

Fermenta Biotech Limited (formerly known as DIL Limited)

CIN: L99999MH1951PLC008485

Regd. Office: A - 1501, Thane One, DIL Complex, Ghodbunder Road, Majiwade, Thane (W) - 400 610, Maharashtra, India.

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Email : info@fermentabiotech.com, Website. : www.fermentabiotech.com



Ref: F.No.:49

September 22, 2022

Corporate Relations
BSE Limited,
Phiroze Jeejeebhoy Towers,
Dalal Street, Fort,
Mumbai – 400 001

Dear Sir,

Sub.: Intimation of Investor Presentation – September 2022

Ref: Scrip Code: 506414

Pursuant to the relevant provisions of SEBI (Listing Obligations and Disclosure Requirements), Regulations 2015, we hereby enclose a copy of Investor Presentation for September 2022 for your information.

The said Investor Presentation will thereafter be uploaded on Company's website at www.fermentabiotech.com

This information is submitted to you pursuant to Regulation 30 of the Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements), Regulations, 2015.

Kindly take the same on records.

Thanking you,

Yours faithfully,
for **FERMENTA BIOTECH LIMITED**

A handwritten signature in blue ink, appearing to read 'Srikant N Sharma', is written over a horizontal line.

Srikant N Sharma
Company Secretary

CS Membership No: F3617

A-1501, Thane One, DIL Complex, Ghodbunder Road, Majiwade, Thane (W) 400610

Encl: As above

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Dist. Mandi - 175 121, Himachal Pradesh, India.
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Fax: +91-1905-287250
Email: info@fermentabiotech.com
Website: www.fermentabiotech.com

Factory : Z - 109 B & C, SEZ II, Dahej,
Taluka - Vagara, Dist: Bharuch - 392 130,
Gujarat, India.
Tel. : +91-2641-291440 / 444
Email: info@fermentabiotech.com
Website: www.fermentabiotech.com



FERMENTA BIOTECH LIMITED

Investor Presentation | September 2022



Only manufacturer of
Vitamin D3 in India



Amongst top 3 manufacturers
of Vitamin D3 globally



Global Presence in
60+ countries



Proprietary technology to
manufacture Vitamin D3



55 Years of Vitamin D3
manufacturing experience



Both manufacturing facilities certified
by global regulatory bodies



DSIR approved
R&D facility



9 patents granted in
2022



Big 4 statutory auditor



350+ clients across
the globe



Backward integrated



Forward Integrating and
diversifying to offer more
nutraceutical products

Company Overview

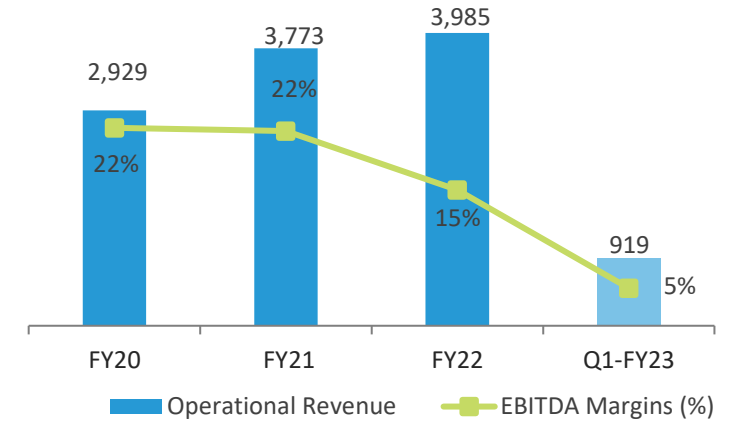


- Fermenta Biotech Limited (FBL) (Erstwhile DIL Ltd.) incorporated in 1951 by Dr. DVK Raju, is engaged in development and manufacturing of pharmaceuticals, biotechnology and environmental solutions used across various industries.
- On September 26, 2019, NCLT approved amalgamation of DIL & FBL which consolidated FBL's leadership capabilities backed by DIL's large asset base.
- With a rich history of seven decades FBL has evolved as a key global player in manufacturing of Vitamin D3 in all its formats and has a non-China dependent supply chain.
- FBL manufactures a range of Vitamin D3 variants having an optimal mix between human and animal feed products which have applications across multiple sectors like:

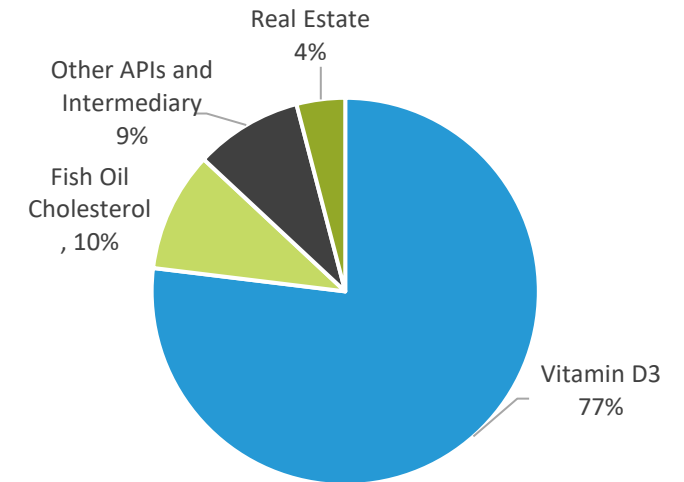
- | | |
|--|-----------------|
| 1. Pharmaceuticals | 4. Animal feed |
| 2. Dietary and nutritional supplements | 5. Veterinary |
| 3. Food and beverage fortification | 6. Rodenticides |

- The company is also involved in manufacturing of APIs for muscle relaxant and anti-flatulent applications.
- FBL delivers innovative enzymes used in manufacturing of active pharmaceutical ingredients and is involved in environmental solutions used for waste water treatment and management.
- The company also has legacy properties at Thane and Worli in Mumbai for which it realizes significant rental income.

Consolidated Revenue (INR Mn) & EBITDA Margins (%)



Revenue Mix % (FY22)





Board Of Directors



Mr. Sanjay Buch - Chairman, Independent Director

He holds a Bachelors Degree in Economics and Law and has over two decades of experience in wide spectrum of legal work.

Currently, he is partner at Crawford Bayley & Co.

An advocate and solicitor, specializing in business restructuring, mergers and acquisitions and is a member of various committees of the Board of Directors of the Company.



Mr. Krishna Datla, Promoter & Executive Vice Chairman

A Commerce Graduate from Mumbai University having around 20 years of experience in the industry

A progressive thinker responsible for the decision making process and overseeing new businesses. He has infused a strong sense of global vision thereby opening the opportunities across International markets.



Mr. Satish Varma, Executive Director

In 1994, he joined the DIL group as the Executive Assistant to the then Managing Director. In this role he garnered extensive operational, management and legal experience across the full scope of the company. In 2003 he joined the Board of Directors of FBL.

In addition to his Executive Board duties, he is also a member of the Stakeholder Relationship Committee.



Ms. Anupama Datla, Executive Director

She is a post-graduate in Biotechnology from the Mumbai University and a Science Graduate from the Boston College, USA. Joined FBL in 2006 and went on to join the board in 2007 as the Executive Director. She has taken executive leadership in R&D, quality control, and implementing safety policies and procedures across the organization. She is the author of various patents within the group, is in charge of introducing and implementing new technology platforms into the company and also spearheads the new business development.



Ms. Rajeshwari Datla, Non-Executive Director

A Science graduate having a rich experience in the Pharmaceutical Industry. She joined the board in 2005 as an additional director.



Board Of Directors



Mr. Vinayak Hajare, Non-Executive Independent Director

Qualified Masters degree holder in Financial management from Jamnalal Bajaj Institute of Management Studies.

He has over three decades of work experience in areas such as Investment Banking and Corporate Finance.

He has served as an Associate Director at Ernst and Young and has held several senior positions in companies like Caylon Bank, Credit Lyonnais, and Lazard India.



Dr. Gopakumar Nair, Non-Executive Independent Director

He has a Ph.D from National Chemical Laboratory (NCL), Diploma in Management & Patent Law and is Law graduate (LL.B) from Mumbai University. He is an Intellectual Property Rights Consultant and practicing Patent Attorney. He is also a practicing lawyer specialising in Mediation and Arbitration as well as in licensing and technology transfer. Further, has been associated with pharmaceutical industry for more than four decades as Director, Managing Director & Chairman of various public limited pharmaceutical companies.



Ms. Rajshree Ojha, Non-Executive Independent Director

Has over 28 years of experience in pharmaceutical industry including in R&D analytical development, technical/CMC documentation QC-QA-QM, regulatory compliance, and registration & marketing approvals globally. She has published many articles and research papers in reputed national and International Journals, she has also been awarded with various leadership awards. She is also an Adjunct Professor at KLE University, Mysore, and an Expert Member of Global Compliance Panel-DE



Mr. Prashant Nagre, Managing Director

Prashant Nagre is Managing Director of the company. Having spent three decades in the pharmaceuticals industry, he has in-depth experience across spheres encompassing the API business, production, research and Development. Prashant heads strategy and day to day operations including Business Development, budgeting, manufacturing, R&D and allied activities. He holds a Master's in Management Sciences, and also a Post Graduate Diploma in International Trade (IIFT, New Delhi) besides a Degree in Pharmacy.



Mr Pramod Kasat, Independent Director w.e.f. 12th August 2022

Managing Director of Intellectap Advisory Services. Prior to this, he was associated as Country Head of Investment Banking at IndusInd Bank, Mumbai and has served as Director and Head of Investment Banking at Pioneer Investcorp Ltd. (PINC) and was instrumental in driving growth in the investment banking business. Prior to PINC, he was Director of Investment Banking and Global Market Solutions Group at Credit Suisse, Director at Deutsche Bank Global Markets and worked with the IL&FS Group as the Head of Origination for the Investment Banking Group, among other leadership roles. He also worked in Citibank NA in the Capital Markets Group.

Awards and Recognitions



India Pharma Awards 2021



Pride of Maharashtra Awards 2021



India Pharma Awards 2018

Excellence in R&D – Development of new product/technology (Runner up)

Best Company of the Year - Excellence in Exports

Excellence in CSR

Excellence in Export Promotion

Pharma International Excellence



The Economic Times Inspiring CEOs 2021

Best Workplaces™ in Biotechnology & Pharmaceuticals

Great Place To Work

INDIA 2021

One of India's Best Workplaces in Biotechnology & Pharmaceuticals 2021



Chief Strategy Officer Summit & Awards 2020



Business Excellence Awards 2019



Best Business Brands 2020

FBL Features in the Media

Forbes

Fermenta Biotech: Lucre in sheep's clothing

By Naini Thaker | Aug 22, 2019

While extracting Vitamin D3 from wool has been its mainstay, the firm is looking to move beyond its niche and expand into biotechnology



Coverage in Forbes India
Issue dated 30th August 2019



ET Now interview telecast on its morning prime time show on 6th January 2020

Fermenta Biotech Limited



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/ Fermenta Biotech Limited Appointed As Distributor Of Kappa Biosciences K2vital Vitamin K2 Mk 7 Range

Fermenta Biotech Limited appointed as distributor of Kappa Bioscience's K2VITAL Vitamin K2 MK-7 range

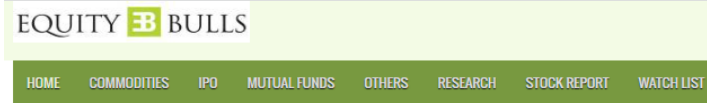
The arrangement between Fermenta and Kappa includes Kappa's branded vitamin K2 MK-7 range of variants, K2VITAL®, which is available in oil and powder formats for applications in the nutraceutical and food & beverage segments, the company claims.

Written by [Health Desk](#)

June 15, 2022 8:14:12 pm



Press release coverage in Financial Express dated 15th June 2022



Stock Report

Fermenta has signed a Definitive Agreement with Aurigene for Molnupiravir



Posted On : 2022-01-20 17:09:11(TIMEZONE : IST)

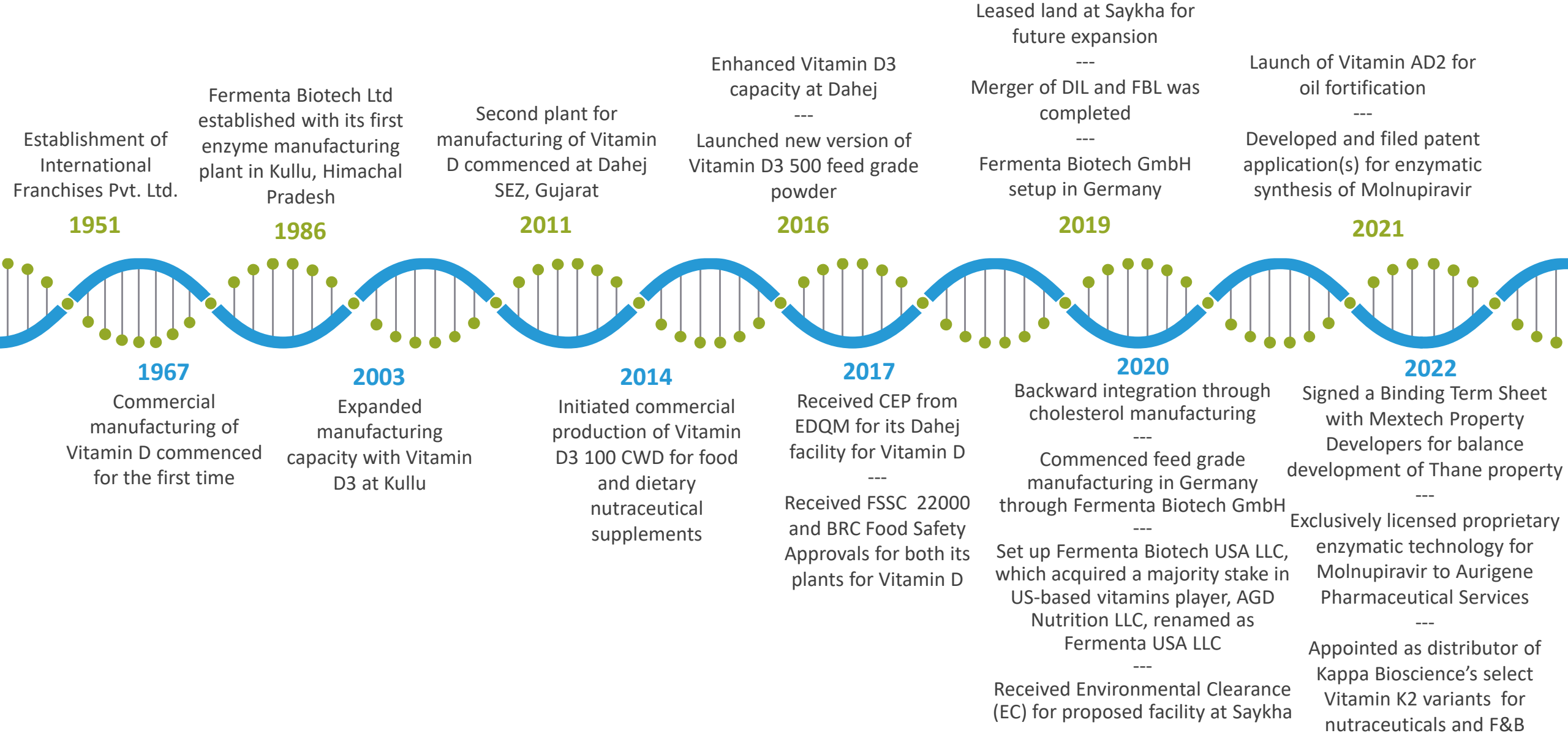


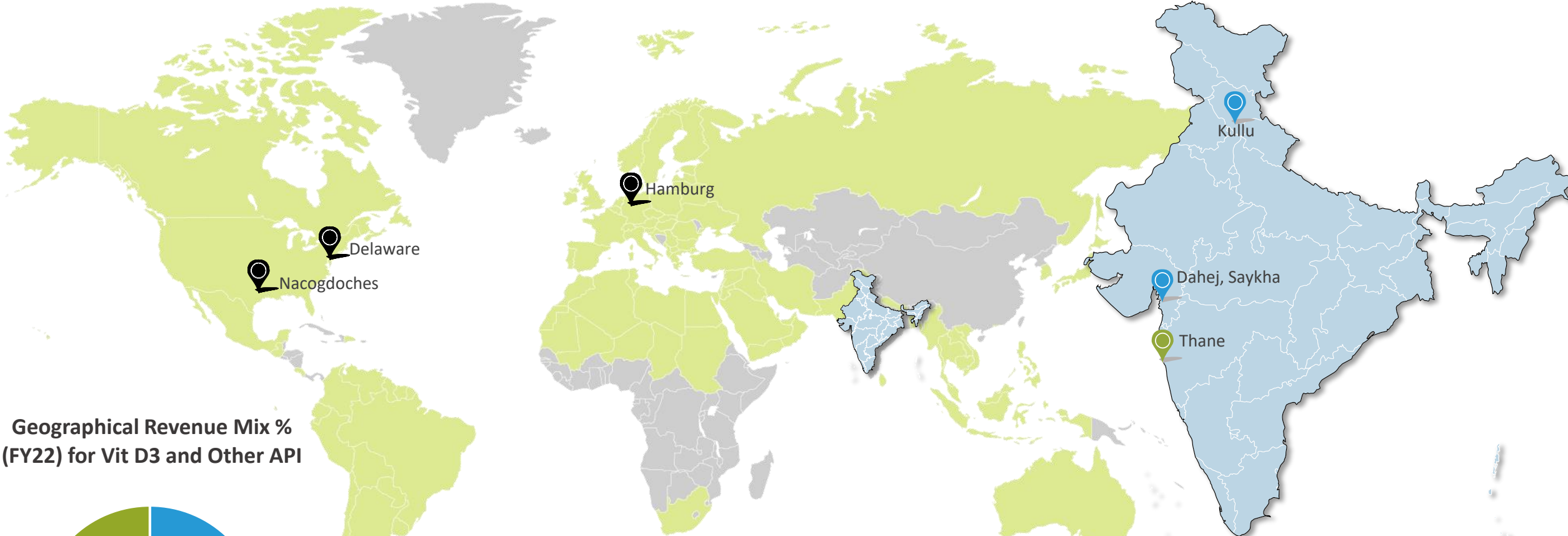
Fermenta Biotech Limited

Press release coverage in Equity Bulls dated 20th January 2022

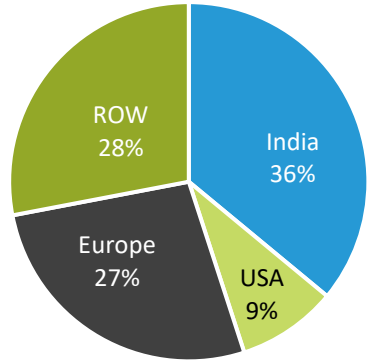


Press release coverage in Business Standard Dated 7th May 2021





Geographical Revenue Mix % (FY22) for Vit D3 and Other API



International Subsidiaries
 Delaware, USA: Fermenta Biotech USA LLC
 Nacogdoches, USA: Fermenta USA LLC
 Hamburg, Germany: Fermenta Biotech GmbH

R&D Centre and Registered Office
 Manufacturing Facility
 Regions catered

Kullu (Himachal Pradesh)

- Set up the Biotech plant in 1987 to manufacture Penicillin G Amidase and Acylase enzyme. A new bulk drug division in 2004 to manufacture various APIs like Vitamin D3, Phenylramidol HCl and Silicon Powder.
- This plant is certified by WHO-GMP, CDSCO-WC, USFDA, HACCP, ISO-9001, ISO-14001, ISO-45001, BRC, FSSC, FSMA, FAMI-QS, HALAL, KOSHER etc.



Dahej (Gujarat) – Vitamin D3

- Established a dedicated green field manufacturing facility in 2011 to primarily manufacture Vitamin D3.
- This plant is certified WHO-GMP, CDSCO-WC, HACCP, ISO-9001, ISO-14001, ISO-45001, BRC, FSSC, FSMA, FAMI-QS, HALAL, KOSHER etc.

Dahej (Gujarat) – Backward Integration for Cholesterol

- Cholesterol is the key raw material for manufacturing of Vitamin D3, which is derived from wool grease (by-product of sheep wool scouring).
- In 2019, FBL implemented backward integration for manufacturing cholesterol which will cover 100% requirements.



Accreditations & Certifications*



*Accreditations & Certifications are products / site specific



R&D

- Modern, fully equipped, DSIR approved Research & Development facility complemented by highly skilled and committed scientists.
- Providing integrated solutions, processes and products for Biotech and Active Pharmaceutical Ingredients (API)
- API R&D, combined with expertise on photochemistry, chromatography and multi-step process development skills
- Biotech R&D has got wide experience in the areas of bacterial fermentation, enzyme expression, immobilization platforms and process development in various enzymatic applications
- Dedicated formulation development lab which currently focuses on solutions for various value-added formats in the nutrition basket, including premix (liquids and solids), and personal care portfolio



Driven by the Discover, Develop & Deliver Philosophy



Quality



- Quality Assurance: Responsible for implementing quality systems, regulatory audits (national and international including customer and GMP) and releasing all manufactured products
- Regulatory Affairs: Ensures compliance with national and international regulatory requirements
- Quality Control: Responsible for all analysis, from analytical support to validations



Patents Granted in 2022



1

Granted on June 15, 2022

- Enzymatic Synthesis of Molnupiravir Intermediate (India)

2

Granted on June 15, 2022

- Chemo-Enzymatic Process For Synthesis Of Molnupiravir (India)

3

Granted on June 01, 2022

- A one step process for the enzymatic synthesis of semisynthetic β -lactam antibiotics (India)

4

Granted on March 09, 2022

- Solvent free process for extraction of Cholesterol from Milk Fat (Japan)

5

Granted on February 28, 2022

- Macroporous Epoxy Reactive Terpolymer Beads for the Immobilization of Penicillin G Acylase and its use in the synthesis of semi-synthetic β -lactam antibiotics and process for preparation thereof (India)

6

Granted on February 21, 2022

- Scalable Two Step Synthesis of Molnupiravir (India)

7

Granted on February 08, 2022

- An Efficient Method for Synthesis of 5-(3-pyridyl)-2,2'-Bithiophene (India)

8

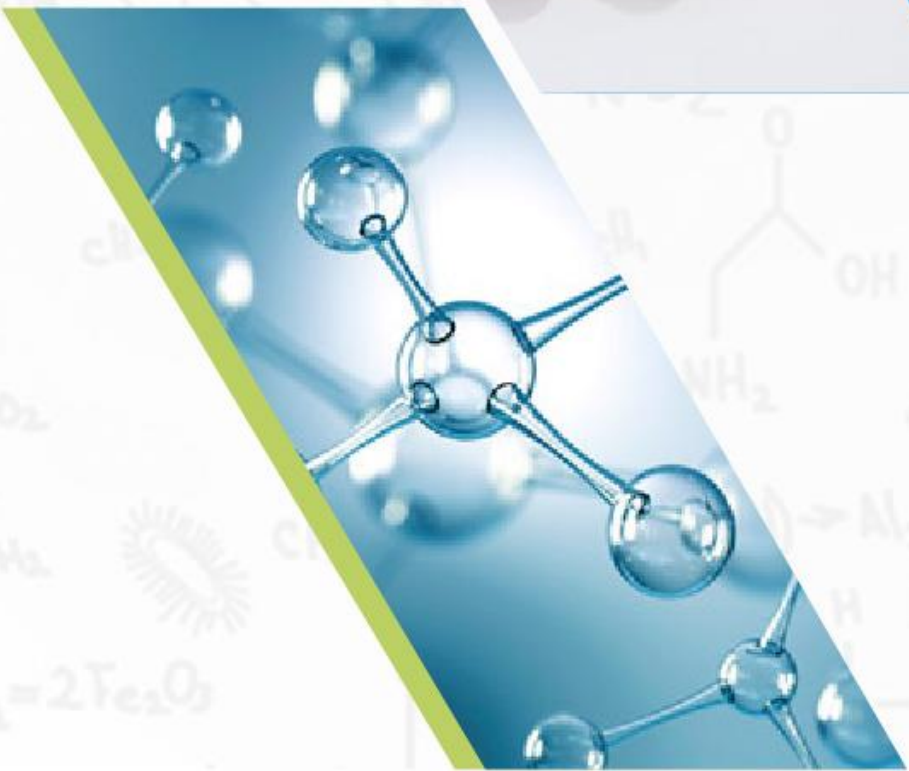
Granted on July 12, 2022

- Mutant Penicillin G Acylases of Achromobacter CCM4824

9

Granted on June 30, 2022

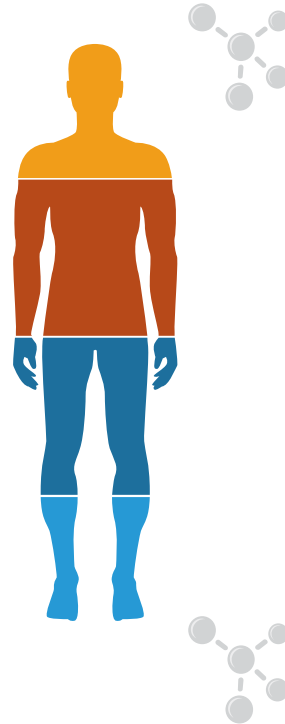
- Macroporous Polyvinyl Acetate Copolymer Beads for Lipase Immobilization and method of preparation of the polymer beads



BUSINESS OVERVIEW

About Vitamin D3

- Vitamin D3 (Cholecalciferol) is a fat-soluble vitamin, responsible for calcium absorption in the body.
- Vitamin D3 is produced by the body when skin is exposed to UV-B rays from the sun. Vitamin D can also be obtained from dietary sources.
- 80-90% of the Indian population¹, and over 1 billion people worldwide², suffer from low Vitamin D levels – due to an indoors lifestyle and poor diet.

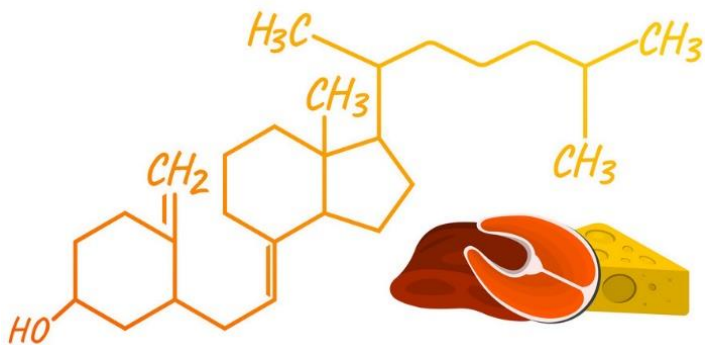


For Humans

- Vitamin D has been linked to a multitude of health benefits such as general health and wellbeing, bone and mental health as well as management and prevention of certain lifestyle disorders such as diabetes and cardiovascular disease.
- Vitamin D has also been shown to play an important role in immunity and protection against respiratory infections.³
- Recent research has suggested that Vitamin D supplementation may reduce the risk of COVID-19 complications. Citing Vitamin D as a potent immune-modifying micronutrient, studies have advocated supplementation and called on governments to increase recommended levels.^{6,7,8}

For Animals

- Vitamin D has been seen to improve bone strength and density as well as fertility. It has the potential to enhance yield and quality of milk, meat and eggs.^{4,5}

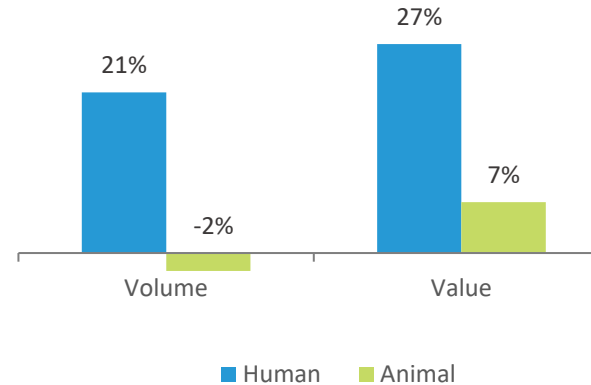


References:

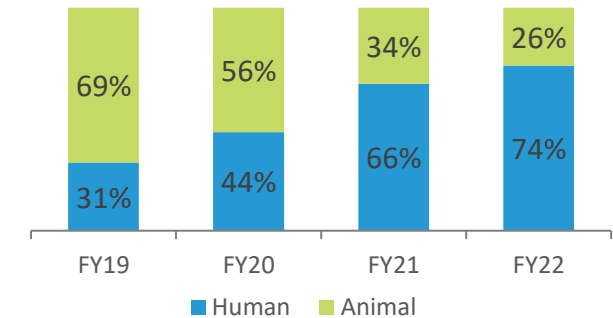
1. J Family Med Prim Care. 2018;7(2):324–330.
2. J Pharmacol Pharmacother. 2012;3(2):118–126.
3. Mayo Clin Proc. 2013;88(7):720–755.
4. J Dairy Sci. 1974 Sep;57(9):985-91.
5. Poult Sci. 1995 Dec;74(12):1919-34.
6. Aliment Pharmacol Ther, 51: 1434-1437., April 2020
7. TILDA, Irish Medical Journal, April 2020
8. Nutrients. 2020;12(4):988., April 2020

- FBL is a leader in manufacturing Vitamin D3, and has the distinction of being the only organization in India to manufacture Vitamin D3
- The company has a Non-China dependent supply chain.

CAGR Growth FY15 to FY22



Vitamin D3 Revenue (INR Mn)



Unique

One of three CEP-certified companies worldwide



Pioneering

Use of proprietary technology to manufacture Vitamin D3 API



Knowledge Capital

55 years of experience and the proficiency in manufacturing Vitamin D3 with a base of over 350+ customers



Scale

Among the top three producers of Vitamin D3 API in the world



One Stop Shop

Manufactures Vitamin D3 for various applications (human and veterinary healthcare, animal feed)



Integrated

Superior quality and cost effectiveness from backward integrated manufacturing operations



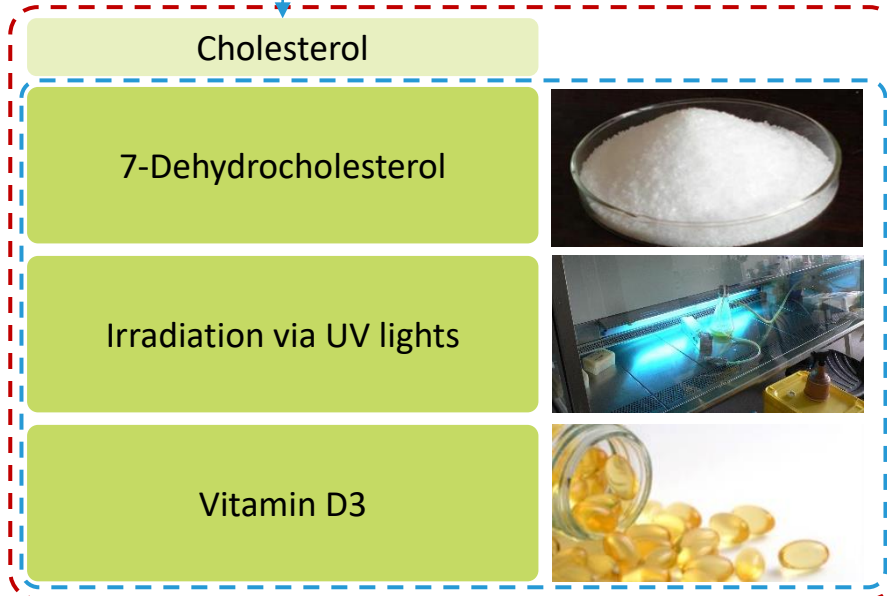
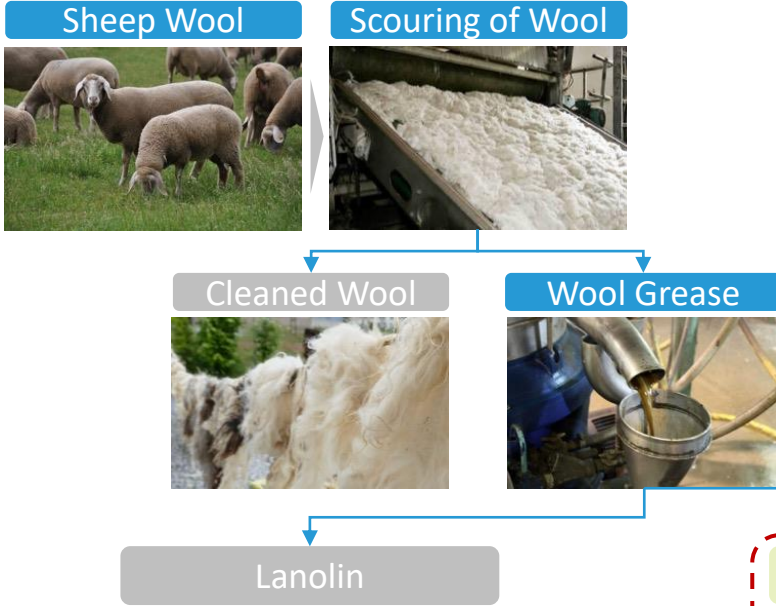
Standardized

Products and manufacturing facilities certified by various global health regulatory like US-FDA (FFRN), American Vegetarian Association, FAMI-QS, WHO-GMP etc.

Manufacturing Process and Applications



Backward Integrated Manufacturing Process



--- Currently processing to manufacture Vitamin D3 from cholesterol

- - - Completed backward integration to manufacture cholesterol

Vitamin D3 Applications

For Humans

- Pharmaceuticals
- Dietary and Nutritional Supplements
- Food and Beverage Fortification

For Animals

- Feed
- Veterinary
- Rodenticides

Heritage of innovation in enzymes



One-stop Destination for Green Chemistry

FBL's core expertise spans from microbial screening, fermentation, immobilization, biocatalysis, enzyme-mediated antibiotic synthesis to API intermediates & APIs

FBL is a pioneer in the development and production of fermentation-based Penicillin G Amidase enzyme (PGA) and commercialized immobilized enzymes in India

The Company is also actively working towards promoting CAL B lipase in niche applications which can revolutionize various critical API processes

FBL has developed and filed patent application(s) for enzymatic synthesis of Molnupiravir, a COVID-19 drug.

APIs & Other intermediaries

- For over 25 years, FBL is a trusted and reliable source of Phenylamidol HCl (muscle relaxant) & Silicon Powder (anti-flatulent) APIs.



Environmental Solutions

- FBL's Environmental Solutions provide unique advantages in waste water treatment and management through integrated biotechnology.



Fish Oil Cholesterol

- As an extension to its product portfolio, FBL has started manufacturing cholesterol from fish oil for applications in the aquaculture market (specifically the shrimp feed segment), which was commercialised in FY21



Real Estate - market value ~ Rs 500 cr.

- 45 Acres of freehold land at Takawe, Pune
- ~10,000 sq. ft. leased area at Worli, Mumbai
- ~ 6.5 Acres of freehold land at Thane One which is partly developed by constructing an IT/ITES building of ~ 200,000 sq ft leasable area.





Monetization of Thane land: Development deal structure



Property	<ul style="list-style-type: none">• As part of its legacy property, Fermenta owns ~6.5 acres of freehold land in Thane. The zoning of the land is Industrial.• This is partly developed by constructing Thane One, an IT/ITES Building having a total BUA of 12,679.81 sq metres as per the TMC approved OC plan.
Project	<ul style="list-style-type: none">• Fermenta has signed Binding Term Sheet with Mextech and granted development rights for construction of residential-cum-commercial buildings in the balance portion of land.• Project completion is expected within 6 years of signing the Definitive Agreement.• Revenues expected to be generated in a staggered manner post launch of the Project.
Development partners and their role	<ul style="list-style-type: none">• Development partners: Mextech Property Developers LLP, incorporated by the promoters of Nandivardhan Constructions Private Limited and RRC Ventures Private Limited• Development partners are solely responsible for obtaining approvals, permissions, construction, OC and sales• They will solely bear all the costs of approvals, permissions, premiums and construction in the Project
Ownership	<ul style="list-style-type: none">• Fermenta to receive 120,000 sq. ft. carpet area (as per RERA) of residential construction along with amenities as its share of premises in the Project, and the balance area to be owned by development partners. The agreement is not on revenue-sharing basis.• Development partners not to mortgage the land or Fermenta's premises for obtaining funding from banks/financial institutions for the Project.• Fermenta continues to solely own the already constructed Thane One building.
Fairness Opinion	<ul style="list-style-type: none">• The Company had appointed Knight Frank (India) Pvt Limited, an internationally reputed real estate advisory firm to provide fairness opinion and validation on the binding term sheet. They conducted valuation independently and opined that the estimated value achievable by Fermenta basis the commercial terms agreed in the binding term sheet signed with Mextech Property Developers LLP is fair and reasonable.

Nutraceutical Product Pipeline



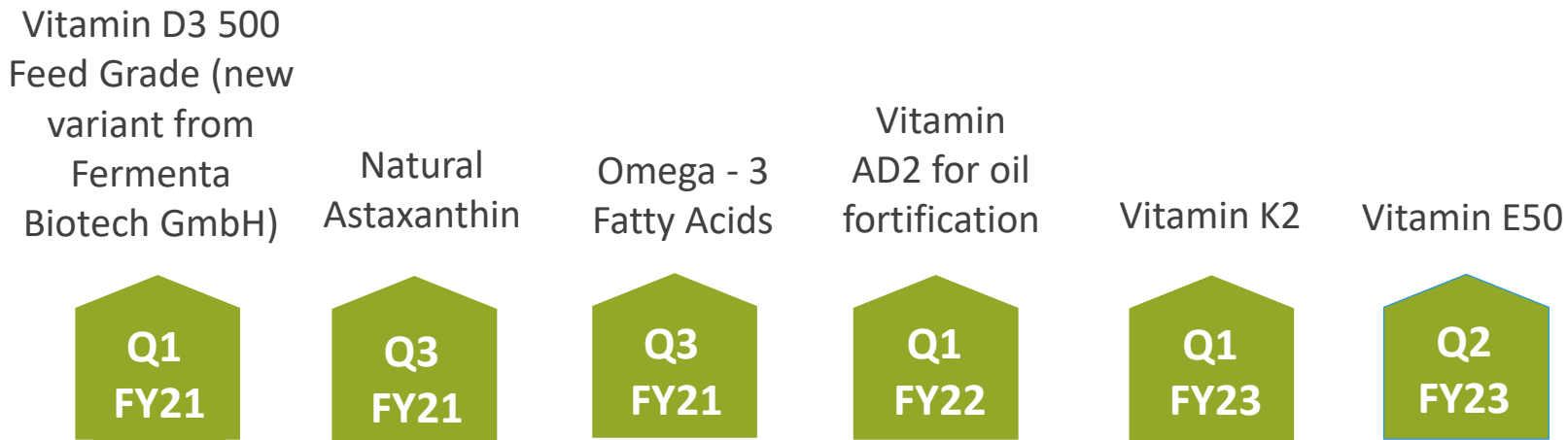
Vitamin D3 and its various formats for
Pharmaceuticals
Dietary & Nutritional Supplements
Food
Feed
Veterinary Science
Rodenticide

Variants of Fat soluble vitamins
Vitamin A
Vitamin E
Vitamin K1

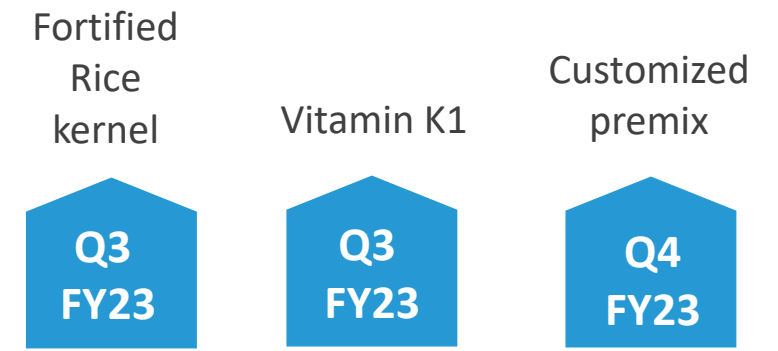
Nutrition portfolio
Fortified Rice Kernel
Smart Minerals
Customized Premixes
Pre and Pro - Biotics



Products Recently Launched



New Product Launch Timeline



Growth Drivers

Internal Factors

- Strong manufacturing capabilities with enhanced capacity utilizations to meet YoY production targets
- Enhancing control and reduced dependence by backward integration
- Sales footprint in 60+ countries spread across the globe
- Expanding into value added formats of vitamins like A, E, D, manufacturing Vitamin K and further focus on development of smart minerals, novel antioxidants, customized premixes, pre and pro-biotics etc.
- Setting up plant at Sayakha, Gujarat for enhancing nutraceutical portfolio and at Kullu, Himachal Pradesh for customized premixes.

External Factors

- Increased prescription market for Vitamin D3 formulations
- Growing need for applications in the form of tablets, capsules and syrups
- Government guidelines related to use of Vitamin D in food fortification
- Significant portion of global population is Vitamin D deficient or insufficient
- Understanding of Vitamin D benefits has moved beyond bone & joint health to management of lifestyle disorder as well as general health, wellbeing and immunity





Enhanced Focus

Exiting of non-core business activities and laying long term emphasis on expanding the Nutraceutical business.



Capital Allocation Plans

All future capital allocation will be focused towards Nutraceuticals business.



Real Estate Business

The company has taken steps towards monetizing these assets at appropriate valuations and there are no plans to infuse any further capital in real estate.



Debt

The company has a long term debt of approximate INR 140 Cr with a low average cost of debt at ~ 7% pa. Around 50% of the long term debt is towards the real estate business where the lease rentals are self sufficient enough to take care of the principal repayment and interest.



Focus to reduce working capital

The company's increase in working capital was primarily due to the increased inventory levels. This was a strategic move to secure key raw material requirements. Going ahead the working capital is expected to significantly reduce.



Dividend Policy

The company strives to have a prudent dividend policy with a healthy balance between shareholders' returns and organizational requirement for future growth.



Capacity Expansion

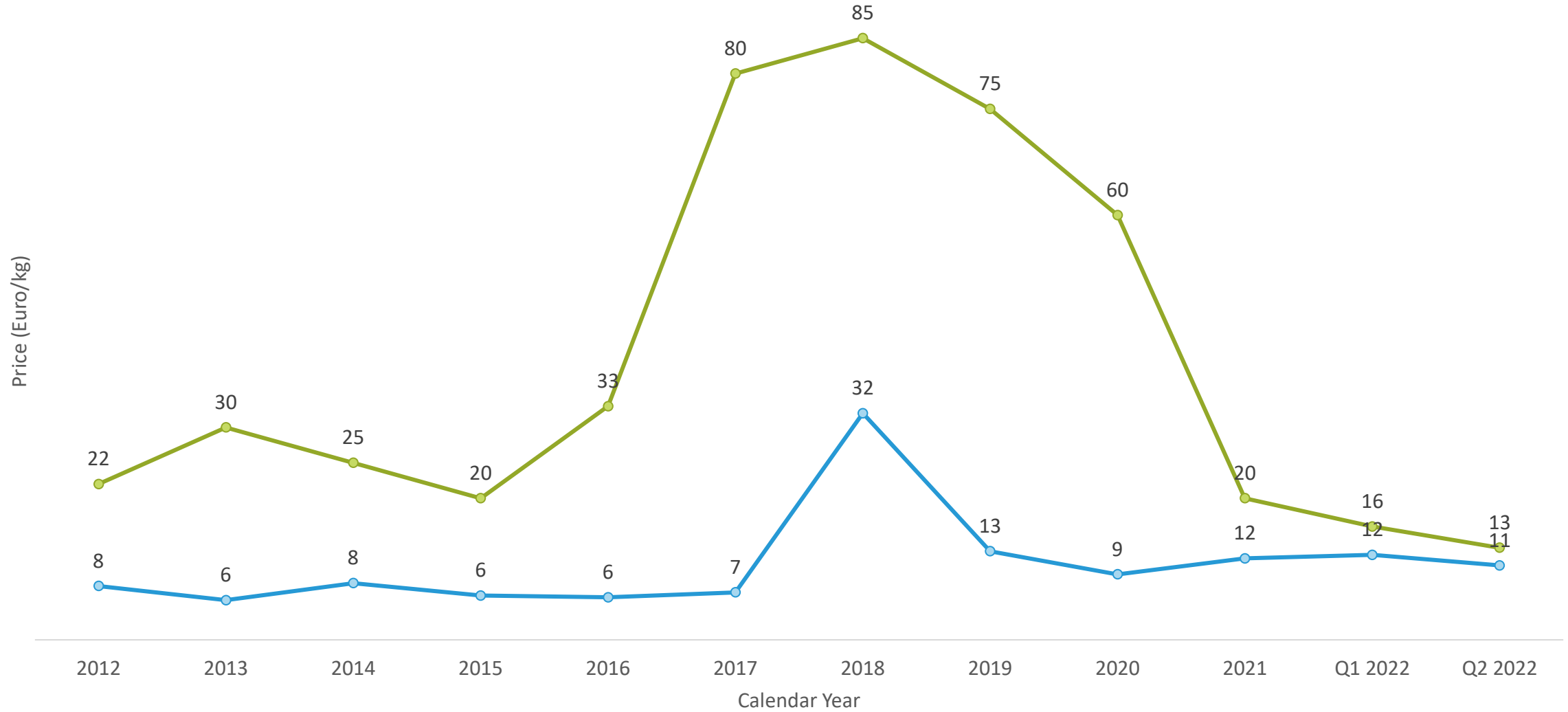
Around 20% capacity expansion for Vitamin D3 in Q2 FY22 with INR 30 Cr investment



INDUSTRY OVERVIEW



Vitamin D3 500 Animal Feed Price Trend



Source: [feedinfo.com](https://www.feedinfo.com)

● Min of Low ● Max of High

*“The goal should be to raise 25(OH)D concentrations above 40-60 ng/mL (100-150 nmol/L). For treatment of people who become infected with COVID-19, higher vitamin D3 doses might be useful.” – Dr. William Grant**

“If you're deficient in vitamin D, that does have an impact on your susceptibility to infection. I would not mind recommending, and I do it myself, taking vitamin D supplements.” – Dr. Anthony Fauci, Director, National Institute of Allergy and Infectious Diseases^

*Nutrients. 2020 Apr 2;12(4):988.

^Business Insider, 12th September 2020

The Journal of Clinical Endocrinology & Metabolism, 2022, 107, 1484–1502
<https://doi.org/10.1210/clinem.2022.1484>
Advance access publication 27 January 2022
Meta-Analysis

Prognostic and Therapeutic Role of Vitamin D in COVID-19: Systematic Review and Meta-analysis

Harsha Anuruddhika Dissanayake,¹ Nipun Lakshitha de Silva,² Manilka Sumanatilleke,³ Sawanawadu Dilantha Neomal de Silva,⁴ Kavinga Kalhari Kobawaka Gamage,³ Chinthana Dematapitiya,³ Daya Chandrani Kuruppu,⁵ Priyanga Ranasinghe,⁶ Sivatharshya Pathmanathan,³ and Prasad Katulanda^{1,7}

¹Department of Clinical Medicine, Faculty of Medicine, University of Colombo, Colombo, 00800, Sri Lanka
²Department of Clinical Sciences, Faculty of Medicine, General Sir John Kotelawala Defence University, Dehiwala-Mount Lavinia, 10390, Sri Lanka
³Diabetes and Endocrinology Unit, National Hospital of Sri Lanka, Colombo, 00800, Sri Lanka
⁴University Medical Unit, National Hospital of Sri Lanka, Colombo, 00800, Sri Lanka
⁵Faculty of Medicine, University of Colombo, Colombo, 00800, Sri Lanka
⁶Department of Pharmacology, Faculty of Medicine, University of Colombo, Colombo, 00800, Sri Lanka
⁷Cruddas Link Fellow, Harris Manchester College, University of Oxford, Oxford, OX1 2JD, United Kingdom

Correspondence: Harsha Anuruddhika Dissanayake, MD, Department of Clinical Medicine, Faculty of Medicine, No 25, Kynsey Road, Colombo 08, Sri Lanka.
Email: harsha@clinmed.cmb.ac.lk

Vitamin D levels were extremely low in non survivors and severe COVID-19 patients compared to controls.

REVIEW | [Free Access](#)

Association of vitamin D deficiency with COVID-19 infection severity: Systematic review and meta-analysis

Zhen Wang, Avni Joshi, Kaitlin Leopold, Sarah Jackson, Stephanie Christensen, Tarek Nayfeh, Khaled Mohammed, Ana Creo, Peter Tebben, Seema Kumar ✉

First published: 23 June 2021 | <https://doi.org/10.1111/cen.14540> | Citations: 6

SECTIONS PDF TOOLS SHARE

Abstract

Background

We sought to evaluate the association between vitamin D deficiency and the severity of coronavirus disease 2019 (COVID-19) infection.

Vitamin D deficiency was associated with 2.5-fold higher risk of mortality, 2-fold increased risk of hospital admissions and longer hospital stays as compared to controls.

Original Article | Published: 24 June 2021

Vitamin D supplementation and clinical outcomes in COVID-19: a systematic review and meta-analysis

R. Pal, M. Banerjee, S. K. Bhadada ✉, A. J. Shetty, B. Singh & A. Vyas

Journal of Endocrinological Investigation 45, 53–68 (2022) | [Cite this article](#)

28k Accesses | 19 Citations | 458 Altmetric | [Metrics](#)

Abstract

Purpose

To provide a precise summary and collate the hitherto available clinical evidence on the effect of vitamin D supplementation on clinical outcomes in COVID-19 patients.

Vitamin D was shown to be significantly associated with reduced ICU admission/mortality by 59% and reduce the risk of adverse outcomes by 73%.

FRONT LINE COVID-19 CRITICAL CARE ALLIANCE
PREVENTION & TREATMENT PROTOCOLS FOR COVID-19

An overview of the MATH+, I-MASK+ and I-RECOVER Protocols

A Guide to the Management of COVID-19

(Updated as of February 22, 2022)

Developed and updated by Paul Marik, MD, FCP (SA), FRCP (C), FCCP, FCCM for the Front Line COVID-19 Critical Care Alliance (FLCCC)

The Front Line COVID-19 Critical Care Alliance (FLCCC), a non-profit organization formed by leading critical care specialists, list Vitamin D as the first priority nutritional supplement in the pre-and post-exposure (I-MASK+) protocol for COVID-19

VITAMIN D INDUSTRY

- The Vitamin D market is estimated to account for about USD 1.1 billion in 2020 and is projected to reach a value of nearly USD 1.6 billion by 2025, growing at a CAGR of 7.0% from 2020 to 2025.
- Vitamin D insufficiency affects almost 50% of the population worldwide. An estimated 1 billion people worldwide, across all ethnicities and age groups, have Vitamin D deficiency. In India, the prevalence of Vitamin D deficiency ranged from 40% to 99%, with most of the studies reporting a prevalence of 80%–90%.
Source: Marketsandmarkets (2020), M Holick; N Engl J Med. 2007 Jul 19;357(3):266-81., J Family Med Prim Care. 2018 Mar-Apr; 7(2): 324–330.

NUTRACEUTICAL INDUSTRY

- The global nutraceuticals market was USD 357.35 billion in 2019 and is projected to reach USD 537.73 billion by 2024, growing at a CAGR of 9%. The nutraceuticals market in India accounts for almost 2% of overall nutraceuticals sales across the globe. It is anticipated that the market growth will increase rapidly, accounting for 3% of overall global market by the end of 2022.
- The nutraceutical ingredients market is estimated to be valued at \$162.1 billion in 2020 and is projected to reach \$227.5 billion by 2025, at a CAGR of seven per cent from 2020 to 2025. Asia Pacific is projected to be the fastest-growing market for the forecast period and India is also projected to be the fastest-growing country in the region. It accounted for nearly 31.5% of the market share in 2019.
- Following the COVID-19 pandemic, consumer focus has switched to illness prevention, resulting in an increase in demand for nutraceuticals. A trend toward health maintenance, early intervention, and disease risk reduction are major pillars furthering the nutraceuticals industry.

AL GROWTH

Manufacturing digitizing
Science Innovation

22.10

24.78

FINANCIAL OVERVIEW



Historical Standalone Income Statement



PARTICULARS (INR Mn)	Q1-FY23	FY22	FY21	FY20
Operational Revenue	845	3,880	3,728	3,005
Total Expenses	764	3,120	2,791	2,311
Operational EBITDA	81	760	937	694
Operational EBITDA Margins (%)	9.59%	19.59%	25.13%	23.09%
Other Income	38	75	66	123
Depreciation	62	237	190	149
Finance Cost	45	172	181	193
PBT	12	426	632	475
Tax	1	124	112	(162)
PAT	11	302	520	637
PAT Margins (%)	1.30%	7.78%	13.95%	21.20%
Other Comprehensive Income	(1)	(2)	(1)	18
Total Comprehensive Income	10	300	519	655
Diluted EPS (INR)	0.36	10.43	17.92	21.96

Historical Standalone Balance Sheet



PARTICULARS (INR Mn)	FY22	FY21	FY20
Equity	3,959	3,704	3,126
a) Equity share capital	144	144	144
b) Other equity	3,815	3,560	2,982
Liabilities			
Non-current liabilities	1,300	1,192	1,115
a) Financial liabilities			
i) Borrowings	1,147	1,104	1,018
ii) Lease liabilities	37	35	45
iii) Other financial liabilities	7	5	6
b) Provisions	57	45	41
d) Other non-current liabilities	52	3	5
Current Liabilities	1,867	1,929	1,855
a) Financial liabilities			
i) Borrowings	1,214	1,188	1,043
ii) Lease liabilities	11	12	11
ii) Trade payables	456	457	472
iii) Other financial liabilities	128	184	297
b) Provisions	8	8	6
c) Other current liabilities	47	76	23
d) Current tax liabilities (Net)	3	3	3
TOTAL EQUITY AND LIABILITIES	7,126	6,825	6,096

PARTICULARS (INR Mn)	FY22	FY21	FY20
Assets			
Non-current Assets	3,974	3,745	3,272
a) Property, plant and equipment	1,935	1,538	1,040
b) Capital work-in-progress	299	527	671
c) Right of use assets	157	147	162
d) Investment property	668	682	707
e) Goodwill	41	41	41
f) Other intangible assets	66	88	18
g) Intangible assets under development	47	42	37
h) Investments			
i) Investments in subsidiaries	127	127	8
i) Financial assets			
i) Investments	3	2	3
ii) Loans	64	-	2
iii) Others financial assets	67	22	41
j) Deferred tax assets (Net)	333	381	381
k) Non-current tax assets (Net)	132	113	91
l) Other non-current assets	35	35	70
Current Assets	3,152	3,080	2,824
a) Inventories	1,296	1,328	1,135
b) Financial assets			
i) Trade receivables	1,178	961	774
ii) Cash and cash equivalents	102	136	68
iii) Bank balances other than (iii) above	206	277	256
iv) Loans	-	48	213
v) Other financial assets	50	80	129
c) Other current assets	320	250	249
TOTAL ASSETS	7,126	6,825	6,096

Historical Consolidated Income Statement



PARTICULARS (INR Mn)	Q1-FY23	FY22	FY21	FY20
Operational Revenue	919	3,985	3,773	2,929
Total Expenses	869	3,371	2,956	2,277
Operational EBITDA	50	614	817	652
Operational EBITDA Margins (%)	5.44%	15.41%	21.65%	22.26%
Other Income	38	81	82	123
Depreciation	67	255	203	150
Finance Cost	45	171	180	191
PBT	(24)	269	516	434
Tax	2	118	91	(161)
PAT before Associates & Joint Venture	(26)	151	425	595
Non-controlling interests	3	3	30	-
PAT	(23)	154	455	595
PAT Margins (%)	NA	3.86%	12.06%	20.31%
Other Comprehensive Income	4	6	(2)	17
Total Comprehensive Income	(22)	157	423	612
Diluted EPS (INR)	(0.80)	5.33	15.69	20.53

Historical Consolidated Balance Sheet



PARTICULARS (INR Mn)	FY22	FY21	FY20
Equity	3,714	3,603	3,094
a) Equity share capital	144	144	144
b) Other equity	3,577	3,462	2,950
c) Non-controlling interests	(7)	(3)	-
Liabilities			
Non-current liabilities	1,283	1,175	1,097
a) Financial liabilities			
i) Borrowings	1,147	1,105	1,018
ii) Lease liabilities	20	17	27
iii) Other financial liabilities	7	5	6
b) Provisions	56	45	41
c) Other non-current liabilities	52	3	5
Current Liabilities	2,071	2,093	1,946
a) Financial liabilities			
i) Borrowings	1,214	1,188	1,043
ii) Lease liabilities	11	12	11
ii) Trade payables	646	621	564
iii) Other financial liabilities	128	184	297
b) Provisions	10	7	5
c) Other current liabilities	59	77	23
d) Current tax liabilities (Net)	3	3	3
TOTAL EQUITY AND LIABILITIES	7,068	6,871	6,137

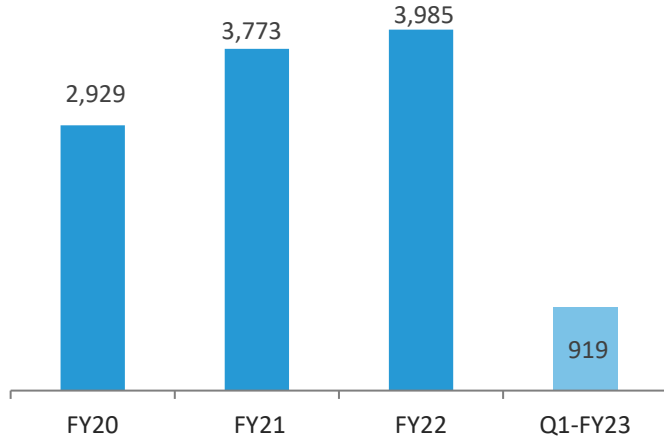
PARTICULARS (INR Mn)	FY22	FY21	FY20
Assets			
Non-current Assets	3,928	3,775	3,297
a) Property, plant and equipment	1,935	1,539	1,040
b) Capital work-in-progress	299	527	671
c) Right of use assets	139	129	143
d) Investment property	673	687	713
e) Goodwill	109	107	41
f) Other intangible assets	129	168	65
g) Intangible assets under development	47	42	37
h) Financial assets			
i) Investments	3	3	3
ii) Loans	-	-	2
iii) Others financial assets	67	22	40
i) Deferred tax assets (Net)	360	403	381
j) Non-current tax assets (Net)	132	113	91
k) Other non-current assets	35	35	70
Current Assets	3,140	3,096	2,840
a) Inventories	1,595	1,623	1,286
b) Financial assets			
i) Trade receivables	871	680	698
ii) Cash and cash equivalents	130	168	75
iii) Bank balances other than (iii) above	206	277	256
iv) Loans	-	48	213
v) Other financial assets	3	35	63
c) Other current assets	335	265	249
TOTAL ASSETS	7,068	6,871	6,137



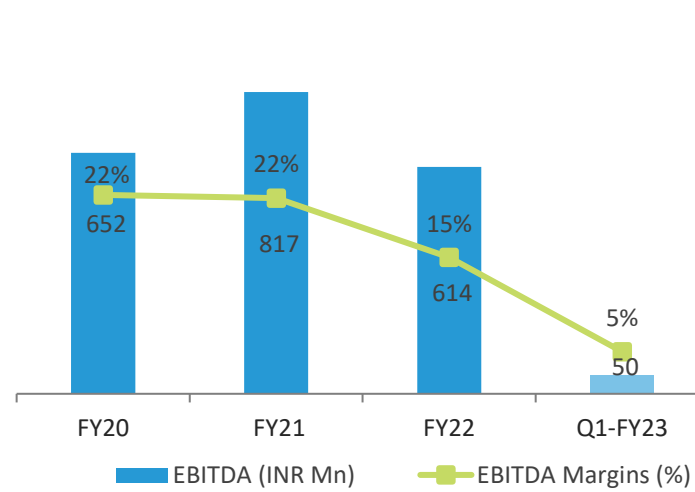
Historical Consolidated Financial Performance



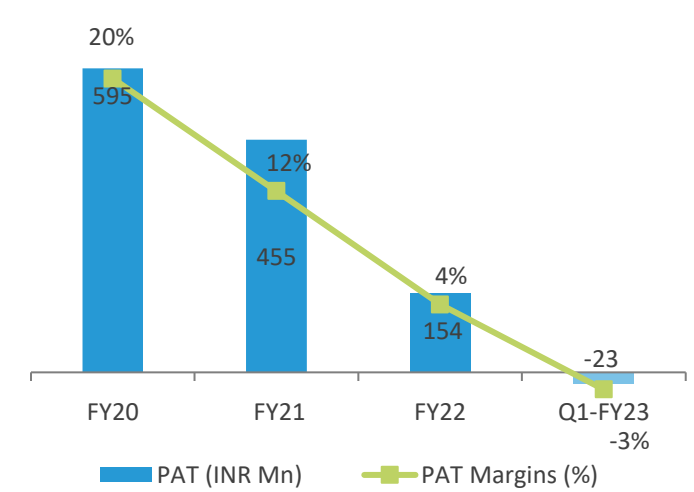
Operational Revenue (INR Mn)



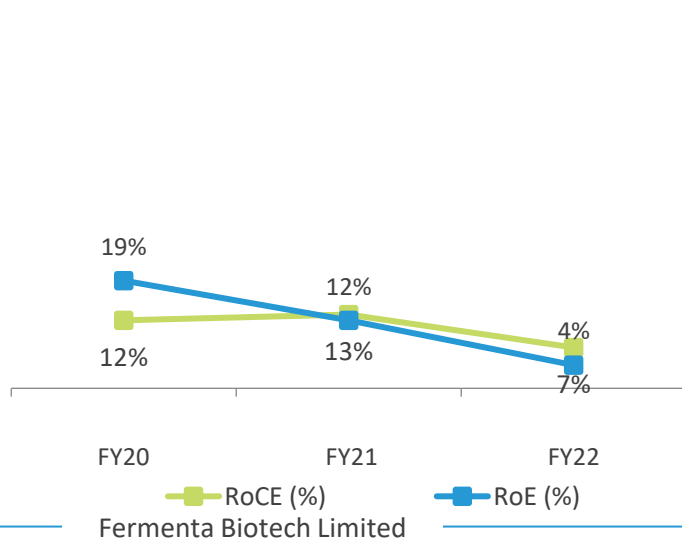
Operational EBITDA (INR Mn) & Margins (%)



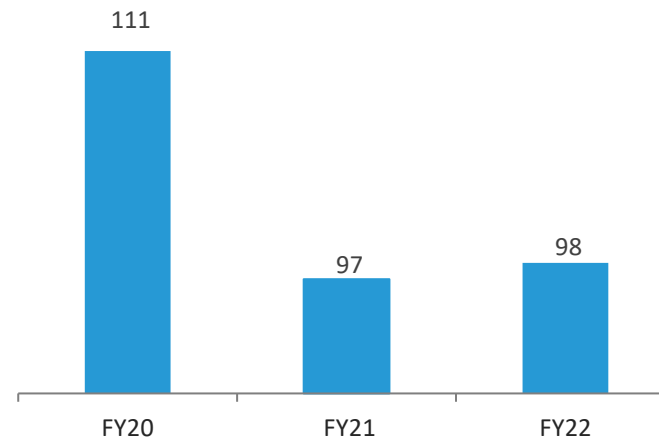
PAT (INR Mn) & Margins (%)



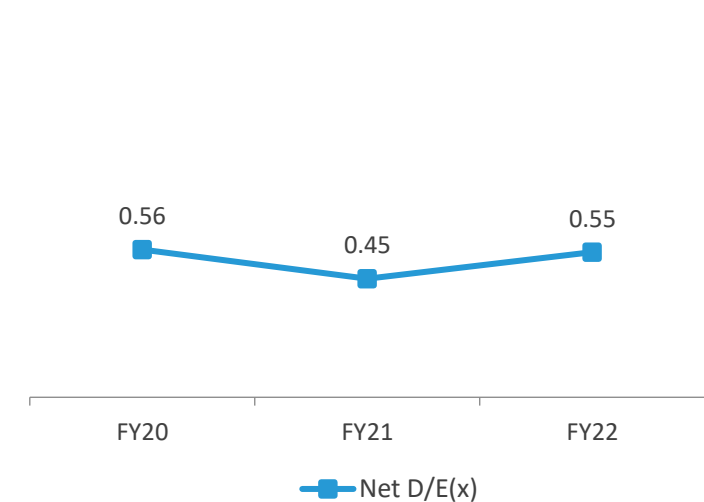
RoCE & RoE (%)



Working Capital Days



Net Debt to Equity (x)



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