NEWSLETTER

BIOFOCUS

DEPARTMENT OF BIOTECHNOLOGY

VOLUME 01

2022 - 2023

"LIFE BEGINS IN THE BIOTECH LAB – WHERE INNOVATION MEETS DISCOVERY!"

KUMARAGURU
college of technology
character is life

"When something is important enough, you do it even if the odds are not in your favor"

– Elon Musk,
SPACE X

In this Issue

1 Message

1.1 Vision, Mission, HOD's Message & From the Editorial Desk

1.1.1 About the Department

The Department of Biotechnology is a pioneering department, which harnesses and nurtures specific skill sets that integrates life science and technology, and the curriculum is constantly upgraded to suit the demands of the industry. Faculty members are trained both in reputed institutes and industries periodically in a constantly evolving field of engineering relevant to biotechnology. Currently, the Department of Biotechnology offers B.Tech.(Biotechnology), M.Tech.(Biotechnology) and Ph.D.(Full/Part-time) with a well-structured and balanced curriculum focusing on the major areas viz., Healthcare, Nutrition, Bioprocess Technology and Environmental Biotechnology.

1.1.2 From the HOD's Desk

Since its inception in 2002, the Department of Biotechnology has been on an exhilarating journey of academic excellence and scientific discovery. Over the years, we have meticulously crafted a vibrant ecosystem equipped with state-of-the-art infrastructure to foster innovation, creativity, and research that matters.

Our students are not just learners-they are trailblazers! They consistently shine in academics, co-curricular pursuits, and extracurricular endeavors, embodying the spirit of holistic growth. Guided by our passionate faculty, who deliver cutting-edge curriculum and spearhead impactful, socially relevant research, our students are empowered to push boundaries and redefine possibilities.

The success stories of our alumni speak volumes about their journey. Whether it's securing coveted roles in leading life sciences companies or pursuing advanced studies at prestigious institutions across the globe, they continue to make us proud as dynamic ambassadors of our department.

Together, we are shaping the future of biotechnology-one idea, one experiment, and one student at a time. Join us, and let's create a legacy of innovation, impact, and inspiration

Dr. ***R Baskar***, Associate Professor & Head

1.1.3 Vision

Strong teaching and research foundation in the area of biotechnology and allied fields through knowledge dissemination to students and the public and to scale new heights in the frontier areas of health and environment and ethics for welfare of humankind globally.

1.1.4 Mission

1. Develop dynamic curriculum and syllabus to promote innovative and create practices.
2. Encourage students for innovation and setting start-ups and equip leadership an entrepreneurial skills
3. Train students on issues related to social welfare.

1.1.5 From the Editorial Desk

Following the resounding success of our previous issue, the Biofocus Newsletter is back-and bigger than ever! Packed with fascinating stories, exciting updates, and behind-the-scenes glimpses of the incredible happenings in our department, this edition promises to captivate and inspire.

In this issue, we dive deep into the key events that have shaped our academic and research journey, unraveling the inside stories that made them truly special. From groundbreaking initiatives to moments of triumph, we bring you closer to the heartbeat of our department.

But that's not all-this issue shines a spotlight on the creativity and talent of our students! Featuring thought-provoking write-ups, creative contributions, and exclusive student-curated pages, this edition is a celebration of collaboration, innovation, and the vibrant spirit of our community.

So, buckle up as we take you on a journey through the stories that define us, the ideas that drive us, and the people who make it all possible. Welcome to the latest edition of Biofocus -where science meets storytelling!

Dr. ***Ram K*** , Assistant Professor-III & Editor-Biofocus

Paper Publication by Faculty

2

March 2022

- Gururaj, V. V. D. (2022). Comparative study on in vitro release kinetics of gallic acid Îš cyclodextrin complex and gallic acid pluronic-loaded films. *Materials Today: Proceedings*.

April 2022

- Kaushik, L., Sarangan, D., Govindarajan, D. K., Muthumanickam, S., Sivaramakrishnan, M., Kothandan, R., ... & Kandaswamy, K. (2022). Image analysis reveals cellular fragmentation of *Spirulina platensis* upon treatment with heavy metal ions. *Maejo International Journal of Energy and Environmental Communication*, 4(1), 49-54.

June 2022

- Muthusamy, S., Anandharaj, S. J., Kumar, P. S., Meganathan, Y., Vo, D. V. N., Vaidyanathan, V. K., & Muthusamy, S. (2022). Microbial pullulan for food, biomedicine, cosmetic, and water treatment: a review. *Environmental Chemistry Letters*, 20(5), 3199-3234.
- Suvetha, S. P., Sathishkumar, T., Kumaraesan, K., Rapheal, V. S., Muthukumaran, V., & Thirugnanam, N. (2022). Purified novel and new diferuloyl glycerate related phenolic acid from *Pandanus odoratissimus* flowers shows antioxidant, invertase inhibition and control against diabetic foot ulcer (DFU) causing bacterial pathogens- An in vitro study to establish an effective regulation over type 2 diabetes mellitus. *Brazilian Journal of Pharmaceutical Sciences*, 58, e19484.

July 2022

- Ethiraj, B., Raihan, T., Sarmin, S., Karim, A., Khan, M. M. R., Muthuvelu, K. S., ... & Islam, M. A. (2023). Strategies to Enhance Biobutanol Production from Lignocellulosic Biomass. In *Microbiology of Green Fuels* (pp. 156-176). CRC Press.

August 2022

- Rambabu, K., Bharath, G., Sivarajasekar, N., Velu, S., Sudha, P. N., Wongsakulphasatch, S., & Banat, F. (2023). Sustainable production of bio-jet fuel and green gasoline from date palm seed oil via hydroprocessing over tantalum phosphate. *Fuel*, 331, 125688.
- Muruganandam, V. V. A., Sivagurunathan, K. A., & Kurichi, S. (2022). Preliminary analysis and applications of bio-enzymes from fermented vegetable and fruit peel wastes. *Indian Journal of Natural Sciences*, 13(73).

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- Arun, A. V., Soundaram, R., Sathishkumar, T., Kumaresan, K., Rapheal, V. S., & Thirugnanam, N. (2023). Purified Stigmasterol Related Novel Phytosterol from *Chrysopogonzizanioides* (L.) Roberty Root Extract Exhibits Strong Cholesterol Esterase (CEase) and Diabetic Foot Ulcer (DFU) Causing Bacterial Pathogens Inhibitory Properties. *Current Bioactive Compounds*, 19(2), 79-92.

November 2022

- Ponnusamy, R., Kumaravel, V., & Nachimuthu, S. (2022, November). Synthesis of cellulose acetate, cellulose propionate and cellulose butyrate for the removal of synthetic dyes. In *AIP Conference Proceedings* (Vol. 2446, No. 1). AIP Publishing.
- Saraswathy, N., Manojkumar, A., Kamali, M., Akila, S., Dymphan, F. G., Balaji, S., & Ramalingam, P. (2022, November). In situ forming alginate dialdehyde-Gelatin hydrogel containing cyclodextrin-curcumin accelerates in vivo wound healing. In *AIP Conference Proceedings* (Vol. 2446, No. 1). AIP Publishing.
- Saraswathy, N., Manojkumar, A., Kamali, M., Akila, S., Dymphan, F. G., Balaji, S., & Ramalingam, P. (2022, November). Studies on release kinetics of curcumin from alginate dialdehyde hydrogel In *AIP Conference Proceedings* (Vol. 2446, No. 1). AIP Publishing.
- Dharani, S., Ramalingam, P., Priya, P., Basavaraju, S., & Saraswathy, N. (2022, November). Extraction of lutein from *targeteserecta* using deep eutectic solvents. In *AIP Conference Proceedings* (Vol. 2446, No. 1). AIP Publishing.
- Gurumallesh, P., Ramakrishnan, B., & Dhurai, B. (2022, November). Banana peel metalloprotease characterizations. In *AIP Conference Proceedings* (Vol. 2446, No. 1). AIP Publishing.
- Varshini, R. A., Sathishkumar, T., Kumaresan, K., & Thirumurugan, A. (2022, November). In silico sequence analysis of urease from *Klebsiella aerogenes*. In *AIP Conference Proceedings* (Vol. 2446, No. 1). AIP Publishing.
- Manimaran, D. R., Swetha, E., Iswaryalakshmi, S., & Sivamani, S. (2022, November). Optimization of inulin extraction from roots of *Cichorium intybus*. In *AIP Conference Proceedings* (Vol. 2446, No. 1). AIP Publishing.

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- Chenthamara, D., Sivaramakrishnan, M., Ramakrishnan, S. G., Esakkimuthu, S., Kothandan, R., & Subramaniam, S. (2022). Improved laccase production from *Pleurotus floridanus* using deoiled microalgal biomass: statistical and hybrid swarm-based neural networks modeling approach. *3 Biotech*, 12(12), 346.
- Govindarajan, D. K., Meghanathan, Y., Sivaramakrishnan, M., Kothandan, R., Muthusamy, A., Seviour, T. W., & Kandaswamy, K. (2022). *Enterococcus faecalis* thrives in dual-species biofilm models under iron-rich conditions. *Archives of Microbiology*, 204(12), 710.
- Veerichetty, V., & Rafi, A. S. M. (2022). Comparative antioxidant capacity of fucoidan batches extracted from *Sargassum* species. *AIP Conference Proceedings*, 2446(1).

February 2023

- George, J., Rajendran, D. S., Venkataraman, S., Rathankumar, A. K., Saikia, K., Muthusamy, S., & Vaidyanathan, V. K. (2022). Insolubilization of *Tramates versicolor* laccase as cross-linked enzyme aggregates for the remediation of trace organic contaminants from municipal wastewater. *Environmental Research*, 209, 112882.
- Balasubramani, K., Sivarajasekar, N., Sarojini, G., & Naushad, M. (2023). Removal of antidiabetic pharmaceutical (metformin) using graphene oxide microcrystalline cellulose (GOMCC): insights to process optimization, equilibrium, kinetics, and machine learning. *Industrial & Engineering Chemistry Research*, 62(11), 4713-4728.
- Poojara, L., K, R., & Rawal, R. M. (2023). Computational approaches screening DNA aptamers against conserved outermembrane protein W of *Vibrio cholerae* O1-an investigation expanding the potential for point-of-care detection with aptasensors. *Journal of Biomolecular Structure and Dynamics*, 41(23), 14438-14449.

March 2023

- Admane, N., Kothandan, R., Syed, S., & Biswas, S. (2023). A quinoline alkaloid potentially modulates the amyloidogenic structural transitions of the biofilm scaffolding small basic protein. *Journal of Biomolecular Structure and Dynamics*, 41(4), 1366-1377.

2.0.6 Book Chapter

April 2022

- Muthukumaran, P., Arvind, J., Kamaraj, M., & Manikandan, A. (2022). Algal-sourced biostimulants and biofertilizer for sustainable agriculture and soil enrichment: Algae for fertilizers and soil conditioners. In *Algal Biorefineries and the Circular Bioeconomy* (pp. 211-235). CRC Press. (Book Chapter)

May 2022

- Manikandan, A., Muthukumaran, P., Poorni, S., Priya, M., Rajeswari, R., Kamaraj, M., & Aravind, J. (2022). Microbial approaches for bioconversion of agro-industrial wastes: A review. *Strategies and Tools for Pollutant Mitigation: Research Trends in Developing Nations*, 151-180. (Book Chapter)

3 Faculty Participation

3.1 Faculty Participation in FTP, STTP, Workshop and Other Training Programs

December 2023 to February 2023

- Dr. Ram K was awarded the Tamil Nadu **Young Scientist Fellowship**, spanning three months from December 12, 2023, to February 10, 2023, involving hands-on training.

June to August 2023

- Dr. N. Sivarajasekar was awarded the **INSA Fellowship** for a summer fellowship, which spanned three months from June to August 2023, involving hands-on training.

May 2023

- Ms. V. Veerabhuvaneshwari undertook a one-month internship at Spinos Life Sciences, Coimbatore, from May 8 to June 8, 2023, focusing on practical training.

April 2023

- Dr. T. Sathish Kumar concluded his twelve-week NPTEL online course (FDP approved by AICTE) on "NBA Accreditation and Teaching and Learning in Engineering (NATE)" in April 2023.
- Dr. S. Nithya Priya completed a four-week Coursera certification course on "Ergonomics of Food Value Chain" in April 2023. The course focused on improving competitiveness in the agro-food value chain by producing high-quality products while aiming for greater sustainability.

March 2023

- Dr. N. Sivarajasekar attended a seven-day online Faculty Development Program (FDP) on "NAAC Accreditation Framework and Documentation" organized by Government College Banda Sagar, MP, from March 1 to March 7, 2023.

February 2023

- Dr. N. Sivarajasekar attended a fifteen-day blended/hybrid FDP on "Modern Packaging Technologies, Smart Warehouse Practices, and Hi-Tech Quality Analytical Instruments for Safe Food Supply" at the National Institute of Food Technology, Entrepreneurship, and Management (NIFTEM), Thanjavur, held from February 2 to February 13, 2023.
- Mr. P. Muthukumaran completed a five-day online FDP on UHV, conducted from February 28 to March 4, 2023.

January 2023

- Dr. T. Sathish Kumar attended a twelve-week NPTEL online course (FDP approved by AICTE) on "NBA Accreditation and Teaching and Learning in Engineering (NATE)âĂİ from January to April 2023. The course covered various elements of outcome-based education (OBE) and its effective implementation through curriculum design, assessment, and measurement of attainable outcomes.
- Dr. N. Saraswathy participated in a ten-day online Faculty Development Program (FDP) on Ecology and Environmental Sciences, organized from January 9 to January 20, 2023.

October 2022

- Dr. Vinohar Stephen Rapheal attended the one-day offline EduTech Summit on October 14, 2022.

September 2022

- Dr. D. R. Manimaran attended a five-day online FDP on "Smart Waste Management" conducted from September 12 to September 17, 2022.
- Dr. Vinohar Stephen Rapheal attended a one-day offline workshop on "Naan Mudhalvan Regional Conference" organized by the Government of Tamil Nadu on September 16, 2022.

- Dr. Ram K attended a three-day offline international workshop on computational tools in drug design, held from September 22 to September 25, 2022.

August 2022

- Dr. M. Shanmugaprakash attended a two-day offline workshop on building effective personal and professional habits at KCT, held from August 23 to August 24, 2022. The workshop provided valuable insights into time management, proactive thinking, and goal setting.
- Ms. V. Veerabhuvaneshwar completed a three-day online training on "Scientific Training and Publishing" organized by Merck, held from August 22 to August 24, 2022.

November 2022

- Dr. D. R. Manimaran attended an eleven-day online FDP on "Sustainable and Robust Electrochemical Technologies for Industrial Application,âĂİ conducted in two parts: November 21-26, 2022, and December 28, 2022-January 2, 2023.
- Dr. Ram K attended a fourteen-day online FDP on advanced research methodology and publishing, held from November 1 to December 30, 2022.

December 2022

- Dr. D. R. Manimaran continued his eleven-day online FDP on "Sustainable and Robust Electrochemical Technologies for Industrial Application" which spanned from November 21-26, 2022, and December 28, 2022-January 2, 2023.

4 Notable Events

Photo. 4.1: Dr Pavithra talk on sparkling ideation

- **Event:** Expert talk on "Process of Innovation Development, Technology Readiness Level (TRL), and Commercialization of Lab Technologies & Tech-Transfer" in collaboration with IIC, KCT.
  Date: March 24, 2023
  Duration: Half-day
  Speaker: Dr. Pavithra Somasundaram, Proprietrix, Sri Yoganarasimha International, Coimbatore
  Participants: 63 students and faculty members.

Photo. 4.2: From a student to a budding Entrepreneur - Ms. Madhumita

- **Event:** Motivational Session by a Successful Entrepreneur on "My Story" in collaboration with IIC, KCT.
  Date: February 1, 2023
  Duration: Half-day

Speaker: Mrs. Madhumitha Haresh, Founder and Proprietor, Earthcare Biotech Pvt. Ltd., Coimbatore
Participants: 85 students and faculty members.

- **Event:** Workshop on thermal analysis of materials using TGA and DSC.
  Date: February 18, 2023
  Duration: 1 day
  Speaker: Dr. H. Arul, Associate Professor and Head, SFS (Physics), KCT
  Participants: 12 technical support staff.
- **Event:** Workshop on project report writing.
  Date: March 17, 2023
  Duration: 1 day
  Speakers: Dr. K. Kumaravel and Mr. P. Muthukumaran, Assistant Professors, BT, KCT
  Participants: 25 students.
- **Event:** Value-added course on Fruit and Vegetable Processing Technology.
  Date: May 5-6, 2023
  Duration: 2 days
  Speaker: Dr. S. Nithya Priya, Assistant Professor III, Kumaraguru College of Technology
  Participants: 20 students.
- **Event:** Value-added course on Techno-Economic Analysis for Bioprocess Systems.
  Dates: January 9-10, 2023, and January 21-22, 2023
  Duration: 4 days
  Speaker: Dr. Karthik, Head, Department of Environmental Engineering, SRM University, AP
  Participants: 18 students.

5 Student's Scribbles

5.1 The Great Protein Powder Scam – A Story of Expensive Shakes and Cheap Lies

Jake had a dream. Not to cure diseases or change the world-just to look like an action hero without doing movie stunts. After a gym session where he lifted moderately heavy weights (ensuring everyone saw him), he checked the mirror. Something was missing. His muscles weren't popping like the guys on Instagram. Clearly, he needed a secret weapon.

Enter the supplement store-where fitness dreams are sold at premium prices. The shelves were stacked with massive tubs screaming promises of beast-mode strength. "ULTRA-ANABOLIC WHEY 9000!" "MUSCLE OBLITERATOR PRO!" Each label looked like it had been designed by a monster truck rally organizer.

Then, from the shadows, emerged the sales rep-shredded, towering, and overly excited. "Bro," he whispered, as if revealing state secrets. "You're not using protein powder?" Jake shook his head, suddenly feeling weak. "No wonder, man. You gotta get on this." The rep slapped a tub labelled *Mega Gainz Xtreme*. "Fast absorption, anabolic window, muscle explosion."

Jake had no clue what that meant, but it sounded important. So, like any rational human being, he swiped his card and left, convinced he had unlocked the secret to getting jacked.

For weeks, Jake religiously downed shakes. *Chocolate Thunder. Vanilla Avalanche. Strawberry Regret.* But something was off. Despite drowning in overpriced powder, his muscles weren't growing any faster. His stomach, however, had begun making noises that could summon demons. And his wallet? It was gasping for air.

One night, bloated and confused, he did the unthinkable-he researched what he was drinking. And that's when he found the horrifying truth. Protein is protein. His body didn't care if it came from a $70 tub or a $5 carton of eggs. Science confirmed that total daily protein mattered more than some "hyper-absorbing, anabolic-matrix, muscle-igniting" nonsense.

And the worst part? Some protein powders were filled with cheap fillers, artificial sweeteners, and even traces of heavy metals. That's right-Jake had paid top dollar for a scoop of

disappointment, a side of bloating, and possibly a sprinkle of lead. And the infamous “anabolic window"? Mostly a marketing trick. His muscles weren’t punching out if he didn’t slam a shake within 30 minutes of lifting. He could’ve just eaten real food like a normal person.

Jake sat there, shaking his head, feeling the weight of his poor choices-both in his stomach and in his bank account. He could’ve spent that money on chicken, beans, eggs, and yogurt. You know, actual food.

So, the next day, Jake made a change. He ditched the powder, ate real meals, and guess what? His digestion improved, his grocery bill shrank, and-shocker-his muscles still grew. Turns out, he had fallen for one of the biggest scams in fitness. And all he got was expensive pee.

So, before you buy into the flashy labels and the gym bros preaching about magic shakes, ask yourself: do you really need that $70 tub of mystery dust? Or are you just paying premium prices for something you could get from a few eggs and a steak? Choose wisely-and maybe spend that money on food that won’t make your stomach question its life choices.

– *Max Irons*

The Hidden Dangers of Protein Powders: A Summary

Protein powders have become a staple in the diets of athletes, gym-goers, and health enthusiasts. Marketed as convenient tools for muscle building, weight loss, and overall health, they are often perceived as harmless. However, an article from Harvard Health Publishing highlights potential hidden dangers associated with these supplements.

Lack of Regulation and Quality Control

One major concern is the lack of strict regulation by the FDA. Unlike prescription medications, dietary supplements like protein powders do not undergo rigorous testing for safety or efficacy before being sold. This allows manufacturers to sell products without ensuring purity or accuracy in labeling. Independent testing has revealed that some powders contain harmful contaminants such as heavy metals (lead, arsenic, cadmium), pesticides, and other toxins, posing long-term health risks.

Excessive Protein Intake

While protein is essential for health, excessive consumption-often encouraged by marketing -can strain the body. High protein intake, particularly from animal-based sources, has been linked to kidney damage in individuals with pre-existing conditions. Overconsumption can also lead to nutrient imbalances, as people may prioritize protein at the expense of other vital nutrients. Most people already meet their daily protein needs through a balanced diet, making supplements unnecessary for the average person.

Additives and Artificial Ingredients

Many protein powders contain additives to enhance flavor, texture, and shelf life, including artificial sweeteners, thickeners, and preservatives. These can cause digestive issues such as bloating, gas, and diarrhea in sensitive individuals. Some sweeteners, like sucralose and aspartame, have raised concerns about their long-term health effects. Additionally, certain plant-based powders may contain allergens or compounds that interfere with nutrient absorption.

Misleading Marketing Claims

Protein powders are often marketed with exaggerated claims about rapid muscle growth, fat loss, or improved athletic performance. These claims are not always backed by scientific evidence and can mislead consumers into believing they need these supplements to achieve their fitness goals. In reality, whole foods like eggs, chicken, beans, and nuts provide high-quality protein without the risks associated with processed powders.

Who Should Be Cautious?

Certain populations should exercise extra caution when considering protein powders. Pregnant women, children, and individuals with chronic health conditions (e.g., kidney disease, liver disorders) are particularly vulnerable to adverse effects. Even healthy individuals should consult a healthcare provider before incorporating these supplements into their routine.

Recommendations for Safer Choices

To minimize risks, prioritize whole food sources of protein whenever possible. If a supplement is necessary:

- Choose products independently tested for quality and safety by organizations like NSF International or ConsumerLab.
- Avoid powders with long lists of unfamiliar ingredients, artificial additives, or proprietary blends.
- Stick to reputable brands and read labels carefully.

While protein powders can be convenient, they are not a magic solution for health or fitness. The hidden dangers-ranging from contamination and excessive protein intake to misleading marketing-highlight the importance of informed decision-making. By prioritizing whole foods and using supplements judiciously, individuals can meet their nutritional needs safely and effectively. As the article concludes, “When it comes to protein, more isn’t always better, and natural sources are often the best choice.”

Reference: Harvard Health Publishing (Harvard Medical School)

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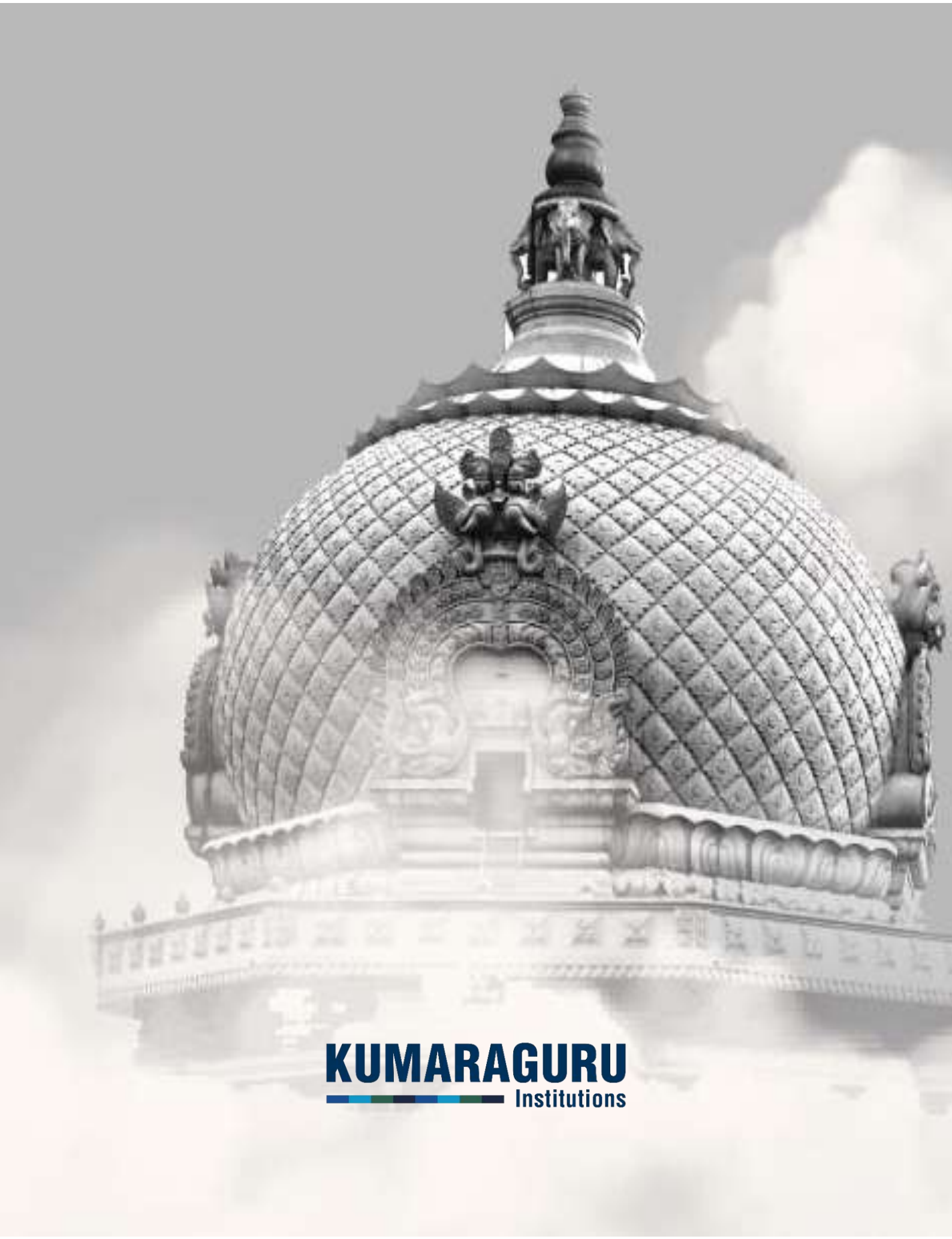
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