

An Insight Into Simulated Product Development: Lotus Stem Dip

Dr. Jyoti D. Vora¹, Padma Srinivasan²

¹(Guide and Head of the Department of Biochemistry and Food Science and Quality Control, Ramnarain Ruia College, Mumbai, India.)

²(Department of Biochemistry and Food Science and Quality Control, Ramnarain Ruia College, Mumbai, India)

Abstract: *Simulated product development is the new innovation in the field of Food science and Food technology. It is an armchair science that accurately estimates the pulse of consumer preferences. The product is developed in reference to an imaginary framework based on fixed attributes. The simulated attributes are usually product attributes, which are of prime importance to both the manufacturer and the consumer. In this technique, acceptability of a product conceived virtually in space via detailed analysis of the data obtained from a well-formulated questionnaire. The questionnaire developed focuses on consumer awareness, recipe development and product value for money (VFM).*

Expert panelists who have the proficiency to predict its organoleptic acceptability usually evaluate the product's viability via their ability to transcend the product idea as if it's a tangible entity. Simulated product development is one of the most cost-effective and sophisticated technique of appraising the effectiveness of a product idea. In this publication, the acceptability of a virtually developed lotus stem dip is analyzed by simulated product development. Future prospects include assessment of the organoleptic acceptability of other virtually developed products of lotus stem.

Keywords: *lotus stem, food science, product development, lotus stem dip, nutrition*

I. Introduction

“Let food be thy medicine and medicine be thy food.” - Ancient wisdom of Hippocrates is revisited to benefit the new *idée fixe* and foundation of the science of Integrative Nutrition. Integrative nutrition being the overall key to wellness and health; focuses on enhancing the physical and emotional wellness of the individual by positive dietary changes. Integrative nutrition involves achieving holistic wellness by rendering the science of nutrition more flexible to address individual needs.

In modern times, pharmaceutical products are the chief channels of therapy. However, rising concerns of side effects and toxicity associated with long-term usage have raised questions on the safety and efficacy of various drugs. To address this concern, the purview of a branch of integrative nutrition also focuses on recognizing and elevating the therapeutic potential of the diet by incorporating simple remedial measures.

Modern lifestyles have fuelled ambitions but compromised the time for ingesting meals with quality nutrition. Hectic schedules have left no time for meal preparation and consumption is usually on the go. Hence, the focus of the food industry is to cater nutritionally balanced meals with maximum consumer convenience. This dawns the era of mass production of convenience foods; which are easy to process, prepare and consume.

The convenience foods market is one of the fastest growing food sectors in India. Affordability, willingness to experiment different and new products, changing tastes and preferences are the key drivers of this growth. However, excessive processing during manufacture of convenience foods has rendered them nutritionally imbalanced. Thus, manufacturers need to develop convenience foods using nutritionally balanced ingredients to render them nutritionally beneficial. One way of achieving this is to provide a new dimension to versatile ingredients like lotus stem by incorporating them into newer recipes, which can serve as convenience foods.

II. Simulated Product Development

Convenience foods are usually developed in the industry using the technique of Simulated Product development. This is the advanced technique by which the manufacturer or food producer conceives a product in virtual space. The various attributes of the product are made concrete using out of the box thinking combined with the knowledge and expertise of food and nutritional sciences. Simulated Product development is the new innovation in product development because it is a more efficient technique of product development because it easily bridges gaps between the concept of the product and its translation into reality. It is more favored in the industrial scenario because it is a profitable venture. The costs associated with translating a virtual product into reality is much lower than developing tangible products with ultimately no market value.

The product is first evaluated by expert panels [usually Descriptive Flavor Assessment Panel (DFAP)] capable of conceptualizing and grading the product solely on the detailed description of its attributes. DFAP

consists of individuals who are experts in Sensory evaluation techniques. They are chosen to assess and constructively suggest constructive alterations to introduce further innovations in the product so as to make it a unique and tangible venture. The product can also be evaluated using this technique by utilizing panels of naïve consumers after thorough briefing to ascertain the mass acceptability, demand and market share of the conceived product even before it is translated into reality.

III. Simulated Product Development Of Lotus Stem DIP

3.1 Product introduction

With this background, a product using lotus stem as the main ingredient is to be developed. Lotus stem is an indigenous vegetable confined to selective cuisines of South East Asia. Lotus stem is a nutritionally balanced food. It is low in fat, low in sugar and high in protein, minerals and vitamins. Exploration of the nutritional and therapeutic profile of lotus stem is a popular topic of scientific research. Lotus stem has been proven to exhibit anti-microbial, antipyretic, anti-viral and anti-fungal activity. The alkaloids in lotus stem have been proven effective in the management of diseases like hypertension, type-2 diabetes and various viral and fungal infections. The consumption of lotus stem is recommended to enhance the physiology and biochemistry of the individual.

A dip or dipping sauce is a common condiment for many types of food. Dips are used to add flavor or texture to a food. Unlike other sauces, instead of applying the sauce to the food, the food is typically put, dipped, or added into the dipping sauce (hence the name). Dips are commonly used for finger foods, appetizers, and other easily held foods. Dip is a very widespread food, and various forms of dip are eaten all over the world. People have been using sauces for dipping for thousands of years. Dips have a high market demand in the Indian scenario; since they are an integral part of Indian cuisine. Dips are made usually from sour cream, coconut and other high fat bases and usually are high in salt. Also, packaged dips are rich in various additives and colorants, which may upset the health of children and sensitive individuals when consumed.

3.2 Product information

A healthy dip using lotus stem (kamalkakdi) as the main ingredient is to be developed. The lotus stem dip would have the following advantages:

- Ready to eat and serve. No cooking required.
- Free from trans fats and low content of saturated fatty acids.
- Low in sodium and high in potassium.
- High in vitamins and minerals.
- Easy standardization for mass manufacture.
- Long shelf life and high VFM.
- Package design can be easily modified to suit consumer demand.
- Abundant local availability of product throughout the year.
- Can be consumed with a wide variety of foodstuffs.
- Versatility of packaging
- Long shelf life.
- No requirement of artificial additives
- Can be manufactured in a variety of flavors.
- Balances taste with nutrition.
- Can be consumed by all age groups of consumers.
- Can be also side-marketed as a paste for curry and gravy bases.
- Easy to distribute and market.
- Healthy alternative to conventional dips.
- Can be incorporated in various recipes.

3.3 Assessment of Consumer demand

To assess the consumer demand and acceptability of the lotus stem dip, a simulated questionnaire was developed. The questionnaire focused on various non-invasive attributes of the simulated dip. After thorough briefing, the questionnaire developed was distributed to 35 random consumers. The data collected was analyzed bio statistically to ascertain consumer awareness, the attributes of the recipe which appeal the consumer and value for money (VFM) of the dip. The interpretation obtained was further used in product development.

3.4 Data analysis

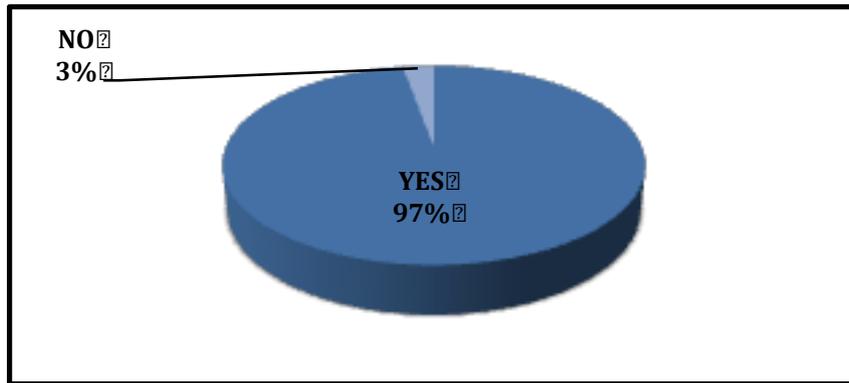


Figure 1: Consumer opinions on whether they like to consume dips.

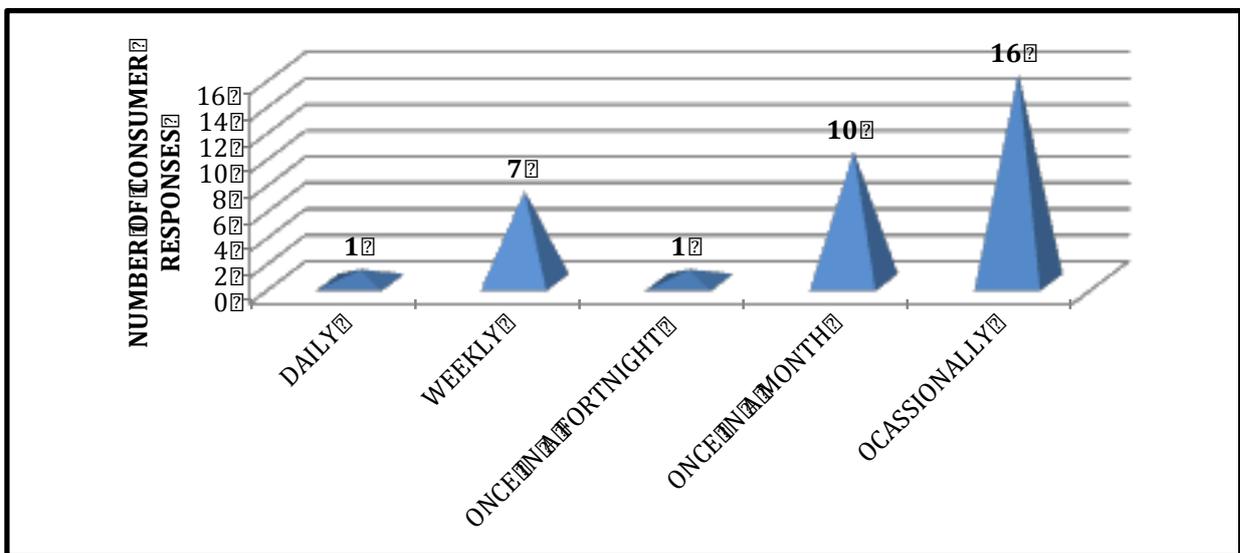


Figure 2: Consumer opinions on how often they prefer to consume dips.

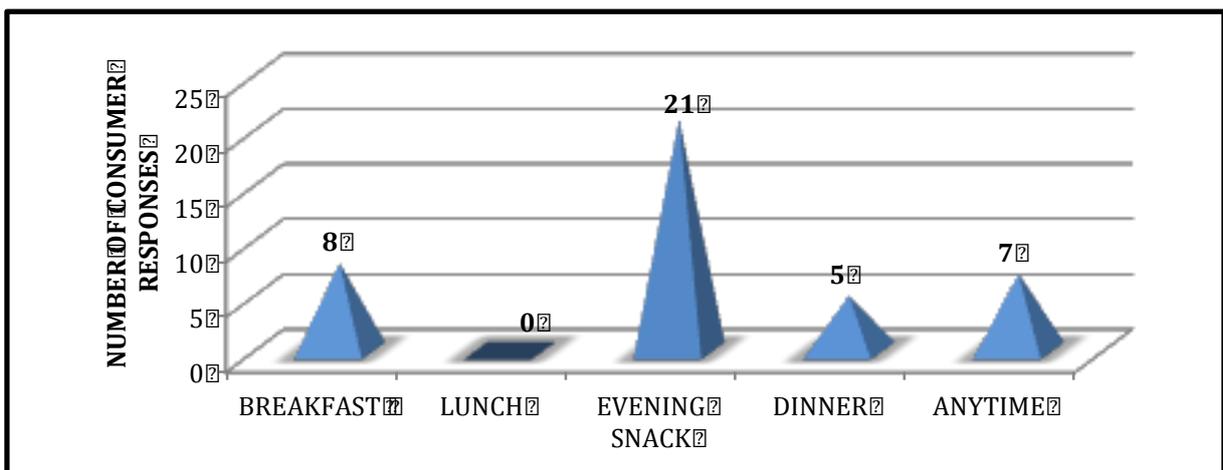


Figure 3: Consumer opinions on in which meal do they usually consume dips.

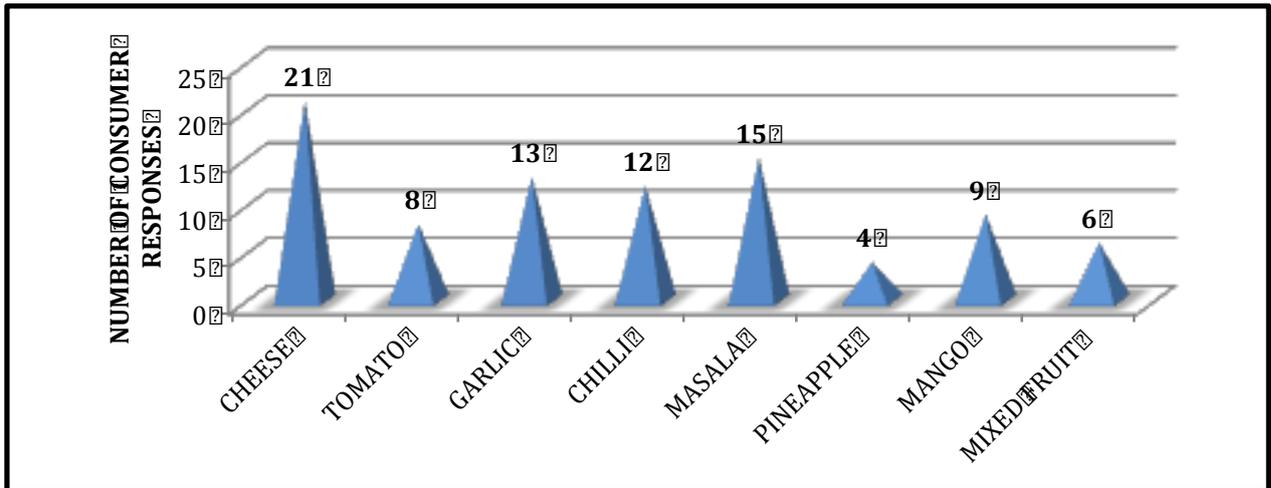


Figure 4: Consumer opinions on which flavors of dips they prefer to consume.

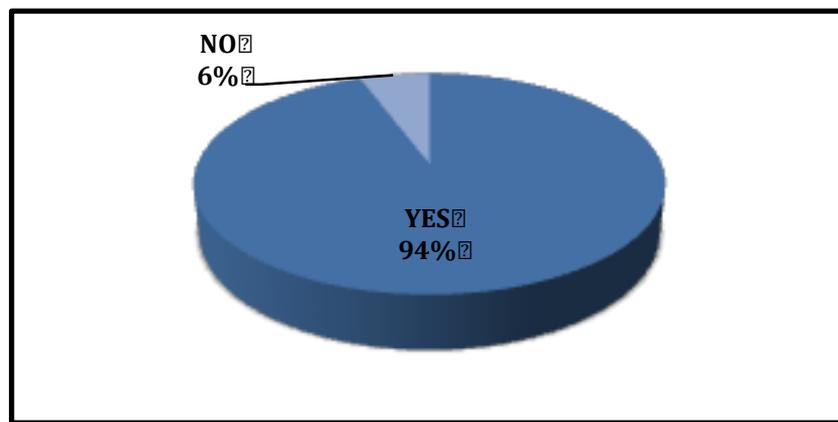


Figure 5: Consumer opinions on whether they liked the idea of a lotus stem dip.

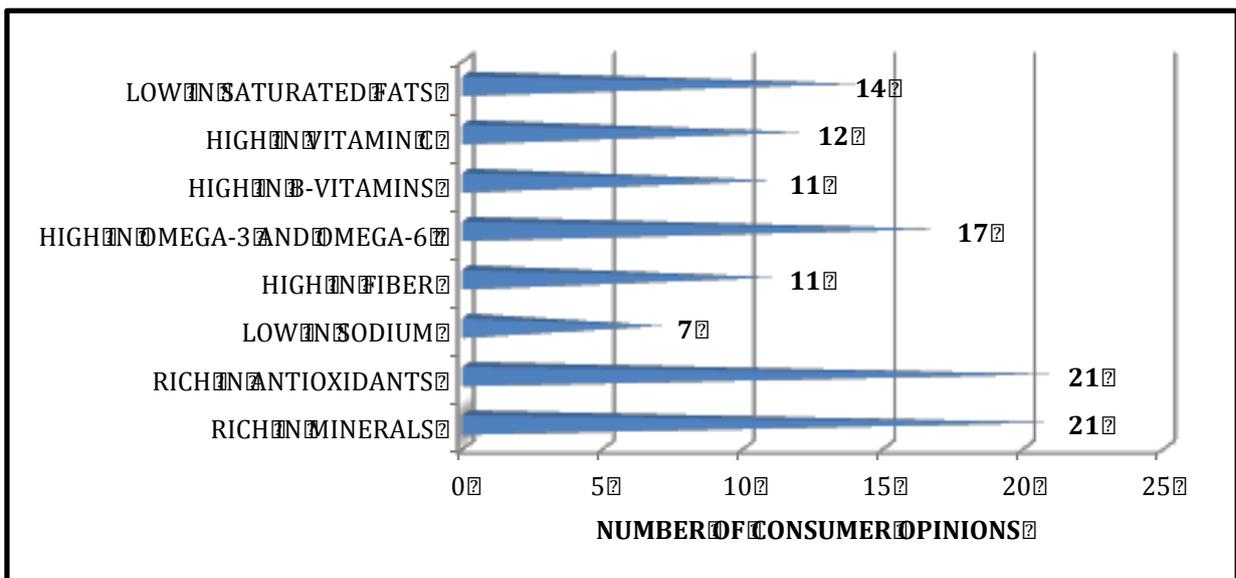


Figure 6: Consumer opinions on which nutritional benefits of the lotus stem dip appeal to them the most.

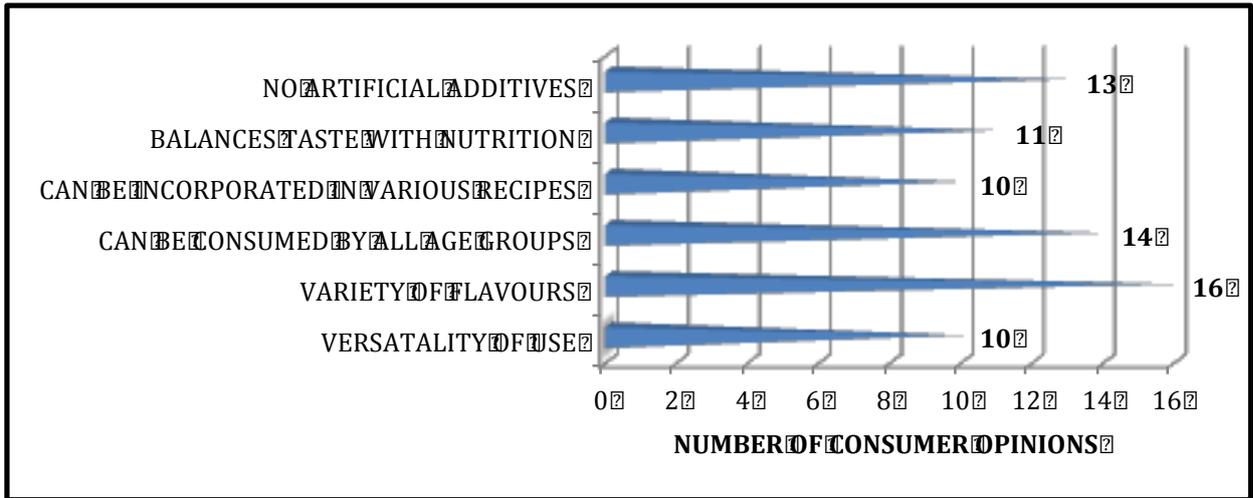


Figure 7: Consumer opinions on which product benefits of the lotus stem dip appeal to them the most.



Figure 8: Consumer opinions the VFM of the dip (Rs. 55 for 200g).

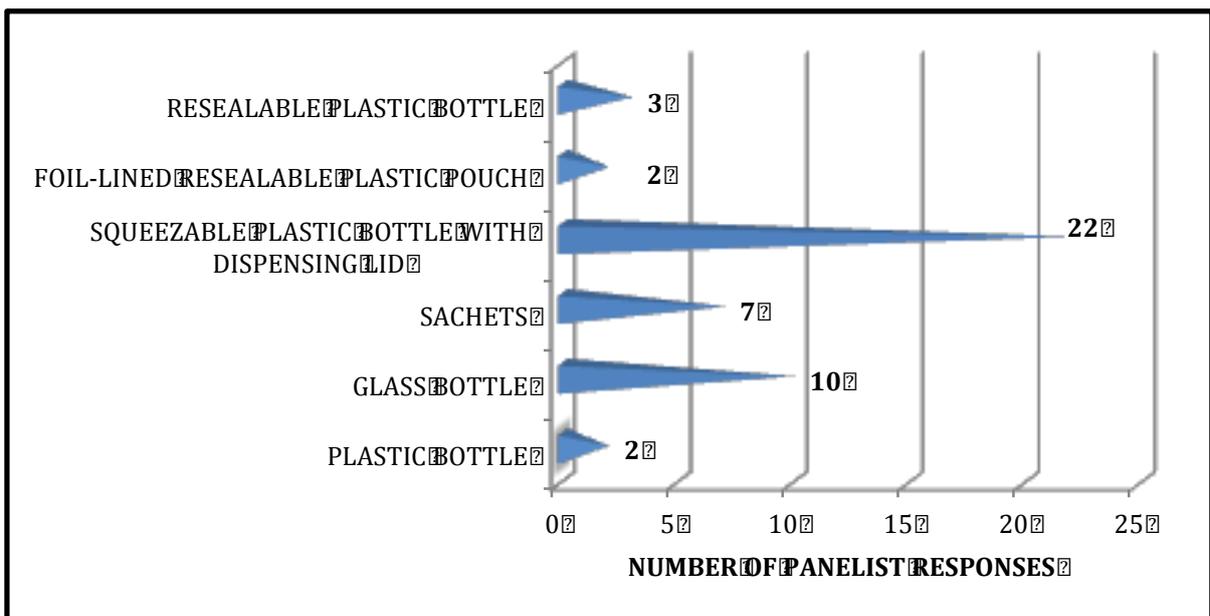


Figure 9: Consumer opinions on which form of packaging they prefer for the lotus stem dip.

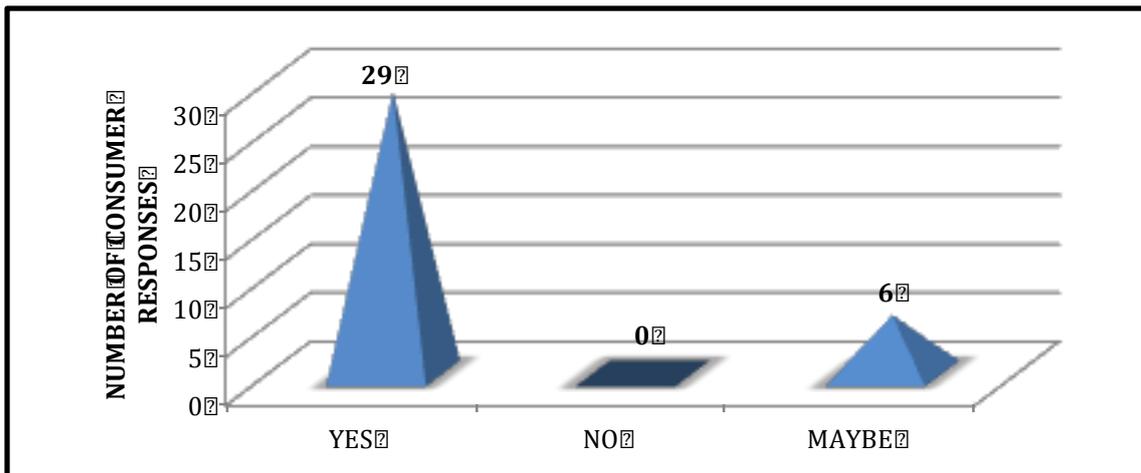


Figure 10: Consumer opinions on whether they will purchase lotus stem dip if it is marketed.

3.5 Results and Findings:

Thorough analysis of the data obtained from the analysis of the questionnaire, the following key observations were as follows:

- 97% of consumers suggested that they like to consume dips.
- 46% consumers aforesaid they like to consume dips occasionally.
- 60% of consumers ascertained that they prefer to consume dips in their evening snack.
- 43% panelists preferred a cheese-flavored dip.
- 94% consumers liked the idea of a lotus stem dip.
- 60% of panelists are appealed by the fact that lotus stem dip is high in antioxidants and minerals.
- 46% consumers were appealed by the fact that the lotus stem dip will be available in a variety of flavors.
- 63% of consumers preferred that the lotus stem dip to be packaged in a squeezable plastic bottle with dispensing lid.
- 88% of consumers have ascertained that the product is adequately priced.
- 83% consumers prefer to buy lotus stem dip if it is commercially available.

IV. Conclusion

The findings clearly suggest that lotus stem dip has high organoleptic and consumer acceptability. The findings suggest that lotus stem dip has high market demand as convenience foods that balance taste with nutrition. This study also suggests that there will always be a rising market demand for innovative convenience foods using wholesome novel ingredients that exhibit consumer convenience as one of the main priorities of product design. The simulated product development exercise concludes further that if the mass-manufacture of such healthy recipes is carried out, there will always be a high consumer demand for such products.

This study also highlights the superiority of simulated product development as a science a technique to ascertain consumer acceptability of a product idea. This technique is highly suitable in the industrial scenario as it is cost-effective and functions as the scientific foundation of recipe development. This research aims to increase awareness about the benefits of lotus stem and to change insights on the marketability and mass manufacture of products made from lotus stem. This research aims to add a new dimension to the organoleptic acceptability and health benefits of lotus stem in the field of food science and nutrition.

Acknowledgements

Myself Padma Srinivasan, student of Ramnarain Ruia College, Mumbai, while presenting this research paper acknowledge with gratitude to our Principal Dr. Suhas Pednekar for providing the best possible resources in the college. I am thankful to my guide Dr. (Mrs.) Jyoti D. Vora for being a constant source of inspiration, support and guidance for me and for providing the conducive atmosphere for research. Last but not the least, I would like to express my sincere thanks to all the faculty members- Mr. Prashant Masali, Mrs. Vidhi Shah, Ms. Sneha Pednekar and Ms. Aditi Patwardhan for their guidance and support. I would also like to thank the non-teaching staff-Mr. Mahesh, Mr. Jaysing, Mr. Sandesh and Mr. Trushal of our department for their patient and untiring help at all times.

References

- [1]. C.R. Kothari, Research Methodology Methods And Techniques- 2nd Edition (New Delhi, India; New Age International (P) Ltd. Publishers; ISBN 81-224-1522-9).
- [2]. Jyoti D Vora and Padma Srinivasan, Biochemical, Organoleptic and Anti-microbial assessment of Lotus stem (*Nelumbo nucifera*), International Journal of Food and Nutrition Sciences, Volume 4, Issue-3, April-June 2015, 63-67.
- [3]. Mukherjee D, Khatua TN, Venkatesh P, Saha BP, Mukherjee PK, Immunomodulatory potential of rhizome and seed extracts of *Nelumbo nucifera Gaertn.* Journal of Ethnopharmacology , March 2010 24; 128(2): 490-4. doi: 10.1016/j.jep.2010.01.015. Epub 2010 Jan 14.
- [4]. Yang D, Wang Q, Ke L, Jiang J, Ying T, Antioxidant activities of various extracts of lotus (*Nelumbo nucifera Gaertn*) rhizome, Asia Pacific Journal of Clinical Nutrition, 2007, 158-163.
- [5]. Sadashivam S, Manickam A, Biochemical Methods-3rd Edition (New Delhi, India; New age international (P) Ltd. Publishers. ISBN 81-224-0976-8).
- [6]. Jayaraman J, Laboratory manual in Biochemistry (New Delhi, India; New age international (P) Ltd. ISBN 85-226-0428-3),