

## **A survey study on acceptance of *spirulina*-based beverage mix over malted-health drinks**

**Swati S Gavimath\***

*Student*

*Department of Biotechnology, Basaveshwar Engineering College (Autonomous), Bagalkote, India*

**Dr. Sharada P\*\***

*Associate Professor, Department of Biotechnology, Basaveshwar Engineering College (Autonomous), Bagalkote, India*

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### **Abstract**

*The present study focuses on consumer's perception and acceptance on consuming spirulina-based beverage mix over malted health drinks. An online survey was conducted with set of questionnaires along with the description. Firstly on top brands of malted health drink mix and counter to that, new product developed i.e., spirulina based mix. In this survey, 250 people of all age and profession participated. Questionnaires contained questions like their choice of malted drink, reason to consume, factor influencing them to buy etc. In another section with respect to alternative spirulina based product questions were such as, awareness of spirulina related foods, acceptance rate, preference over other healthy powders, perception of buying/taste etc. Overall, respondents expressed positive feedback and wanted to buy and taste the new product developed.*

**Keywords:** malted-health drinks, spirulina, spirulina-based mix, survey, consumer behavior

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### **I. INTRODUCTION**

Decades ago inventions and advanced technology made possible the world for food innovations. Results of innovations are ready to drink, ready to serve, canned, packed food products loaded with high sugars, high sodium, high fat and food additives to keep them for long period of time. Additionally reduced physical activities of the people have led to serious health issues like obesity, diabetes, heart disorders, skin problems and so on [1].

Malnutrition is also a condition which is under-recognised and illtreated. Causes for the malnutrition are lack of nutrients in diet, decreased absorption in micro and macro nutrients, lack of social equality, lack of maternal care and poverty. The percentage of malnutrition: stunted growth, low weight for height, underweight according to NFHS- (2015-2016) are 35.5%, 19.3% and 32.1% respectively [2]. On the other side consumption of such kinds of food was from kids to late adults. Another fact is that people have also been trapped by marketing gimmicks of malted healthy drinks. India is the largest consumer of malted health drinks. Top brands like Horlicks, Bournvita, PediaSure, Complan etc have been formulated for all the age groups in different formulations. These are the products which children are supposed to have every single morning. Packaging of products displays "immune system", "strong bones", "strong muscles", "active brain" and so on this is nothing but a scam. But the ingredients say, it has 3 kinds of sugar- sucrose, maltodextrin and liquid glucose. Liquid glucose has a higher glycemic index than sugar. And also few claim that they have DHA, but why do children need high growth promoting packaged drinks that have the top 3 ingredients: milk solids, sugar again and edible fat? When the prime ingredients are high in calories, how can the product become healthy? For instance if the recommended size is 30-15 grams, it contains 8-10 grams of sugar. Unnecessarily incorporated acidity regulators (INS 502 (ii)), natural color (INS 150 (d)), stabilizers (INS 415, INS 340(ii)), emulsifier (INS 471), antioxidants (INS 304, INS 307). Constantly feeding individuals with such products is an ill-informed decision. Ultimately the unhealthy food products give rise to health implications such as heart disorders, cancer, obesity etc.

After COVID-19, people have become more cautious about their diet, mindfulness and physical activities. That has resulted in demand for healthy food products; one among them is protein products for adequate protein intake. Leading protein source was animal-based till 2021 which was from meat products, milk products especially whey and fish products. The problem with the whey protein is that it is derived from milk and milk is allergic to some individuals. Research findings reported that consumption of whey protein causes liver abrasion [3,4,5, 6], rise in oxidative stress [7], possibility of kidney disorders [8,9], anxiety, acne [10] and disruption of microbiota in gut [11]. So, consuming foods that are 100% natural and vegan instead of having

packaged malted health drinks is a right choice. Hence, Spirulina being one of the alternatives to animal protein and natural source is also a super food for the future loaded with all in one reservoir of nutrients.

### Health benefits of Spirulina(*Arthrospiraplatensis*)

A nutritional treasure - Spirulina [12]

- Reduces tiredness in individuals with chronic fatigue : By absorption of polysaccharides and fat by the body cells resulting in fullness of energy
- Anti-inflammatory : histamine component released from mast cells are suppressed by spirulina
- Powerful antioxidant : Phycocyanin content of spirulina suppresses the lipid peroxidation
- Antiviral activity : Calcium, Cyanovirin-N and Sulpholipids in spirulina suppresses the replication of viruses
- Immunity booster : Spirulina stimulates the lymphocyte cells
- Protects liver : Bioactive contents of spirulina such as vitamin E and ascorbic acid, omega 3 fatty acids, phenolic compounds help in hepatoprotection
- Helpful for anemic population
- Excellent prebiotic : helps to localize good gut microbiota in small intestine
- Good for eyes : Zeaxanthin helps in decreasing the possibility of cataract occurrence
- Helpful for anemic : Spirulina is found to increase complete blood count

## II. Review of literature

### Review of study on survey of acceptance of food product in consumers

Examining the reviews on survey studies provided key comprehension regarding the format for conducting a survey for a particular food product, framing attractive yet informative questionnaires, targeted respondent selection, platforms to conduct surveys and so on. Below are the few research articles examined to study the same. Questions included their favorite brand, tagline identification, factors influencing them to buy the same product repeatedly, family income, child's age/consumers age, reason behind drinking health drinks and so on. Survey results of which few are discussed here.

**Table 1: Review on survey studies of food products in consumers**

Sl No.	Product	Survey size	Survey purpose	Results	Author
1.	Bournvita, Milo, Horlicks, Complan, Boost	Population size - 150	To know the likings, insights, awareness and different buying reasons of customers towards malted health beverages	Bournvita was favored by 42% and 31% favored the taste for their major parameter in buying malted health drinks	Nipun <i>et al.</i> , (2020) [13]
2.	Complan, Amul (Pro), Boost, Horlicks, PediaSure, Milo	500 individuals	Studied preference over nutritional drinks in parganas of West Bengal in North side	Horlicks ranked high for its flavor, Complan for its nutrition, brand identity and PediaSure as their preferred product	Ranjan <i>et al.</i> ,(2020) [14]
3.	Maltova, Horlicks, Milo, Viva	Consumer size was 210 in PollachiTaluk of Tamil Nadu	To study the preference and consumer's understanding on health drinks	Preference of the brand went like this, Boost – 1, Horlicks – 2, Bournvita – 3 and the main factors influencing them to buy were Taste – 1, Quality – 2&Price - 3	Selvan <i>et al.</i> , (2018) [15]
4.	Complan, Boost, Bournvita, Horlicks	110 respondents	To identify likings of consumer's in malted health drinks and determine the key parameter to buy them	High preference (25%) was given to Horlicks and Boost	Ananthi (2018) [16]
5.	Horlicks, Boost,	57 participants	To identify influencing	Highest scored:	Tamilselvi&Kirubaharan

	Bournvita, Complan, Pediasure, Milo		factor, consumer behavior and their reliability on information	Horlicks for top brand, Bournvita for palatability, Bournvita for price aspect, Horlicks for packaging	(2011) [17]
6.	Horlicks, Bournvita, Complan, Pediasure	502 participants	To know percentage of people consuming MBHD	97.4% of people reported consumed MBHD in past & 74.3% of people currently consuming MBHD	Nilamadhab <i>et al.</i> , (2022) [18]
7.	Horlicks, Bournvita, Complan, Maltova, Viva, Milo, Boost	200 consumers	To know brand preference & awareness on MBHD	Taste scored for influencing factor	Angayarkanniet <i>al.</i> , (2019) [19]
8.	Horlicks, Boost, Cadbury's Bournvita, Complan, Nestle'sMilo	100 respondents	To study preference on brand, loyalty on brand, influencing factor & awareness of MBHD	Brand preference: Bournvita followed by Horlicks Brand loyalty: Horlicks	Dharmesh&Khushbu (2012) [20]
9.	Horlicks, Boost &Complan	150 people	To know the rate of satisfaction on health drinks	65% of people have purchased and are satisfied with Horlicks	Mubarak &Hadi (2014) [21]
10.	Consumer satisfaction on Boost	130 sample size	To identify percentage of consumer satisfaction on Boost	High scores on satisfaction were on Boost (82%)	Kalaivani (2021) [22]

\*Malted-based health drinks -MBHD

From the review study, there were few outcomes noticed. Horlicks, Bournvita and Boost were most preferred by the consumers. Taste was their main factor of buying the product followed by quality, price and branding.

### III. Methodology

For survey to perform, online platform "Google forms" was used. Few of the personal details were asked such as, name, gender, age and profession. A description on demerits of malted health drinks was mentioned along with pictures (figure 1, 2 & 3). Followed by the set of questions related to health drinks and accordingly suitable options were also provided. The link to the survey was shared in platforms like LinkedIn, WhatsApp groups, Facebook, Twitter and Instagram so that people from different place and profession can participate.

#### Section 1: Malted-health drinks

**Description:**In this era of ultra-modern days, people are fond of consuming nutritionally valued health drinks. Some to get daily intake of nutrients and some have it as refreshment. But, marketed malted health drinks of top brands have more carbohydrates (more calories), chemical additives, artificial flavors, artificial nutrients like synthetic vitamins and minerals, preservatives and some lack in claimed content like DHA.

### Nutritional facts of commercial products (Per 100g)



Figure1 & 2: Comparison of nutritional facts of malted-health drinks & Synthetic

#### Questions:

1. Which of the malted health drinks do you usually buy?
2. Which factor influences you to pick the above selected malted drink?
3. How occasionally do you consume malted health drinks?
4. For what purpose do you consume malted health drinks?
5. Are you aware of the nutrition provided by health drinks?
6. Which nutritional content do you prefer to be present in a high percentage in health drinks?
7. Do you desire to have a substitution for malted health drinks?

#### Section 2: Spirulina-based mix

**Description:** As a replacement for malt beverage mix and whey protein as well, an attempt has been made to develop and formulate "SPIRULICIOUS", spirulina based maltless healthy and nutritious 100% vegan beverage mix. The product has chocolate flavor and natural zero calorie sweetener with other ingredients. Mixed with dairy milk or plant-based milk namely coconut milk, almond milk.



Figure 3: Nutritional content of "Spirulicious" (spirulina-based mix)

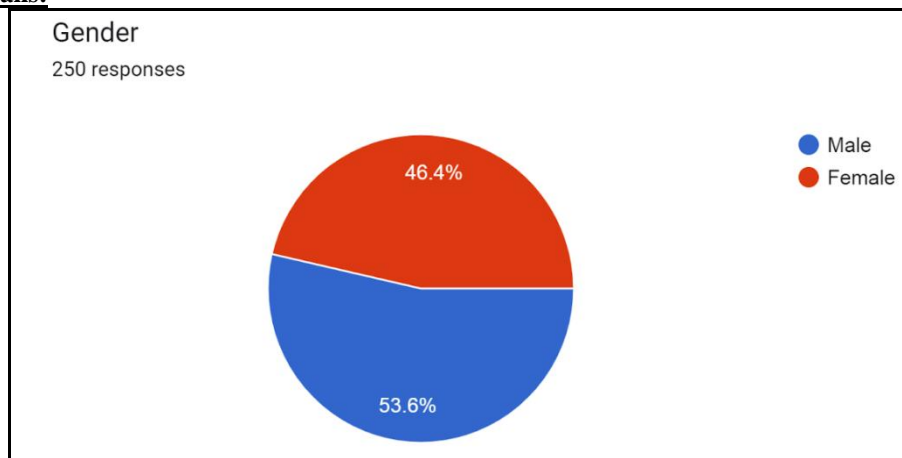
**Questions:**

1. Do you know about spirulina?
2. Have you ever tasted spirulina(capsules/tablets) or spirulina based food products
3. If yes, which product you have tried and how was your experience?
4. Do you think my product is healthy yet tasty?
5. How much would you rate my product innovation?
6. How much would you like to taste my product?
7. How likely are you to buy my product?

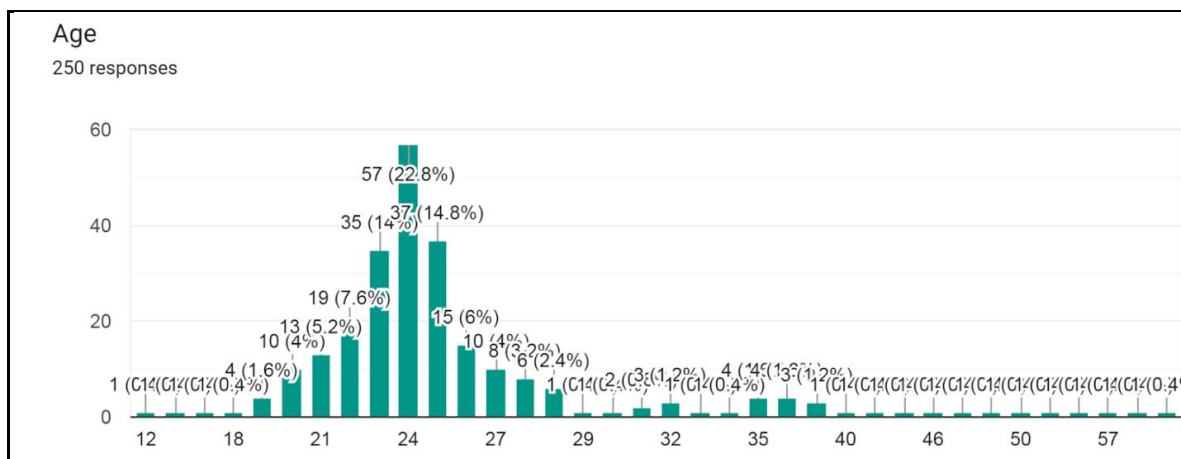
**III. Results and discussion**

Online googleplatform used for the survey resulted in a response of about 250 in number. Responses obtained have been represented graphically below. Among the total respondents age group range was from 12 to 60. Personal details and questions asked, their response along with graphs presented below.

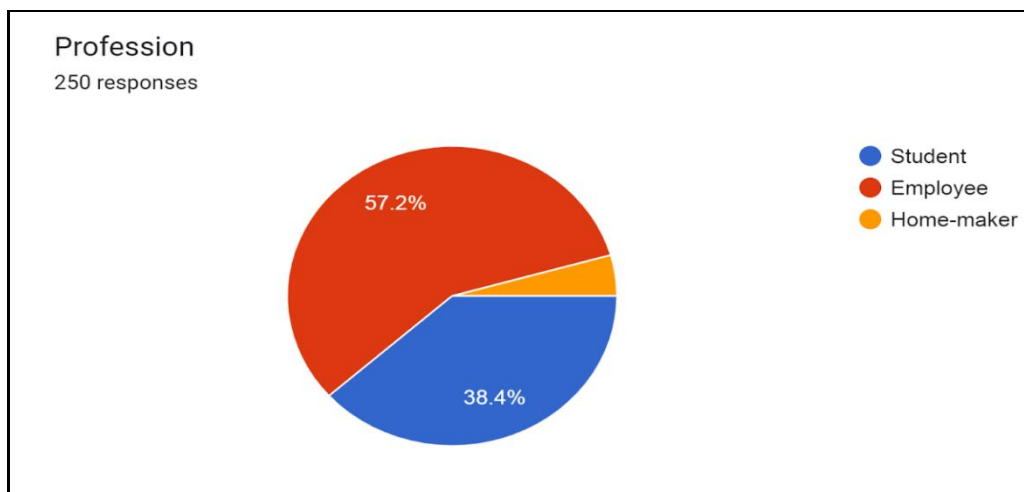
**Personal details:**



**Figure 4: Gender of respondents**

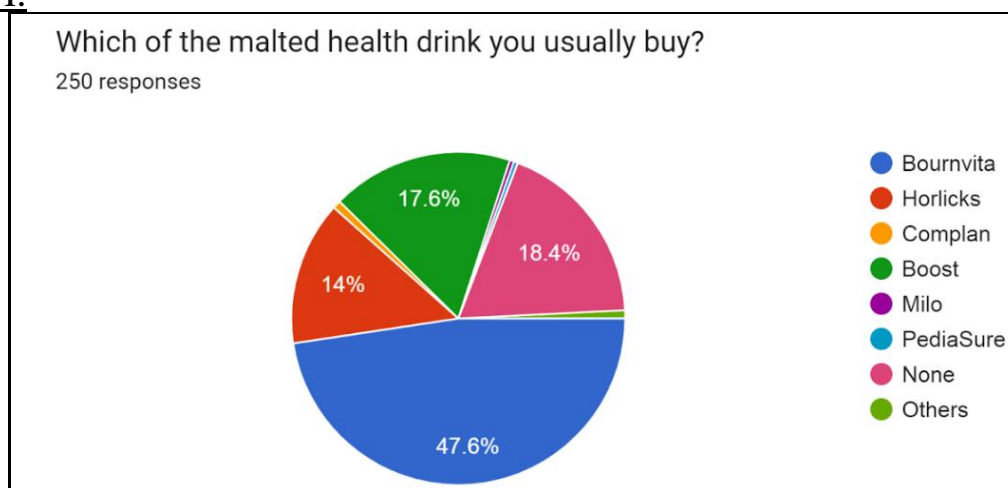


**Figure 5: Age of respondents**

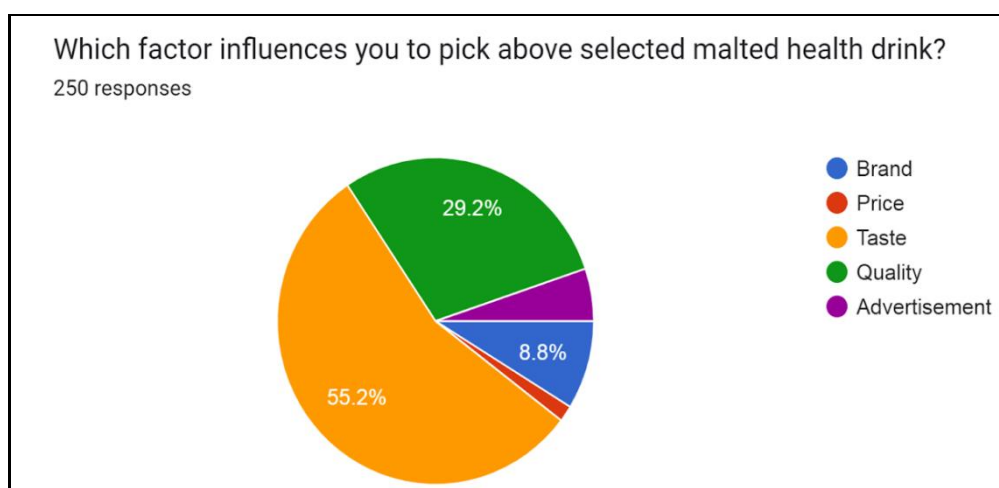


**Figure 6: Profession of respondents**

**Section 1:**

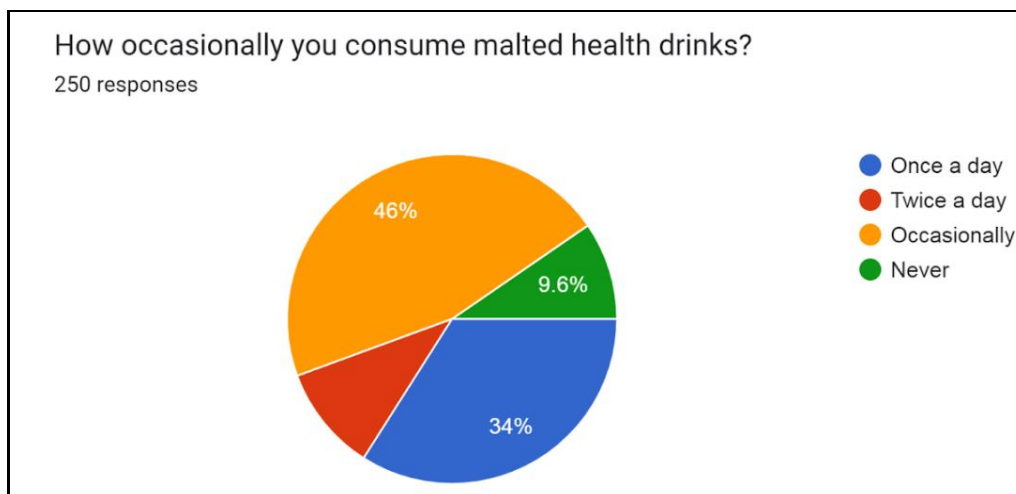


**Figure 7: Response for usually purchased malted health drink mix**

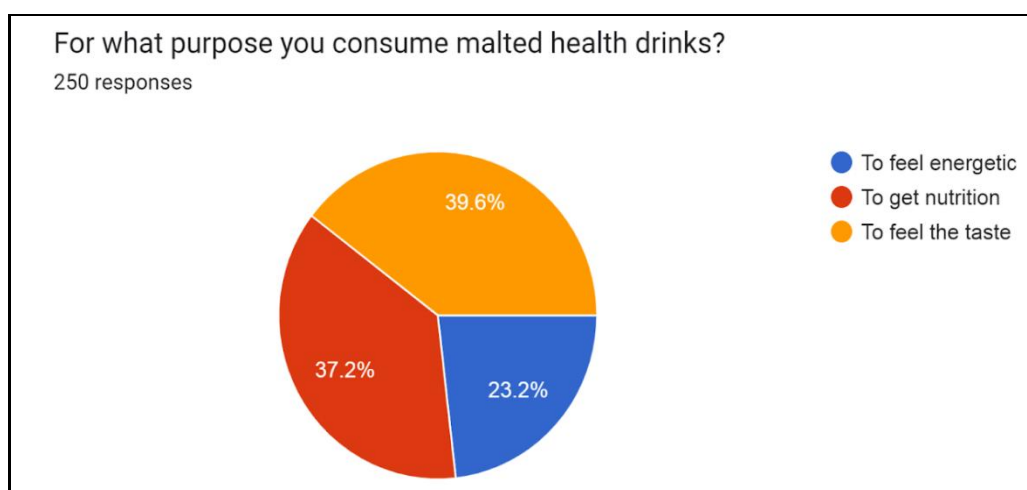


**Figure 8: Response for factor influencing in purchasing malted health drink mix**

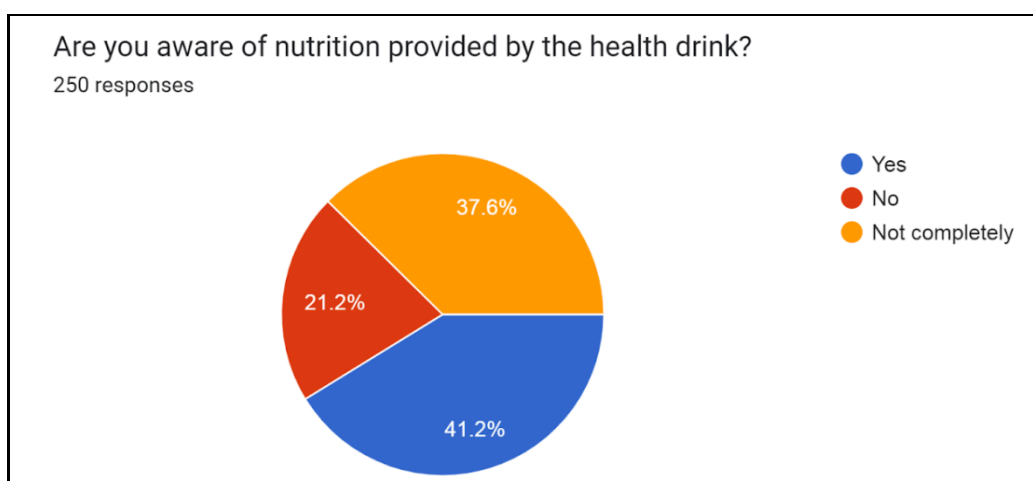




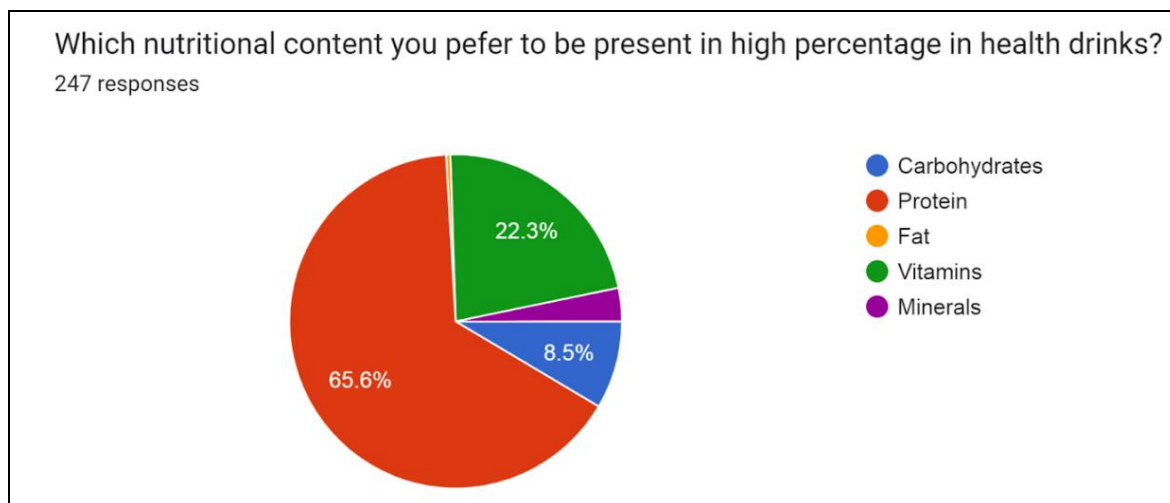
**Figure 9: Response for consumption of malted health drink mix**



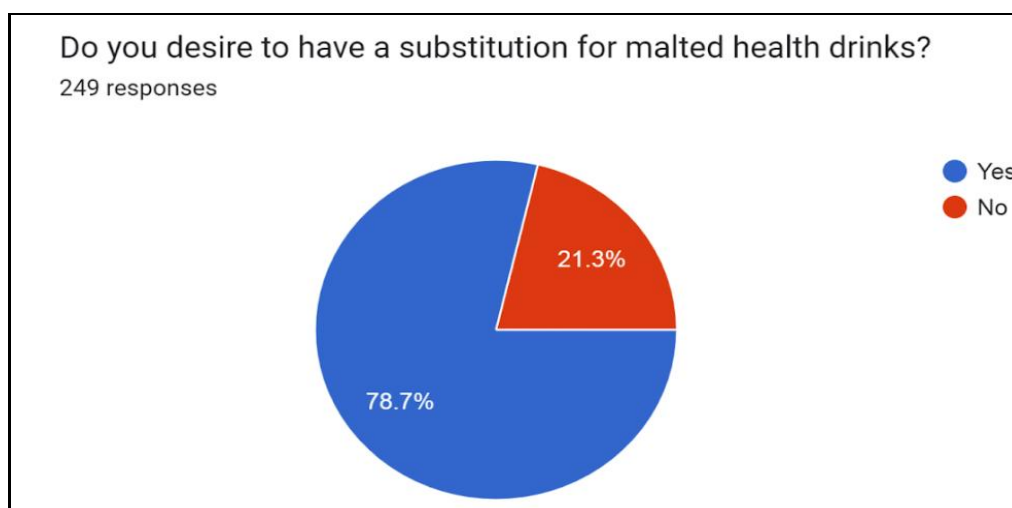
**Figure 10: Response for purpose for consuming malted health drink mix**



**Figure 11: Response for awareness on nutrition provided by malted health drink mix**

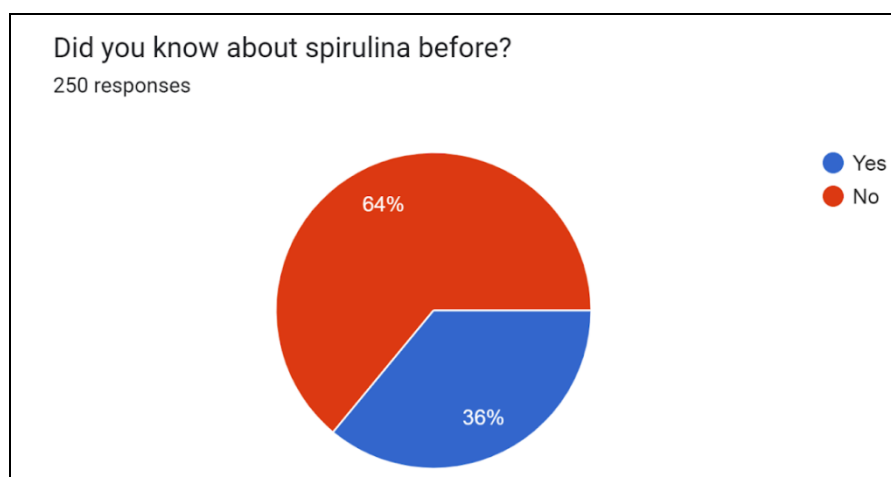


**Figure 12: Response for preferred nutrition in malted health drink mix**



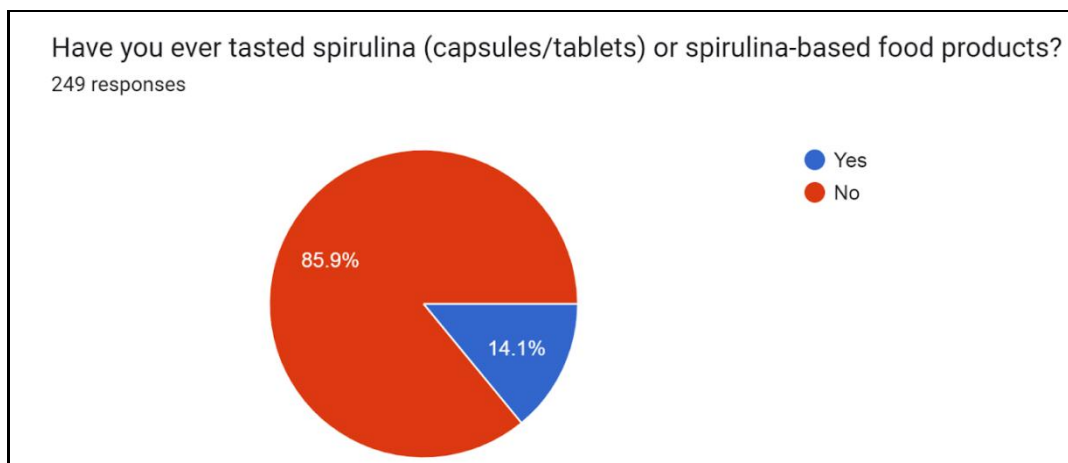
**Figure 13: Response for substitution for malted health drink mix**

## **Section 2**

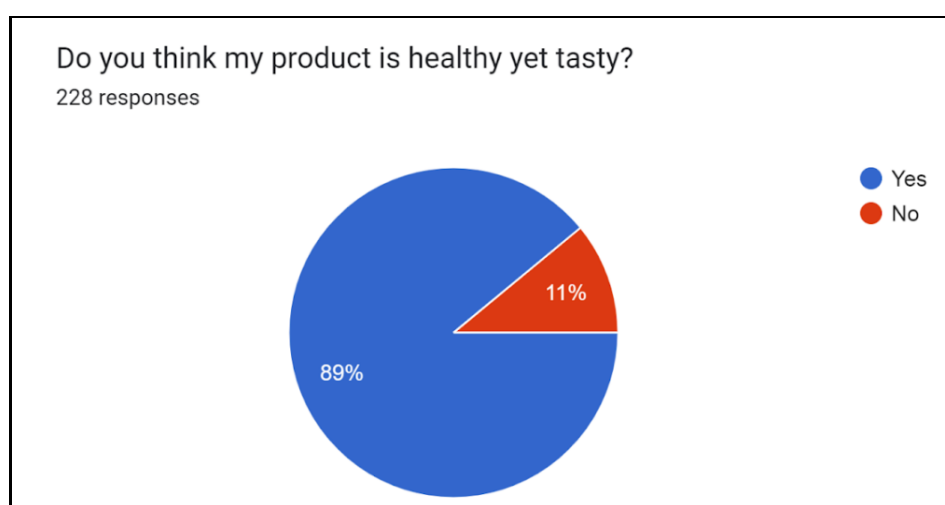


**Figure 14: Response for whether they knew spirulina before**

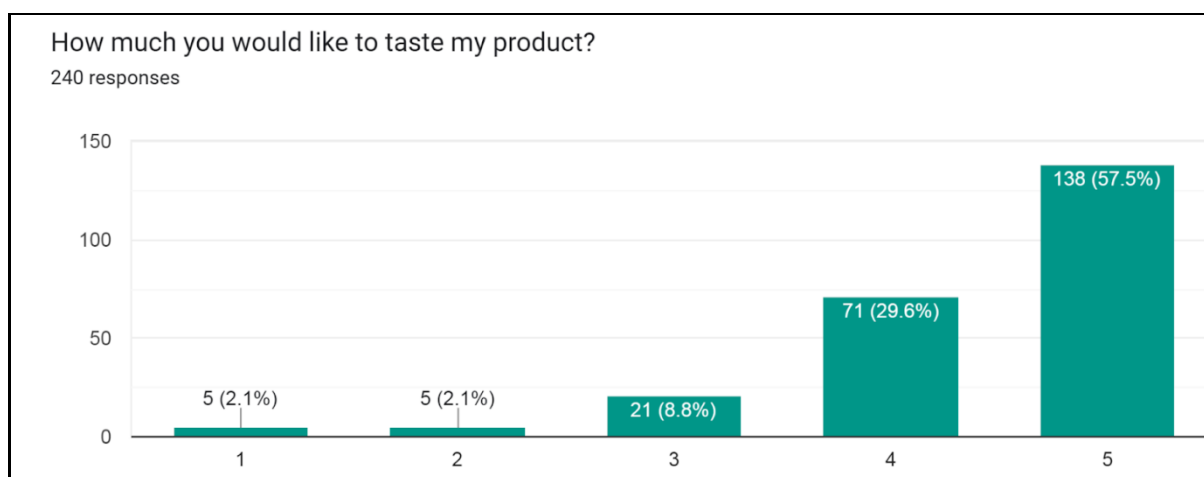




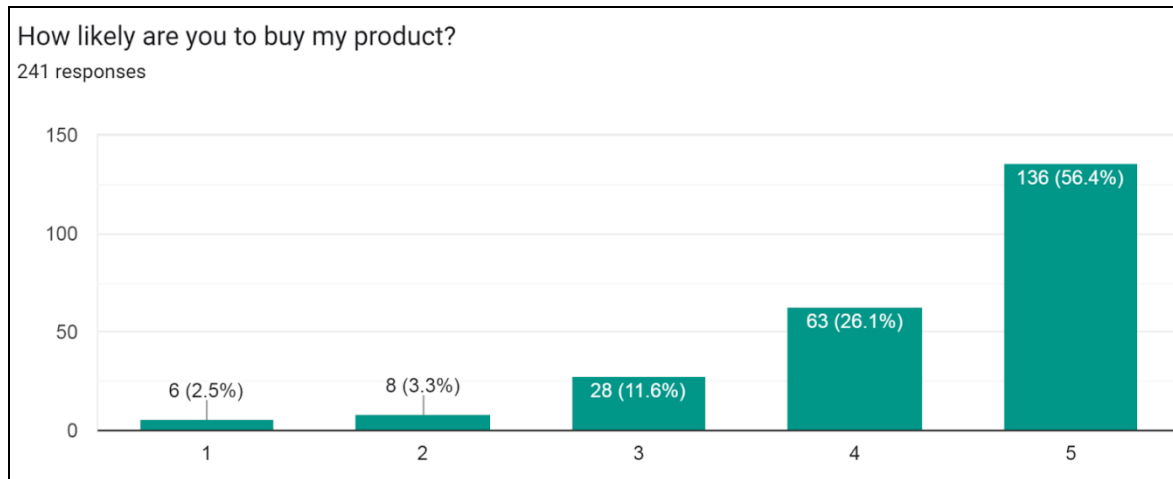
**Figure 15: Response for whether they tasted spirulina or spirulina-based foods before**



**Figure 16: Response for whether they think newly developed product is healthy yet tasty**



**Figure 17: Response for whether they liked to taste my product**



**Figure 18: Response for whether they liked to buy my product**

Respondents also mentioned their perceptual reviews and suggestions in comments. Few of them are, as follows:

- One respondent suggested that product need to be high in essential amino acids and need to be too low in carbohydrates and fat content
- One wanted no fishy odor to be present in the product
- Many wanted to taste the product
- Very few do not wanted to try the product

Overviews of the online survey: 46.4% of respondents were male & 53.6% were females. Age between 12-60 participated in a survey where 57 (22.8%) of respondents were of age 24. The 20s age is the phase where people tend to realize the importance of fitness and good health. They tend to work out or go to the gym. Also are excited to try out new nutritional food products and supplements. Out of 250 respondents, 57.2% were employees, 38.4% were students and the remaining 4.4% were home makers. In the survey, the majority of people consume Bournvita because they believe that it is rich in taste, reasonable and chocolaty. This study states that people go for the “taste” factor that influences them to buy again and again. Majority of the people consume such drinks occasionally. But, if it is protein powder they consume it once in a day or twice and is the major nutritional component people are focused on. Protein such as whey protein powders is costly and has their demerits and hence many people want a substitution. Many consume it to feel energetic and get nutrition. Almost a similar percentage of people know the national facts and do not know completely. If an individual is health conscious or science professions they might be having an idea and a practice of looking at the displays of products. Most of the respondents in the survey were unaware about what spirulina was. Very few were aware and had tasted the products based on spirulina. Looking at the nutritional value of the new product and based on the perception, people found it was healthy and tasty which made more than 50% of respondents to taste and buy the product. A good impression on the new product was supported by the online survey.

#### **IV. Conclusion**

The present study attempted to focus on consumer’s behavior towards malted health drinks. The survey indicated that in the consumer is the ruler in commercial market. Consumers of various pay bunches rated the different wellbeing drinks likewise. From survey, it was reported that factor influencing them to buy such products, major concern for their consumption and many more things which were used for improvement in newly developed spirulina-based beverage mix. In the second part of the survey, most of the people were aware of spirulina but had not tasted the food products much. The response for acceptance of the newly developed product was in good number. Respondents by looking at the nutritional facts felt the product developed was healthy and tasty. They liked to consume it over malted health drinks and why protein powders. Overall, survey provided positive feedback on the spirulina-based beverage mix and paid way to its acceptance if it gets marketed.

#### **References**

- [1]. Popkin Barry M, Adair Linda S, Ng Shu Wen Ng, “NOW AND THEN: The Global Nutrition Transition: The Pandemic of Obesity in Developing Countries: Nutrients, vol 58 (1):3–21, 2017
- [2]. [www.pib.gov.in](http://www.pib.gov.in). Visited on 1 september 2022
- [3]. Kerry N Whitt, Stephen C Ward, Kemal Deniz, Lawrence Liu, Joseph A Odin, Lihui Qin, “Cholestatic liver injury associated with whey protein and creatine supplements”, Seminars in liver disease, vol 28(2): 226-231, 2008

- [4]. Gorgen S G, Yucel A T, Karakus A C, Cecen D, Ozen D, Kocturk S, "Usage of whey protein may cause liver damage via inflammatory and apoptotic responses", *Human and Experimental Toxicology*, vol 34(7): 769-779, 2015
- [5]. Ramiro Nunes, Priscila Silva, JadsonAlves, Giuseppe Stefani, Marcelo Petry, Claudia Rhoden, Pedro Dal Lago, Claudia Dornelles Schneider, "Effects of resistance training associated with whey protein supplementation on liver and kidney biomarkers in rats," *Applied Physiology, Nutrition and Metabolism*, vol 38(11): 1166-1169, 2013
- [6]. Deminice, Rafael, Hugo Comparotto, and AlceuAfonsoJordao, "Whey protein supplementation increases methionine intake but not homocysteine plasma concentration in rats", *Applied Physiology, Nutrition, and Metabolism*, vol 40(1): 46-50, 2015
- [7]. Virginia A Aparicio, Elena Nebot, Jesus M Porres, Francisco B Ortega, Jose M Heredia, Maria Lopez-Jurado, PilarAranda Ramirez, "Effects of high-whey-protein intake and resistance training on renal, bone and metabolic parameters in rats", *British Journal of Nutrition*, vol 105(6): 836-845, 2011
- [8]. Hattori, CamilaMithie, Hans-Goran Tiselius, ItaPfefermanHeilberg, "Whey protein and albumin effects upon urinary risk factors for stone formation", *Urolithiasis*, vol 45(5): 421-428, 2017
- [9]. Santos, Joao Francisco Severo, Felipe Henrique Santana Maciel, DanieMenegetti, "Consumption of protein supplements and anger expression in body builders", *Revista da EducacaoFisica/UEM* 22: 623-635, 2011
- [10]. Thais de Carvalho Pontes, Gilson Mauro Costa FernandesFilho, Arthur de Sousa Pereira Trindade, JaderFreireSobralFilho, "Incidence of acne vulgaris in young adult users of protein-calorie supplements in the city of Joao Pessoa-PB", *AnaisBrasileiros de Dermatologia*, vol 88: 907-912, 2013
- [11]. Diego Moreno-Perez, Carlo Bressa, Maria Bailen, SafaHamed-Bousdar, Fernando Naclerio, Manuel Carmona, Margarita Perez, Rocio Gonzalez-Soltero, Maria GregoriaMontalvo-Lominchar, Claudia Carabana, Mar Larrosa, "Effect of a protein supplement on the gut microbiota of endurance athletes: A randomized, controlled, double-blind pilot study", *Nutrients*, vol 10(3): 33-44, 2018
- [12]. Saadaoui I, Rasheed R, Aguilar A, Cherif M, Al Jabri H, Sayadi S, Manning S R, "Microalgal-based feed: promising alternative feedstocks for livestock and poultry production," *Journal of Animal Science and Biotechnology*, vol 12(1): 1-15, 2021
- [13]. Nipunsharma, SyedaShaziaBukhari, "Consumer buying Pattern-A study on Malted Health Drinks," *International Journal of Research and Analytical Reviews (IJRAR)*, vol 7(1): 934-938, 2020
- [14]. Gupta Ranjan Kumar, Debdip Khan, PapitaGhosh, "A study on the customer's perception of different children's health drinks," *South Asian Journal of Marketing & Management Research*, vol 10(9): 29-39, 2020
- [15]. Selvan M, Chithirai, M Sobika, "Consumer's awareness and preference towards selected health drinks," *International Journal of Multidisciplinary Research and Modern Education*, vol 4(1): 2454 – 2462, 2018
- [16]. Ananthi N, "A Study on Consumer Behavior towards Malt-Based Health Drinks in Madurai City," *Multidisciplinary Global Journal of Academic Research*, vol 5(3): 35-43, 2018
- [17]. Tamilselvi J and M Kirubakaran, "A study on consumer preference towards health food drinks in Trichy city", *Cauvery Research Journal*, 2011, vol4(2): 6-13.
- [18]. Aangayarkanni R, "Consumer preference of health drinks users at Perambalur town – A study" *Scholar: National School of Leadership*, 2019, vol8(21).
- [19]. MotwaniDharmesh, and KhushbuAgarwal, "Customers' behavior in health food drink product category", *Pacific Business Review International*, 2012, vol 5(1): 78-84.
- [20]. Kalaivani M, "Consumer Satisfaction Study towards Boost with Special Reference to Chennai City", *RevistaGentec-GestaoTechnologies*, 2021, vol 11(2): 1933-1940.
- [21]. Ali E Mubarak and G Hadi Mohamed, "Consumer satisfaction towards selected health drinks in Tiruchirappalli town", *International Journal of Management*, 2015, vol 6(1): 226-232.
- [22]. NilamadhabMohanty, PurnaSinha, SakshiNath, "Factors Influencing the Consumption of Malt based Health Drinks among Indian Consumers: An Application of the behavioral Reasoning Theory", *Academy of Marketing Studies Journal*, 2022, vol 26(2):1-19.