



# Unlocking Secrets to Successful Formulations

**THE JOURNEY FROM** concept to a successful food product is analogous to a culinary adventure that blends creativity, science, and meticulous attention to detail. For food product developers, crafting formulations that not only meet consumer demands but that also stand out in a competitive market requires a nuanced understanding of multiple factors, careful consideration, and time. There are numerous steps involved, and occasionally, some steps require a pause for reassessment. Throughout each stage, thorough testing and research are essential to ensure progress in the right direction. It's important to note that these steps don't always unfold sequentially; some occur concurrently while others necessitate going back and forth between different disciplines.

This multifaceted process, which encompasses ideation,

## Learning Objectives

1. Find out how ideation, ingredient selection, sensory evaluation, packaging design, regulatory compliance, marketing strategy, and distribution planning are key to unlocking the secrets to successful formulations.
2. Learn why understanding consumer needs, selecting the right ingredients, leveraging advanced technologies, and adhering to regulatory standards are integral to the food product developer's toolbox.
3. Gain insight into how to strike a balance between quality, efficiency, sustainability, and meeting customer expectations to achieve market success.

ingredient selection, sensory evaluation, packaging design, regulatory compliance, marketing strategy formulation, and distribution planning, is key to unlocking the secrets to successful formulations. Throughout the product development process, food and beverage

developers who endeavor to strike a delicate balance between quality, efficiency, sustainability, and meeting customer expectations will achieve success in the market.

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## The Consumer-Centric Approach

At the heart of successful food product formulation is a deep understanding of consumer needs and preferences. Today's consumers are more informed and selective than ever, demanding products that align with their lifestyles, values, and dietary preferences (see sidebar, Key Consumer Trends, p. 61). This shift necessitates a consumer-centric approach in food product development. Also, by understanding and leveraging these market trends and formulation strategies, companies can create successful products that meet consumer

demands and stand out in a competitive marketplace. For example, brands are reformulating products to replace synthetic ingredients with natural alternatives and ensuring sustainable sourcing practices.

Moreover, consumers are seeking personalized products tailored to their specific needs, such as protein products based on individual needs or nutritional supplements customized to dietary requirements. The trend toward clean labels, where consumers expect transparency about ingredient sources, manufacturing processes, and the absence of harmful chemical additives, continues to grow. Increasing regulations around product labeling and ingredient disclosure are also driving this trend.

Enhancing understanding of the interconnectedness among food properties, biological functions, sustainability, and consumer perception will heighten awareness of the significance of producing and consuming functional food that is also sustainable. Exploring the interplay between food design, functionality, and sustainability will advance scientific knowledge on formulating and processing functional, concurrently sustainable food. Investigating consumer behavior and attitudes will aid in devising appropriate strategies to communicate product innovation accurately and effectively, including health and sustainability claims. This, in turn, will empower consumers to choose food that aligns with a healthy and sustainable diet (Alongi and Anese 2021).

### **Prototyping and Iteration**

Developing prototypes is a critical step in the formulation process. This allows for testing various formulations and refining the product based on sensory evaluations, stability tests, and consumer feedback. Iterative prototyping helps in

identifying the optimal balance of ingredients and processing methods. Prototyping allows food developers to create initial versions of a product based on a desired formulation. Through iteration, they can refine the recipe by adjusting ingredient quantities, proportions, and processing techniques to achieve the desired taste, texture, and consistency.

Prototypes are often subjected to internal or external sensory evaluation, in which trained panelists or consumers provide feedback on factors such as flavor, aroma, appearance, and mouthfeel. This feedback helps identify areas for improvement and guides further iterations to enhance the sensory experience of the product. Food prototypes then undergo functional testing to assess their performance in terms of nutritional content, shelf stability, and food safety. Iterative testing allows developers to optimize formulations to meet regulatory standards and ensure product safety and quality. Prototyping enables food formulators to produce small batches of products for market testing and consumer feedback. By releasing prototypes to a select group of consumers or conducting focus group studies, formulators can gauge consumer preferences, identify potential market niches, and fine-tune formulations to better meet consumer needs and preferences.

Through iteration, developers can identify cost-effective ingredient substitutions or process modifications without compromising product quality. This iterative approach helps optimize the formulation to achieve the desired product attributes while keeping production costs manageable. Iterative prototyping allows for experimentation with novel ingredients, flavor combinations, and processing techniques, fostering innovation and differentiation in the marketplace. By continually

iterating and refining formulations, food companies can stay ahead of trends, capture consumer interest, and establish themselves as leaders in the industry. The iterative process of prototyping fosters a culture of continuous improvement within food development teams. By collecting and analyzing data from each iteration, developers can identify patterns, trends, and opportunities for enhancement, leading to ongoing refinement and innovation in food formulations.

### **Technological and Process Innovations**

Modern food processing techniques play a crucial role in the development of new products. Processing innovations are essential in food product development for enhancing food safety, maintaining nutritional integrity, improving texture and mouthfeel, enabling ingredient transformation, facilitating product innovation and differentiation, optimizing production efficiency, addressing consumer preferences and trends, and meeting regulatory requirements. By leveraging advanced processing technologies, product designers can create high-quality, safe, and innovative food products that delight consumers and drive market success.

Advances in artificial intelligence and data analytics are enabling companies to offer personalized product recommendations and formulations. Whether using heat treatment or high-pressure processing or any other novel thermal or nonthermal technologies, it is key to ensure the product attributes and microbial stability. It will also be critical that any new technologies are used responsibly. It is critical to involve all stakeholders in the food supply chain, including farmers, manufacturers, regulators, and consumers, in the development and deployment of new technology. This will

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entail carefully analyzing the social, environmental, and economic implications of its deployment. In particular, the possible health and environmental repercussions of a new generation of structurally engineered meals should be thoroughly examined on a case-by-case basis to ensure that there are no unforeseen consequences for individual or global health (McClements 2020).

### Scaling Up from Lab to Production

Scaling up lab-scale formulations to full-scale production is another critical step in unlocking the secrets to successful food formulations. Once a formulation is finalized, scaling up from the lab to full-scale production involves pilot testing. This step ensures that the product can be manufactured consistently at larger volumes while maintaining quality and safety standards. Scaling up can present challenges such as variations in ingredient behavior, processing times, and equipment efficiency. It is crucial to anticipate these issues and adjust formulations and processes accordingly. Successful scaling up prepares formulations for commercialization, ensuring that products are ready to meet consumer demand and compete effectively in the marketplace.

Collaboration between food scientists and production engineers is essential to navigate these challenges successfully. Evaluate and optimize production processes to ensure efficiency, consistency, and scalability. This may involve adjusting mixing times, temperatures, and other parameters to achieve desired results. It is key to invest in appropriate production equipment that can handle larger volumes while maintaining product integrity. This may include mixers, filling machines, and packaging equipment etc. Implementing robust quality control measures to ensure that products meet safety, quality,



**For more ideas on formulation, listen to our interview with Karthik and Kartik in Episode 40 of the Omnivore podcast.**

## KEY CONSUMER TRENDS

- **Health and Wellness.** Products that offer health benefits, such as low-calorie, organic, gluten-free, and high protein, are in high demand. Consumers are increasingly focused on preventing health issues rather than just treating them. They are seeking products that help maintain and improve overall well-being. There is a growing market for foods and supplements that offer health benefits beyond basic nutrition, such as immune support, heart health, and mental wellness. By staying attuned to these consumer trends and leveraging advanced formulation techniques, product developers can create successful health and wellness products that meet consumer demands and stand out in the competitive market.
- **Convenience.** Busy lifestyles drive the need for ready-to-eat meals, snacks, and beverages that are both nutritious and easy to prepare. With busy schedules, consumers prefer products that are quick and easy to consume without compromising on nutrition. There is a growing demand for single-serve and portion-controlled packaging that offers convenience and reduces food waste.
- **Sustainability.** Ethical sourcing, sustainable packaging, and environmentally friendly production methods are increasingly influencing purchase decisions. It is critical to understand that sustainability is no longer optional but a critical component of food product development. By integrating sustainable practices and focusing on transparency, developers can create successful food formulations that meet consumer demand for environmentally friendly and ethically produced products. Approaches include developing formulations that use upcycled ingredients or alternative proteins, conducting life cycle assessments to understand and mitigate the environmental impact of products from production to disposal, and developing strategies for the end-of-life stage of products, such as recyclability. Sharing the story behind sustainable practices and ingredient sourcing to engage and educate consumers is also critical.
- **Indulgence and Experience.** Even health-conscious consumers seek indulgent treats that offer unique and pleasurable eating experiences. There's a growing interest in unique flavors and ingredients that offer a new culinary experience. For example, classic treats with a modern twist, such as artisanal takes on popular chocolates or updated versions of traditional baked goods, attract consumers.
- **Balancing Nutrition and Sensory Considerations.** Achieving the right balance between taste and nutrition is a critical challenge in food formulation. Consumers increasingly seek products that are both delicious and healthy. This requires innovative approaches to reduce sugar, fat, and salt content without compromising on taste. Natural sweeteners, healthy fats, and salt substitutes are often employed to achieve this balance. Texture and mouthfeel are as important as taste in determining a product's appeal. The sensory experience of eating a product—its crunchiness, creaminess, or chewiness—can significantly influence consumer satisfaction. Food technologists often use hydrocolloids, starches, and proteins to modify texture and create desirable sensory attributes.

and regulatory standards includes testing raw materials, in-process samples, and finished products for consistency and compliance.

Recordkeeping and close monitoring of production processes to collect data to identify areas for optimization and improvement also is important. Iterate on formulations and processes as needed to achieve desired outcomes. Moreover, it is critical to ensure compliance with regulatory requirements and maintain thorough documentation of production processes, ingredient sourcing, quality control measures, and any changes made during scale-up.

### **Launching and Marketing the Product**

A well-thought-out go-to-market strategy is vital for the successful launch of a new food product. This includes branding, packaging design, pricing, and distribution plans. Effective marketing campaigns that highlight the product's unique selling points, health benefits, and sustainability credentials can attract consumer interest and drive sales. After the product launch, gathering consumer feedback is important to assess market reception and identify areas for improvement. Continuous monitoring and responding to consumer reviews can help in making necessary adjustments to enhance product success.

### **Formulating Success**

Unlocking the secrets to successful food product formulations requires a multidisciplinary approach that blends consumer insights, scientific innovation, and meticulous execution. By understanding consumer needs, selecting the right ingredients, leveraging advanced technologies, and adhering to regulatory standards, food product designers can create products that not only meet market demands

but also delight consumers. As the food industry continues to evolve, staying attuned to emerging trends and continuously innovating will be key to achieving sustained success in the competitive landscape of new product development. 

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**Karthik Sajith Babu**, PhD, is senior research scientist, Sargento Foods and a member of IFT's Product Development Division (ks7@ksu.edu).

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**Kartik Shah** is technology principal, Sargento Foods and a member of IFT's Product Development Division (shahkartik.vd@gmail.com).