieves joint pain, anti-inflammation etc), Ayurveda, Unani, Siddha, traditional Chinese Medicines, etc.

The nutraceuticals market is divided into following: 1) dietary supplements, 2) functional foods & beverages and 3) personal care.

Exhibit 9: Nutraceuticals classification



Source: F&S –FICCI report, University of Michigan Health System report, ICICIdirect.com Research

Globally, the nutraceuticals market is expected to reach \$578 billion by 2025 from \$295 billion in 2017, a CAGR of ~9%. The US, Europe and Asia Pacific account for 95% of the total global nutraceuticals market. The trend towards nutraceuticals is driven by several factors, mainly due to consumer perceptions: the first and dominant being ‘Natural is good’, others being fewer side effects, increasing popularity among the aging population, increasing perception on the need for a healthy diet and its importance in health and rising medical costs.

In matured markets like the US, growth is likely to be driven by functional food segment (that comprises ~40% of the US nutraceuticals market) rests with the functional food segment followed by the dietary supplement and functional beverages market.

Pharmaceutical companies are increasingly using enzymes to manufacture APIs using bio catalysis to speed up chemical reactions. Enzymes offer chemical properties that make them alternatives to traditional chemical catalyst in chemical manufacturing, with lower energy requirements and waste. Biocatalyst enzymes are used in small volumes, add high value to the product and are included in specialty enzyme class. AET supplies enzymes to various pharmaceutical companies mainly catering to therapeutic areas of pain management, gastrointestinal (GI) and anti-infectives among others.

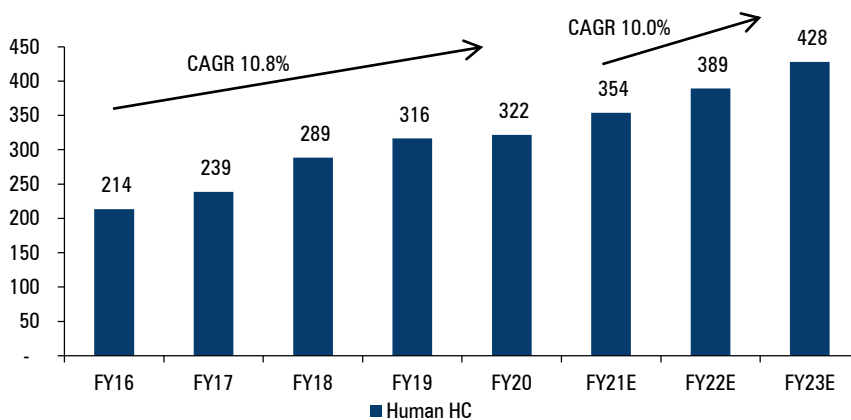
Increasing research and development has made it possible for specialty enzymes to be used in drug formulation and delivery. Manufacturers in pharmaceutical industry are inclined toward the production of enzyme-based pharmaceutical drug formulations that have fewer side effects.

JC Biotech acquisition to complement pharma segment

The company acquired 70% stake in JC Biotech (Hyderabad based) in FY17 (topline of ₹ 39 crore in FY16) for a sum of ₹ 50 crore. JC Biotech was a strong competitor to AET for Serratiopeptidase API (anti-inflammatory) and commanded 50%+ share for the API in the domestic market.

Overall, we expect the human healthcare segment to grow at 10% CAGR in FY21-23E to ₹ 428 crore, due to strong all-round growth in the nutraceuticals and pharma segment across geographies, led by innovative product push and acquisition of newer clients.

Exhibit 10: Human HC expected to grow at 10% over FY21-23E



Source: ICICI Direct Research, Company

Animal healthcare segment

AET’s animal healthcare (animal HC) segment contributed 13% (₹ 54 crore) to net revenues in FY20.

Animals are fed with mainly two categories of livestock feed viz. 1) forage and 2) fodder. Other than these two the third category is compound feed, which uses enzymes for production. This feed is designed specifically to suit the nutritional requirements of animals and includes additives, corns, soybeans, sorghum, oats, barley, etc.

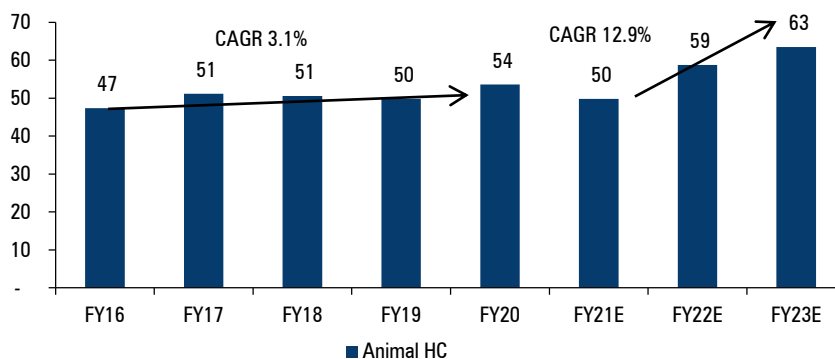
Enzyme feed additives act as biocatalysts to assist in digestion and utilisation of nutrients, thereby allowing feed compounders to develop products with unconventional and less expensive formulations. When low cost or nutritionally inferior raw materials such as cereals, beans or seeds are processed enzymatically, they can be used as substitutes for higher quality feed rations without sacrificing animal productivity. In addition, enzymes allow greater utilisation of grains themselves without the use of additives, such as phosphates, which help to reduce the amount of waste nutrients.

Enzymes can also act as milk replacers in feed formulations, allowing early weaning of farm animals, which is important to animal breeders. In addition, enzyme treatments provide the following benefits: increased final animal weight, better feed utilisation, healthier digestive systems, more homogenous production, lower death rate, improved eggshell quality and waste products that are easier to handle. Animal feed remains a major cost in the production of meat. The ability of enzymes to reduce both actual costs and cost volatility in production of feed is expected to drive increased adoption, especially in the Asia/Pacific region and other developing economies. New product introduction will continue to be an important factor in the market, as newer and more customised enzyme products are developed that have been optimised for particular animals, feed types and other conditions.

Geographically, AET's animal HC business is mainly concentrated in India. However, the mix is expected to change as the management is targeting geographical expansion and is in the process of setting up distribution networks. Post the product registrations and setting up of distribution networks, export markets would likely show higher contribution to the segment revenues.

Animal HC business is expected to clock a CAGR of ~13% in FY21-23E to ₹ 63 crore on the back of greater exports, led by addition of more overseas customers, increasing list of product registrations in export destinations besides incremental animal feed probiotics traction.

Exhibit 11: Animal HC expected to grow ~13% over FY21-23E



Source: ICICI Direct Research, Company

Industrial processing segment:

Industrial enzymes segment contributed 13% (₹ 56 crore) to net revenues in FY20. As mentioned earlier, the segment has been divided into two sub-segments- food and non-food industrial processing.

Food business consists of baking, dairy & cheese processing, fruits & vegetables processing, cereal extraction, brewing, grain processing, protein processing, and oils & fats processing. Following are some solutions among others the company is currently offering-

Baking - The company provides enzymatic solutions for replacing chemicals, additives used for whitening of bread and more loaf volume thereby increasing output. Enzymes give better whiteness, texture, volume, moisture, colour, taste and also increase output by reducing bran resulting in more profits to the baker.

Fruit and vegetable processing - Addition of enzymes helps improve the liberation of juice from the pulp. The company's solutions help increase the yield, clarification of juices and, hence, improve quality of the juice manufactured and its stability.

Dairy and cheese processing- The company offers solutions for enzymes required for production of cheese, yogurt and other dairy products for improving yield, better taste and texture, consistent quality, reduced bitterness and for products containing low levels of lactose.

Brewing - AET's enzymes for brewing offer a range of benefits including flexibility of raw materials, increased extraction and improved filtration of finished products, flavour control, beer stability and chill proofing.

Starch and grain processing- Various products are manufactured using grains like wheat, corn, malt, barley, etc, which are rich source of starch. The company's products increase plant output with improved yields.

Industrial processing encompasses enzyme solutions to industries like textiles, leather, detergent and pulp & paper. These industries suffer from issues of heavy energy usage in processing the raw material (e.g. pulp & paper), extensive pollution due to usage of harsh chemicals (e.g.: detergent, leather, textiles industry) etc. Enzymes are considered as potent biocatalysts for a large number of reactions. The biological solutions offered by AET improve the efficiency of industrial processes by saving energy, water & other raw materials while reducing waste & effluent load, thereby helping clients to comply with pollution norms reducing overall process cost. Following are some instances of AET's offerings in Industrial processing.

Textile processing - The company offers solutions from pre-treatment to finishing in garment and fabric finishing by substituting the basic & specialty chemicals. These enzymes act as substitutes in fabric processing for de-sizing, scouring, degumming, bio-polishing, print wash and bleach clean-up.

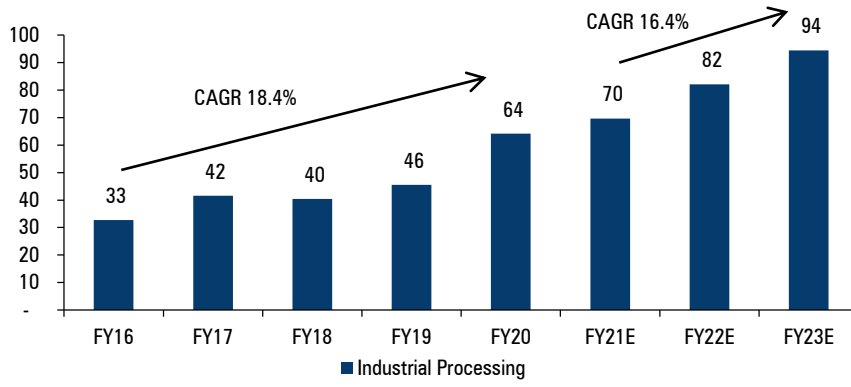
Enzymes for biofuels - The company offers solutions for biomass processing, saccharification and bioethanol production. In order to design an economically & environmentally sustainable biodiesel production process, plant oils, animal fats and waste products such as animal renderings, fish processing waste and cooking oils are employed as feedstock for biodiesel production.

Leather Processing- The company offers eco-friendly solutions for the leather processing industry. Its products include acid bate, which removes cementing matter from collagen, bio-conditioner, bio-enhancer (for natural fat removal), unhearing, bio-enhancer and bio-degreaser. For leather processing, it has also developed a patent that enables lime and caustic free leather processing. The use of enzymes in leather processing results in a more environmentally friendly process and improves the quality of the leather (cleaner and stronger surface, softer leather, less spots).

Pulp and paper processing- The company's eco-friendly solutions replace chemicals/additives used for whitening/brightness of paper and its lustre and helps in controlling pollution by reducing chemicals used in handling water/wastage.

Overall, we expect the industrial processing business, to grow at ~16% CAGR in FY21-23E to ₹ 94 crore, led by incremental opportunity for the company panning out mainly from the food segment besides triggers emanating from non-food opportunities such as enzymes for reducing waste, better energy usage, reducing water usage, etc.

Exhibit 12: Industrial processing expected to grow at ~16% over FY21-23E



Source: ICICI Direct Research, Company

Financials

Well poised to grow aggressively via organic, inorganic route

Revenues have grown at a CAGR of 11% to ₹ 444 crore in FY16-20 through the organic and inorganic route. Historical growth has been aided by acquisitions by the company starting with 100% shareholding in Cal-India and Advanced Supplementary Technologies Corporation (AST Enzymes), both based in California, US. The acquisition of these companies has enabled the company to tap its large client base thereby enhancing its presence in the US and hence widening customer base. In FY17, the company acquired 70% stake in JC Biotech, which has brought additional capacity under its fold to serve the growing demand for enzymes. Recently the company also bought an enzyme R&D firm named Evoxx in Germany for €7.5 million to strengthen its R&D capabilities.

Overall, the company is focusing on building strengths in all four pillars of the enzyme business viz. a) enzyme development (Evoxx) b) strain development, c) process development (AET & JC Biotech) and d) marketing & customised solutions (AET).

Exhibit 13: Few examples of industrial enzymes catered to by AET (current and past)

Year	Company Name	Amount	Region	Strategic Intent
1994	Messrs Super Organic Research Laboratories	~₹21 lakhs	India	NA
2011	Cal-India	~₹17 crore	US	To strengthen customer base
2012	AST Enzymes	~₹17 crore	US	To strengthen customer base
2016	JC Biotech	~₹50 crore	India	To strengthen Manufacturing
2017	Evoxx	~₹54 crore	Europe	To strengthen R&D

Source: ICICI Direct Research, Company; *Assumption: 2011 US\$/INR: 45, 2012 US\$/INR: 53.8, 2017 Euro/INR: 72

As of FY20, the company's top 10 clients account for 35% of total revenues. Noteworthy trend over the last five years is the waning dependence on top client for revenue generation. Thus, from 24% of sales in FY16, the revenue contribution from the top client has come down to 9% in FY20. The reducing contribution also has some impact on the overall growth over the last five years, which registered a CAGR of ~11% during FY16-20. However, excluding this, the CAGR was ~16% during the same period as the company judiciously attempted to derive growth from other clients.

Exhibit 14: Revenue breakup and waning dependence on top customer

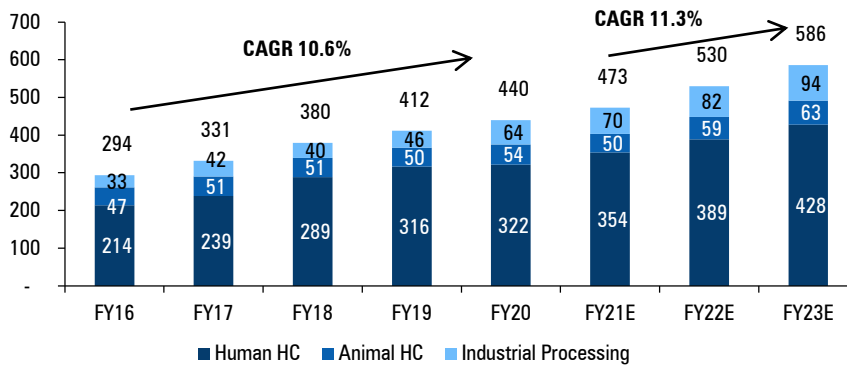
	FY16	FY17	FY18	FY19	FY20	FY16-20
Human HC	214	239	289	316	322	10.8
Animal HC	47	51	51	50	54	3.1
Industrial Processing	33	42	40	46	64	18.4
Total	294	331	380	412	440	10.6
Top Customer (HC)	71	79	81	70	39	
% of Human HC	33.2	33.1	28.1	22.1	12.1	
% of Total sales	24.2	23.8	21.3	17.0	8.9	
Other Human HC	143	160	208	246	283	18.6
Other Total sales	223	252	299	342	401	15.8

Source: ICICI Direct Research, Company

Revenues to grow at CAGR of ~11% during FY21E-23E

We expect revenues to grow at a CAGR of 11.3% to ₹ 586 crore over FY21-23E on the back of 1) 10% CAGR in human HC driven mainly by pharmaceuticals and new orders in nutraceuticals in the exports market besides expansion in B2C segment in the US, 2) ~13% CAGR in animal HC on the back of new registrations in the overseas markets and traction from probiotics and 3) ~16% CAGR in industrial processing to be driven by expansion into new applications and client addition. The company is also likely to evaluate small ticket acquisitions to deploy incremental cash flows (not included in our assumptions).

Exhibit 15: Revenues expected to grow ~11% over FY21-23E

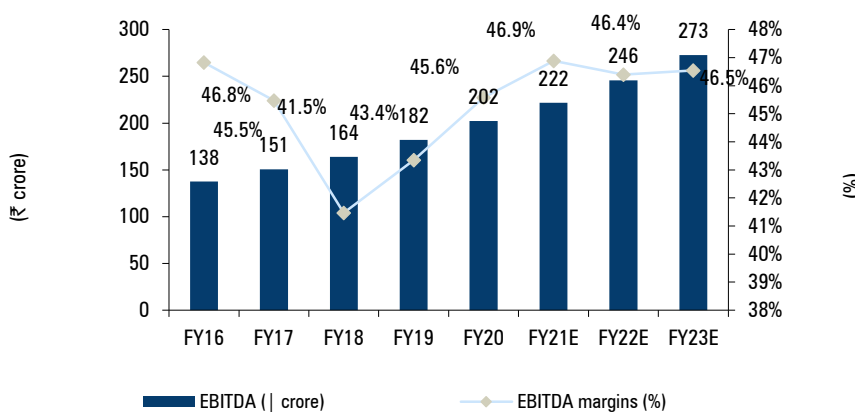


Source: ICICI Direct Research, Company

EBITDA growth to track revenue growth with strong margins

EBITDA grew at a CAGR of 11% in FY16-20. The company has maintained 40-45% EBITDA margin trajectory over the past few years despite loss making acquisitions. The Evoxx acquisition especially dented the margins in FY18 and FY19 (~42% and ~44%, respectively). Evoxx became EBITDA positive in FY20, which helped the margins to move to ~46% in FY20. The company is currently operating at 55-60% of plant utilisation (fermentation capacity). The expectation is to achieve ~90% three to five years down the line. That said, the management has guided for a broader EBITDA margin range of 40-48% considering likely increase in scalability related overhead expenses. We expect margins to remain more or less stable in the 45-47% range. We expect EBITDA to grow at a CAGR of 11% to ₹ 273 crore by FY23E.

Exhibit 16: EBITDA margins likely to remain strong during FY21-23E

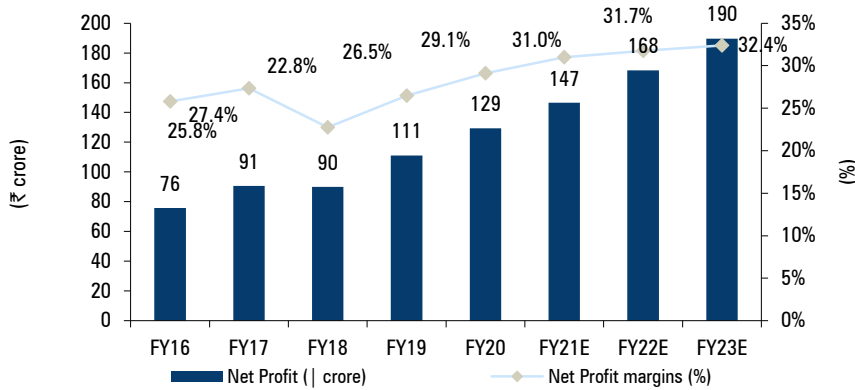


Source: ICICI Direct Research, Company

Net profit expected to increase at ~14% CAGR over FY21-23E

Net profit grew at 14% CAGR over FY16-20 to ₹ 129 crore mainly due to a strong operational performance. We expect net profit to increase at ~14% CAGR over FY21-23E to ₹ 190 crore. Higher growth vis-à-vis EBITDA is likely to be on the back of higher other income generated by significant FCF generation.

Exhibit 17: Net profit expected to grow at 14% over FY21-23E

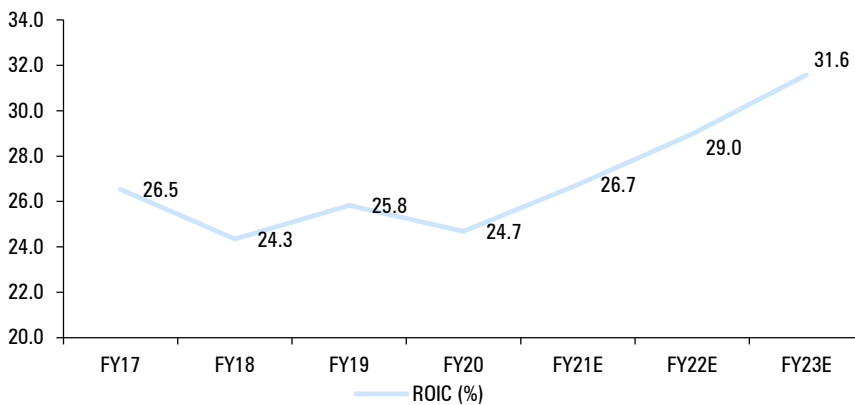


Source: ICICI Direct Research, Company

RoIC to improve 690 bps amid strong operational performance

RoIC declined 184 bps to 24.7% over FY17-20. Acquisitions have impacted the company’s assets turnover, thus reducing RoIC. We expect RoIC to improve 690 bps to 31.6% in FY20-23E mainly due to a strong operational performance and improvement in assets turnover. We believe RoE and RoCE are not comparable amid high cash and liquid investment on the book.

Exhibit 18: Improvement in operational performance to drive RoIC

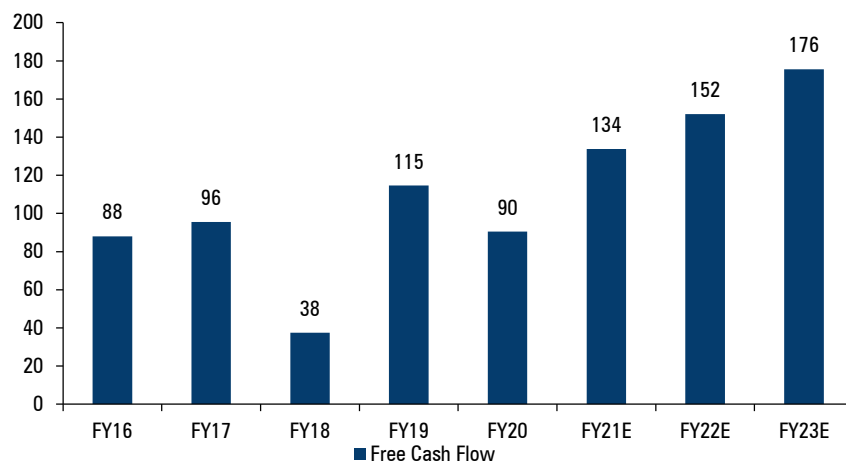


Source: ICICI Direct Research, Company

Leverage free b/s; robust cash flow to support inorganic growth

Over the next two to three years, the company has no plans to incur capex (capex mainly earmarked to put R&D blocks), as existing capacities remain under-utilised. The company is expected to report robust FCF generation for the next two to three years, which can be further utilised for inorganic growth.

Exhibit 19: Free cash flow



Source: ICICI Direct Research, Company

Valuation & Outlook

The enzyme industry is dominated by big MNCs like Novozymes A/S, DSM Nutritional Products, Du Pont, Danisco, etc. However, at the same time smaller players from China and India are gaining greater ground in the segment helped by innovation and newer technologies.

AET is poised to capture the growing opportunities in the enzymes and probiotics space backed by its proven capabilities and stable financials, which have been fairly consistent, thanks to a mix of organic and inorganic growth strategy employed by the management. Strong margins and healthy return ratios reflect the pricing power and balance sheet strength of the company. Going ahead, the management intends to augment its R&D capability for better facilitation and strengthening of in-house R&D capability which should bode well in the long run in its quest to improve scalability and possible foray into more complex enzymes. We expect sales, EBITDA and PAT to grow at a CAGR of 11%, 11% and 14%, respectively, in FY21-23E. We have ascribed a target price of ₹ 425 based on 25x FY3E EPS of ₹ 17.

Although there are few more companies in the listed space operating in the enzyme business, in most cases the size of their enzymes business is just a small fraction of their chemical businesses. Hence, we only have one pure-play enzyme player (Novozymes) which can be directly compared with AET.

Exhibit 20: Global peer in listed enzymes space (₹ crore)

Company	Market Cap	Revenue	EBITDA	EBITDA margin (%)	PAT	RoCE	P/E (Trailing 12M)
Novozymes	1,23,500	17,070.0	5,322.0	31.2	3,745.0	25.7	33.0
Advanced Enzymes Technologies	3,691	444.0	202.3	45.6	129.3	19.6	28.5

Source: ICICI Direct Research, Company, *Financial data for AET – FY20; Novozymes – CY19

Key risk

Estimation risk- peculiar phenomenon for B2B players

Verifying the revenue stream from third party and independent sources is always a difficult task to estimate revenues of B2B players compared to B2C players. On account of client confidentiality, most of these players are reluctant to divulge important details. Similarly, there can be significant quarterly gyrations (or even yearly) in the performances due to the contractual nature of the revenue stream. Hence, the only reliable source is the broader management guidance.

Regulatory issues

The company has seven manufacturing facilities (five in India, two in the US) and seven R&D facilities (four in India, one in the US and two in Germany). AET requires regulatory licenses and product registrations to operate in various geographies. There have been instances in the past where the operations at Sinnar manufacturing site had been halted and drug license suspended for 15 days by the FDA Maharashtra.

The company has its own manufacturing facilities in the US, which annually undergo USFDA audit. Although the current USFDA regulations are less stringent towards enzymes providers, any implementation of stricter regulations, licensing procedures can compound the cGMP related adherence thus adding cost and uncertainty.

Growing competition from existing players

Competition from Chinese players or existing players in the domestic and international markets would result in pricing pressures and would force the company to reduce the prices of its products in order to retain or attract customers, which may impact its revenues and margins. The company relies on R&D to develop innovative and cost effective products and to increase its product range. However, in the event its competitors harness better process technology or improved process yield or are able to source raw materials at more competitive prices and are, therefore, able to create new products or substitutes for existing products at competitive prices, AET will be negatively impacted.

Financial Summary

Exhibit 21: Profit and loss statement				
	₹ crore			
(Year-end March)	FY20	FY21E	FY22E	FY23E
Revenues	444.0	473.1	529.9	585.8
Growth (%)	5.8	6.6	12.0	10.6
Raw Material Expenses	80.9	83.9	93.4	102.3
Employee Expenses	80.2	85.3	97.9	108.2
Other Manufacturing Expenses	80.6	82.1	92.8	102.6
Total Operating Expenditure	241.7	251.3	284.1	313.1
EBITDA	202.3	221.8	245.8	272.7
Growth (%)	11.2	9.6	10.8	10.9
Interest	3.0	1.9	1.9	1.9
Depreciation	25.8	27.2	29.2	31.0
Other Income	5.6	17.3	26.5	32.2
PBT before Exceptional Items	179.2	210.0	241.1	271.9
Less: Forex & Exceptional Items	0.0	0.0	0.0	0.0
PBT	179.2	210.0	241.1	271.9
Total Tax	46.1	58.6	67.5	76.1
PAT before MI	133.0	151.3	173.6	195.8
Minority Interest	3.8	4.7	5.4	6.1
PAT	129.3	146.6	168.2	189.7
Adjusted PAT	129.3	146.6	168.2	189.7
Growth (%)	16.4	13.4	14.7	12.8
EPS	11.6	13.1	15.1	17.0
EPS (Adjusted)	11.6	13.1	15.1	17.0

Source: ICICI Direct Research

Exhibit 22: Cash Flow Statement				
	₹ crore			
(Year-end March)	FY20	FY21E	FY22E	FY23E
Profit/(Loss) after taxation	128.3	146.6	168.2	189.7
Add: Depreciation & Amortization	25.8	27.2	29.2	31.0
Net Increase in Current Assets	-17.4	-10.9	-20.5	-20.3
Net Increase in Current Liabilities	1.8	2.5	3.2	3.3
Others	2.5	1.9	1.9	1.9
CF from operating activities	140.9	167.4	182.1	205.7
(Inc)/dec in Fixed Assets	-50.4	-33.7	-30.0	-30.0
(Inc)/dec in Investments	-1.0	-100.0	-100.0	-100.0
Others	8.7	-4.0	-3.7	-3.5
CF from investing activities	-42.7	-137.7	-133.7	-133.5
Inc / (Dec) in Equity Capital	0.2	0.0	0.0	0.0
Inc / (Dec) in Debt	-25.7	-7.0	0.0	0.0
Dividend & Dividend Tax	-10.5	-8.8	-10.1	-11.4
Others	-2.5	-1.9	-1.9	-1.9
CF from financing activities	-38.6	-17.7	-12.0	-13.3
Net Cash flow	59.6	12.0	36.3	58.9
Opening Cash	23.4	83.0	95.0	131.4
Closing Cash	83.0	95.0	131.4	190.2
Free Cash Flow	90.5	133.7	152.1	175.7
EBITDA conversion	0.7	0.8	0.7	0.8
FCF Yield	2%	4%	4%	5%

Source: ICICI Direct Research

Exhibit 23: Balance Sheet				
	₹ crore			
(Year-end March)	FY20	FY21E	FY22E	FY23E
Equity Capital	22.3	22.3	22.3	22.3
Reserve and Surplus	817.3	955.1	1,113.3	1,291.6
Total Shareholders funds	839.7	977.5	1,135.6	1,313.9
Total Debt	24.7	17.7	17.7	17.7
Deferred Tax Liability	32.9	29.6	26.6	24.0
Minority Interest	27.8	28.4	28.9	29.5
Long term Provisions	1.3	1.4	1.4	1.5
Other Non Current Liabilities	5.5	5.6	5.7	5.8
Source of Funds	931.8	1,060.1	1,216.0	1,392.4
Gross Block - Fixed Assets	427.4	457.4	487.4	517.4
Accumulated Depreciation	158.7	185.9	215.2	246.2
Net Block	268.7	271.5	272.3	271.2
Capital WIP	10.1	13.8	13.8	13.8
Net Fixed Assets	278.9	285.3	286.1	285.0
Goodwill on Consolidation	294.1	294.1	294.1	294.1
Investments	123.6	223.6	323.6	423.6
Inventory	80.0	85.3	95.5	105.6
Cash	83.0	95.0	131.4	190.2
Debtors	74.7	79.6	89.1	98.6
Loans & Advances & Other CA	14.3	15.0	15.8	16.6
Total Current Assets	252.0	274.9	331.8	410.9
Creditors	9.6	10.3	11.5	12.7
Provisions & Other CL	46.8	49.3	52.5	55.7
Total Current Liabilities	46.8	49.3	52.5	55.7
Net Current Assets	205.2	225.6	279.3	355.2
LT L&A, Other Assets	22.5	23.6	24.7	25.9
Deferred Tax Assets	7.4	7.8	8.2	8.6
Application of Funds	931.8	1,060.1	1,216.0	1,392.4

Source: ICICI Direct Research

Exhibit 24: Ratio Analysis				
	₹ crore			
(Year-end March)	FY20	FY21E	FY22E	FY23E
Per share data (₹)				
EPS	11.6	13.1	15.1	17.0
Cash EPS	13.2	14.8	16.8	18.7
BV	75.2	87.5	101.7	117.7
DPS	0.7	0.8	0.9	1.0
Cash Per Share	7.4	8.5	11.8	17.0
Operating Ratios (%)				
Gross Profit Margins	81.8	82.3	82.4	82.5
EBITDA margins	45.6	46.9	46.4	46.5
PAT Margins	29.1	31.0	31.7	32.4
Inventory days	65.8	65.8	65.8	65.8
Debtor days	61.4	61.4	61.4	61.4
Creditor days	7.9	7.9	7.9	7.9
Asset Turnover (x)	1.0	1.0	1.1	1.1
Return Ratios (%)				
RoE	15.4	15.0	14.8	14.4
RoCE	19.6	20.0	20.0	19.7
RoIC	24.7	26.7	29.0	31.6
Valuation Ratios (x)				
P/E	28.6	25.3	22.0	19.5
EV / EBITDA	17.4	15.3	13.3	11.4
EV / Revenues	7.9	7.2	6.2	5.3
Market Cap / Revenues	8.3	7.8	7.0	6.3
Price to Book Value	4.4	3.8	3.3	2.8
Solvency Ratios				
Debt / Equity	0.0	0.0	0.0	0.0
Debt/EBITDA	0.1	0.1	0.1	0.1
Current Ratio	3.6	3.6	3.8	4.0

Source: ICICI Direct Research

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