International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Preparation and Characterization of Nutraceutical Drink

Prerana Sahu[1], Gagan Sahu[1], Harish Sharma[2], Gyanesh Kumar Sahu[2]

[1]Rungta Institute of Pharmaceutical Sciences
[2]Rungta Institute of Pharmaceutical Sciences and Research

***Corresponding Author- Dr. Gyanesh Kumar Sahu**
Dean, Rungta Institute of Pharmaceutical Sciences and Research

Abstract:
A nutraceutical, a portmanteau of the words "nutrition" and "pharmaceutical", is a food or food product that provides health and therapeutic benefits, including the prevention and treatment of disease. Nutraceuticals are medicinal foods that play a role in manage wellbeing, enhancing health, modulate immunity and thereby preventing as well as treating specific illness. Established nutritional functions, such as vitamins, minerals, amino acids and fatty acids – Nutrients. Cinnamon, Aswagandha, Brahmi as drugs main ingredients used in the nutraceuticals. This nutraceutical is the various prevention of diseases. Nutraceutical are powerful medicinal and pure herbal the drugs. Therefore, nutraceuticals may be used to improve health, prevent chronic diseases, postpone the aging process, and in turn increase life expectancy, or just support the functions and integrity of the body. Physiological benefit or provides protection against chronic disease. Emphasis has been made to present herbal nutraceuticals effective on hard curative disorders related to oxidative stress including allergy, alzheimer, cardiovascular, cancer, diabetes, eye, immune, inflammatory and Parkinson's diseases as well as obesity.

Keywords: Antioxidants, prevention of disease, nutraceuticals, food supplementary, memory booster.

1. INTRODUCTION

1.1 Nutraceuticals

The quality of life in terms of income, spend and lifestyle has developed with profitable development, major challenge in the form of way life diseases'. The first victim of this lifestyle change has been food routine, utilization of junk food has increased multiple, which has led to a character of diseases related to nutritional want. [1]

I put forward to revisit functional foods and nutraceuticals. When food is being cooked or prepared using "scientific brainpower " with or without expertise of how or why it is being used, the is called "functional food."[2]

According to the Acharya Charak, a diet should be absorb which, besides providing the basic nutrition to the body, can also help to continue the healthy state of the body and prevents the incident of diseases. Pharmaceuticals substance usually are made of one single substance, being this the main difference from nutraceuticals, which are made of a basin of substances.[3] Foods and nutrients play a crucial role in normal

functioning of the body. They are helpful in manage the health of the separate and in reducing the risk of various diseases. Nutraceuticals are medicinal foods that play a role in manage wellbeing, enhancing health, modulate immunity and thereby preventing as well as treating specific illness. Thus the field of nutraceuticals can be envisioning as one of the missing blocks in the health welfare of an individual. It has been carefully proved and supported by various research articles that nutraceuticals are effective to treat and prevent various disease state. [4]

Nutraceuticals may range from isolated nutrients, herbal products, dietary supplements and diets to genetically engineered "designer" foods and processed products such as cereals, soups and beverages. Doubtlessly, many of these products possess pertinent physiological functions and valuable biological activities. [5] The demands of natural bioactive compounds with health-promoting and disease-preventing benefits have gained much attention recently from the scientific community and food industry. However, the biological efficacies of nutraceuticals are considerably compromised by their low bioavailability, which arises from various factors such as insufficient gastric residence time, poor permeability and/or solubility within the gut, susceptibility to physical conditions encountered in food processing (heat, oxygen light), and instability to changing physiological environments in the gastrointestinal (GI) tract (pH, enzymes, presence of other nutraceuticals. [6]

1.2 Categories of Nutraceuticals

Nutraceuticals are non-specific biological therapies used to promote wellness, prevent malignant processes and control symptoms. These can be grouped into the following three broad categories:

i. The substances with established nutritional functions, such as vitamins, minerals, amino acids and fatty acids – Nutrients.

ii. The herbs products as concentrates and extracts – Herbals.

iii. The reagents derived from other sources (e.g. pyruvate, chondroitin sulphate, steroid hormone precursors) serving specific functions, such as sports nutrition, weight-loss supplements and meal replacements – Dietary supplements. [7]

2. MATERIALS AND METHOD:

i. Collection of sample.
ii. Moisture content.
iii. Protein content.
iv. Fat content.
v. Fiber content.
vi. Ash content.
vii. Nitrogen free extract.
viii. Minerals content.
ix. Vitamin content.
x. Bioactive compound.[8]

Total Antioxidant Capacity Test: The total antioxidant capacity test (Blois, 1958) was achieving using vitamin C as the qualified standard. Using a spectrophotometer, the total antioxidant capacity test was determined.

Statistical Analysis: Data attained from each parameter was subjected to statistically analyzed using SPSS 25-version. [9]

Materials: There are the following ownership of drugs (Ashwagandha, Cinnamon, Brahmi) there are different flavoring agent will be used (Orange pill) through the extract, and coconut sugar are used in bitter taste to remove. [10]

Table: 1.1 Crude Drug

S/ No.	Drugs	Characteristics
1.	Cinnamon (C)	Brown colour and warm sweet flavour
2.	Ashwagandha (A)	Bodys resilience to stress
3.	Brahmi (B)	Intellect promoter hypotensive sedative drug
4.	Orange Pill	Flavouring agent
5.	Coconut Sugar	sugar

(a) (b) (c)

Fig.1.1: (a) (b) (c) Ingredients of Nutraceutical

Table: 1.2 List of nutraceuticals with health benefits

Nutraceuticals/ Dietary Supplements	Nutrients	Health Benefits
Water Soluble Vitamins	Vitamin C	Wound healing, Antioxidant
	Vitamin B1	Carbohydrate metabolism, Neurological function
	Vitamin B2	Energy metabolism,
	Vitamin B3	Brain function
	Vitamin B6	Convert proteins to energy
	Vitamin B12	Metabolism of fat, protein and carbohydrate
	Folic acid	Formation of RBC's, Formation of genetic material of cells

	Pantothenic acid	Intraneuronal synthesis of acetylcholine Synthesis of cholesterol, steroids
Fat Soluble Vitamins	Vitamin A	Cancer, Skin disorder
	Vitamin D	Absorption of calcium, Formation of bones and teeth
	Vitamin E	Boost immune system
	Vitamin K	Blood clotting
Minerals	Calcium	Maintaining bone strength
	Iron	Oxygen transport, Energy production
	Magnesium	Healthy nerve and muscle function and bone function
	Phosphorus	Phosphorylation process
	Copper	Heart functioning, Iron absorption
	Iodine	Functioning of thyroid gland
	Chromium	Diabetes
	Selenium	Antioxidant
	Zinc	Sperm production
Herbals	Aloe vera	Anti-inflammatory
	Evening primrose oil	Treatment of atopic eczema
	Garlic	Anti-bacterial, Anti-fungal
	Ginger	Carminative, Anti-emetic

Cinnamon is commonly known as "Dalcini".The cinnamon name comes from a Greek word meaning sweet wood. Cinnamon is a member of the family Lauraceae. The cinnamon bark has been use as a spice and as a sweet as well as saltiodour from antiquity. Botanical name Cinnamomum is derived as of the Hebrew as well as Arabic words amomon, meaning spice plant. Worldwide, there are about 250 species of the Lauraceae family of Cinnamomum; however, only a small number of varieties of Cinnamomum are grown for commercial purposes.[14]

Ashwagandha (Withania somnifarum, fam. Solanaceae) is commonly known as “Indian Winter cherry” or “Indian Ginseng”. It is one of the most important herb of Ayurveda (the traditional system of medicine in India) used for millennia as a Rasayana for its wide ranging health benefits. Rasayana is described as an herbal or metallic preparation that promotes a youthful state of physical and mental health and expands happiness.[15] Ashwagandha is commonly available as a churna, a fine sieved powder that can be mixed with water. It enhances the function of the brain and nervous system and improves the memory. It improves the

function of the reproductive system promote a healthy sexual and reproductive balance. Being a powerful adaptogen, it enhances the body's flexibility to stress. Ashwagandha improves the body's protection against disease by improving the cell-mediated immunity. It also own potent antioxidant properties that help protect against cellular damage begin by free radicals. [16]

Brahmi: Fruiting of Brahmi occurs simultaneously with flowering. The flowers are solitary, axillary, white or purple-tinged, with short trunk and two bracteoles. Sepals are five in number, 0.4–0.9 cm long. Corolla tube is cylindrical with spreading lips, twice as long as sepals. Capsule is ovoid in shape, acute, two-grooved and two–valved with numerous seeds that are very minute, pale, and irregular. [17]

Role of Cinnamon:

i. Contain powerful medicinal properties.
ii. May have anti-inflammatory properties.
iii. Could protect against heart disease.
iv. Loaded with antioxidants.
v. Could improve sensitivity to insulin.
vi. Helps lower blood sugar levels.
vii. May prevent bacterial and fungal infections.
viii. May prevent bacterial and fungal infection.[18]

Role of Ashwagandha:

i. May help reduce stress and anxiety.
ii. May reduce blood sugar levels.
iii. Enhances conjective function.
iv. Improves Cardiac Health.
v. Reduces Inflammation and Pain.
vi. Supports Immunity.
vii. improve brain function including memory.
viii. Increase muscle and strength.[19]

Role of Brahmi:

i. Memory boster.
ii. May help reduce ADHD symptoms.
iii. May prevent anxiety and stress.
iv. May have anticancer properties.
v. Treatment of insomnia.
vi. Powerful antioxidant.[20]

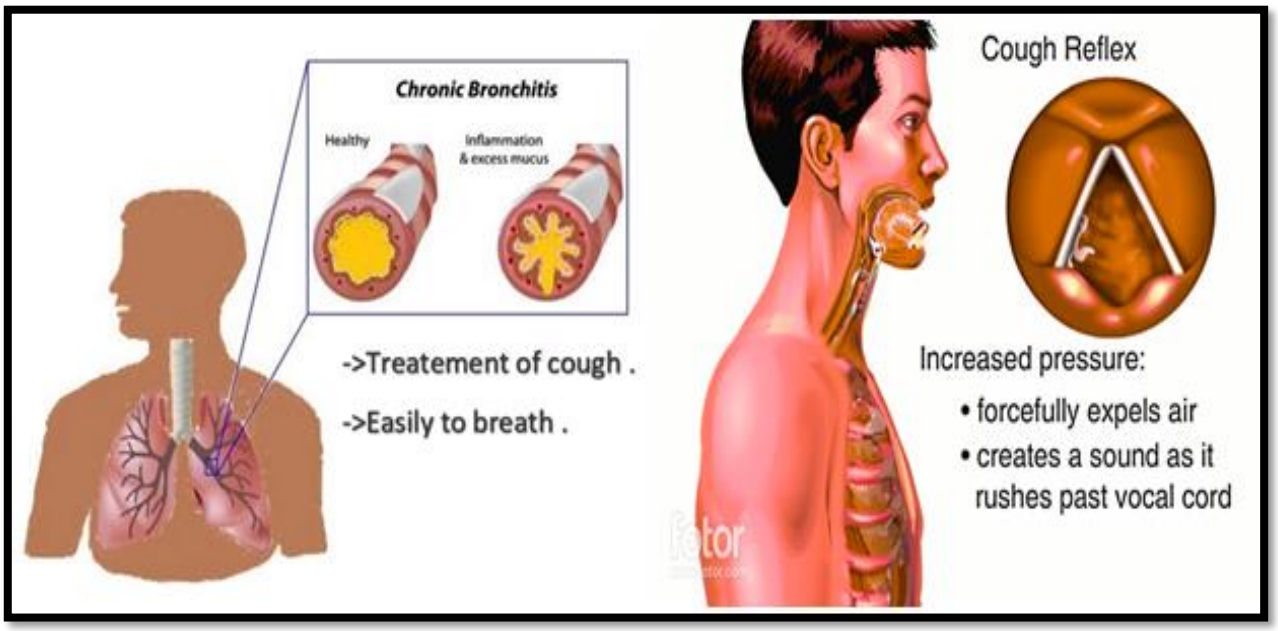

Fig.1.2: Role of Nutraceutical in Prevention Diseases.

Table 1.3: Various formulations of neutraceutical drink

S.No.	Ingredient	F1	F2	F3
1.	Cinnamon	0.10 gm	0.05 gm	0.15 gm
2.	Aswagandha	1 gm	1 gm	1 gm
3.	Brahmi	1.5 gm	1.5 gm	1.5 gm
4.	Orange Pill	0.20 gm	0.25 gm	0.20 gm
5.	Coconut Sugar	0.20 gm	0.20 gm	0.15 gm

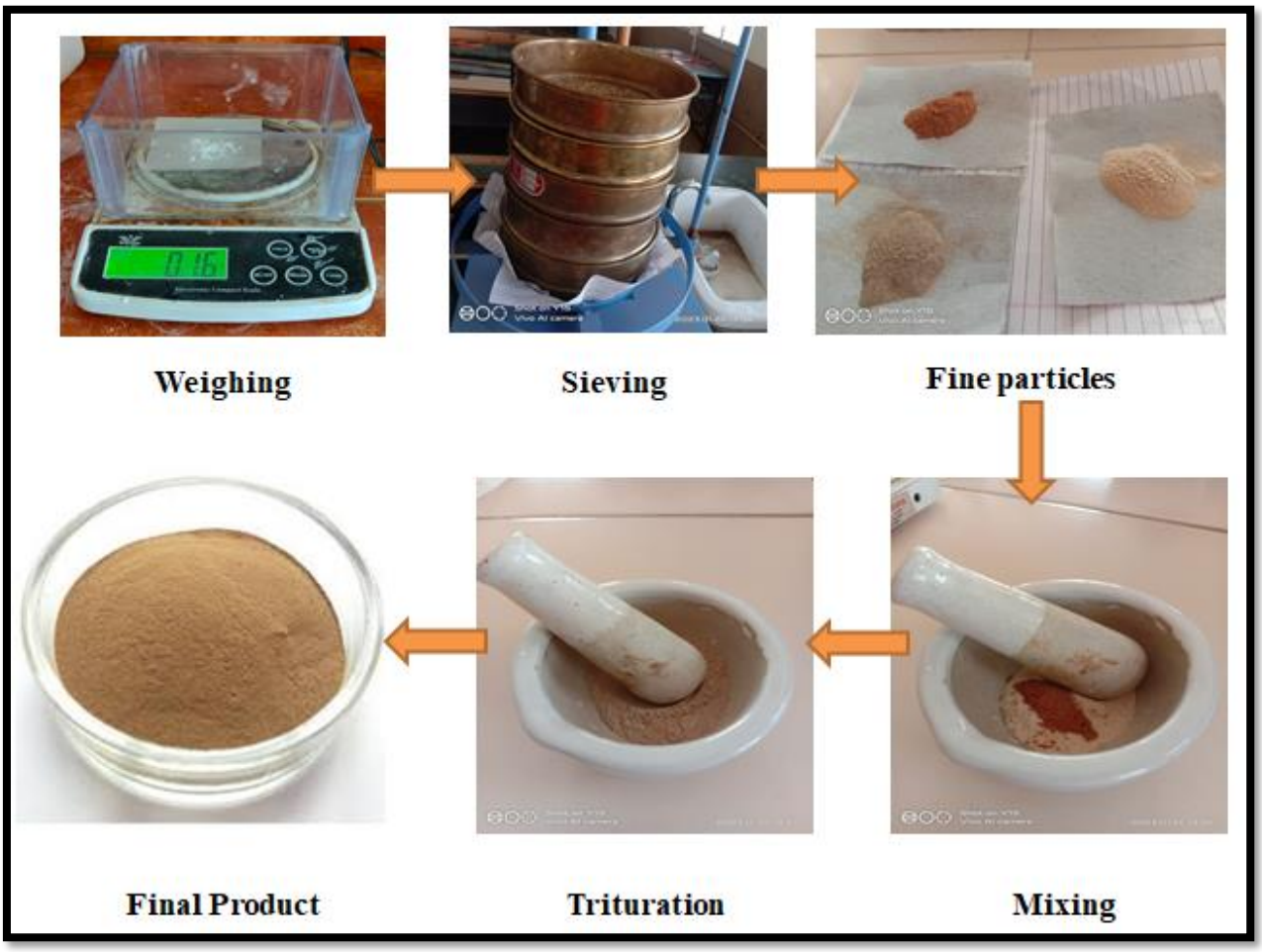

Fig 1.3: Formulation of neutraceutical

3. CHARACTRIZATION:

i. Particle size and shape determination: Particle characterization technology is essential for optimizing powders and ensuring consistent, high quality production. Particle size is a key property, but there is widespread recognition that particle shape also has an important role to play; finer particles are advantageous from the perspective of packing behavior, but are typically associated with poor flowability, which can compromise processing efficiency. Controlling particle shape can help to alleviate this problem. In this article, the impact of particle size and shape on metal powder performance is considered, highlighting the value of automated imaging in quantifying particle shape. Case study data illustrates what can be measured and the insight gained. [21]

ii. Surface Area: Total surface area available in a powder sample is a function of both its particle size and porosity. Particle size is relatively easier to measure and compare among different powders. Porosity of the particles refers to air-filled solvent accessible channels inside particles. Thus, porosity contributes to the surface area of the particles without impacting particle size or shape. A higher porosity particle of the same size and shape as a lower porosity particle will have greater surface area. The rate of disintegration and drug dissolution from granules depends on the penetration of the dissolution medium inside the granules, which is determined by the porosity of the granules. [22]

iii. Density: Determination of Bulk and Tapped Densities is a method to determine the bulk densities of powdered drugs under loose and tapped packing conditions respectively. Loose packing is defined as the state

obtained by pouring a powder sample into a vessel without any consolidation, and tapped packing is defined as the state obtained when the vessel containing the powder sample is to be repeatedly dropped a specified distance at a constant drop rate until the apparent volume of sample in the vessel becomes almost constant. [23]

iv. Flow properties: Some of the most commonly applied methods to measure the flow of powders include: density indices, such as the Carr index and Hausner ratio, powder avalanching, the angle of repose (AOR), flow through an orifice, powder rheometry and shear cell testing.

v. Moisture content: The amount of water is determined by subtracting the dry weight from the initial weight, and the moisture content is then calculated as the amount of water divided by the dry weight or total weight, depending on the reporting method.

vi. Percentage fines: To measure the particle size distribution of fine powder, a laboratory sieving instrument called an Air Jet Sieve can be used. HMK-200 Air Jet Sieve has been commonly used to sieve and classify powder-like materials, particularly in the pharmaceutical industry, among other areas.

4. RESULTS AND DISCUSSION:

The results of various parameters of neutraceutical drink are given in table 1.4.

Table 1.4: Evaluation parameters of various neutraceutical formulations

S.No.	Parameters	F1	F2	F3
1	Surface Area	49.5	54	53.1
2	Density (g/cm^3)	4.85	4.80	4.81
3	Flow properties	1.12	1.19	1.25
4	Moisture content	3.44 %	5.6 %	4.8 %
5	Percentage fines	95	117	12
6	Particle size and shape determination	11.26 µm- 11.34 µm	12.4 µm- 12.6 µm	12.6- 12.8 µm

5. CONCLUSION:

Nutraceutical is the health benefits of the human body. Although nutraceutical is the consumption of health and various diseases prevention, health profession and nutritions. An excellent antioxidant that also possesses anti-inflammatory, anti-proliferative and gene expression changing capacities. These nutraceticals help in combating some of the major health problem of the century such as obesity, cardiovascular disease, cancer, arthritis, diabetes, cholesterol etc. Nutraceutical antioxidants have strong scientific support to be developed as novel therapies for neurodegenerative diseases. In present system of medicine and healthcare, nutraceuticals play a significant role. These products are extremely active, have profound effect on cell metabolism, and possess little adverse effects. In this work we have prepared a formulation using various herbal ingredients will be converted into a neutraceutical drink. The various evaluation studies has been done which is seen in table 1.4 and we found that the formulation F1 is more suitable and palatable formulation as compared to other two.

6. REFERENCE:

1. Pandey M, Verma RK, Saraf SA. Nutraceuticals: new era of medicine and health. Asian J Pharm Clin Res. 2010 Jan;3(1):11-5.
2. Kalra EK. Nutraceutical-definition and introduction. AapsPharmsci. 2003 Sep;5(3):27-8.
3. Daliu P, Santini A, Novellino E. From pharmaceuticals to nutraceuticals: Bridging disease prevention and management. Expert Review of Clinical Pharmacology. 2019 Jan 2;12(1):1-7.
4. Singh AM, Dubey RA, Paliwal RT, Saraogi GK, Singhai AK. Nutraceuticals-an emerging era in the treatment and prevention of diseases. International Journal of Pharmacy and Pharmaceutical Sciences. 2012;4(4):39-43.
5. Dureja H, Kaushik D, Kumar V. Developments in nutraceuticals. Indian journal of pharmacology. 2003 Feb;35(6):363-72.
6. Wang J, Guleria S, Koffas MA, Yan Y. Microbial production of value-added nutraceuticals. Current opinion in biotechnology. 2016 Feb 1;37:97-104.
7. Dudeja P, Gupta RK. Nutraceuticals. InFood safety in the 21st century 2017 Jan 1 (pp. 491-496). Academic Press.
8. Manasa V, Vaishnav SR, Tumaney AW. Physicochemical characterization and nutraceutical compounds of the selected spice fixed oils. Journal of Food Science and Technology. 2021 Aug;58(8):3094-105.
9. Lauro MR, Crasci L, Carbone C, Aquino RP, Panico AM, Puglisi G. Encapsulation of a citrus by-product extract: Development, characterization and stability studies of a nutraceutical with antioxidant and metalloproteinases inhibitory activity. LWT-Food Science and Technology. 2015 Jun 1;62(1):169-76.
10. Shahgholian N. Introduction to Nutraceuticals and Natural Products. Handbook of Nutraceuticals and Natural Products: Biological, Medicinal, and Nutritional Properties and Applications. 2022 May 13;1:1-4.
11. K, Luo X, Xu K, Murthy MV. Role of oxidative stress in neurodegeneration: recent developments in assay methods for oxidative stress and nutraceutical antioxidants. Progress in Neuro-Psychopharmacology and Biological Psychiatry. 2004 Aug 1;28(5):771-99.
12. Guo Cui L, Zhang W, Li S, Ho CT. Chemical and nutraceutical properties of Coreopsis tinctoria. Journal of Functional Foods. 2015 Mar 1;13:11-20.
13. ABD EL-SALAM MH, El-Shibiny S. Formation and potential uses of milk proteins as nano delivery vehicles for nutraceuticals: a review. International journal of dairy technology. 2012 Feb;65(1):13-21.
14. Gurjar PS, Bhattacherjee AK, Singh A, Dikshit A, Singh VK. Characterization of nutraceuticals in bael powder prepared from fruits harvested at different developmental stages.
15. Ventura G, Calvano CD, Abbattista R, Bianco M, De Ceglie C, Losito I, Palmisano F, Cataldi TR. Characterization of bioactive and nutraceutical compounds occurring in olive oil processing wastes. Rapid Communications in Mass Spectrometry. 2019 Nov 15;33(21):1670-81.
16. Lamberti C, Mangiapane E, Pessione A, Mazzoli R, Giunta C, Pessione E. Proteomic characterization of a selenium-metabolizing probiotic Lactobacillus reuteri Lb2 BM for nutraceutical applications. Proteomics. 2011 Jun;11(11):2212-21.
17. Jhan F, Gani A, Shah A, Ashwar BA, Bhat NA, Ganaie TA. Gluten-free minor cereals of Himalayan origin: Characterization, nutraceutical potential and utilization as possible anti-diabetic food for growing diabetic population of the world. Food Hydrocolloids. 2021 Apr 1;113:106402.
18. Espinoza Aguilar MS, Gómez Villacorta EM, Quispe Contreras S, Sánchez-González JA, León-Vargas JM. Physicochemical and nutraceutical characterization of sirimbache fruit (Gaultheria glomerata (Cav.) Sleumer). Scientia Agropecuaria. 2017 Oct;8(4):411-7.

19. del Valle Carranza A, Bonacci G, Moran Y, Asprelli P, Carrari F, Asis R. Assessment and characterization of tomato lipophilic electrophiles and their potential contribution to nutraceutical properties via SKN-1/Nrf2 signaling activation. Food Chemistry. 2022 Jan 1;366:130531.
20. Du Toit A, De Wit M, Seroto KD, Fouche HJ, Hugo A, Venter SL. Rheological characterization of cactus pear mucilage for application in nutraceutical food products. InIX International Congress on Cactus Pear and Cochineal: CAM Crops for a Hotter and Drier World 1247 2017 Mar 26 (pp. 63-72).
21. Reque PM, Brandelli A. Encapsulation of probiotics and nutraceuticals: Applications in functional food industry. Trends in Food Science & Technology. 2021 Aug 1;114:1-0.
22. Garcia-Perez P, Cassani L, Garcia-Oliveira P, Xiao J, Simal-Gandara J, Prieto MA, Lucini L. Algal nutraceuticals: a perspective on metabolic diversity, current food applications, and prospects in the field of metabolomics. Food Chemistry. 2022 Dec 23:135295.
23. Castro de Cruz E. Development and characterization of edible films based on cassava starch-glycerol blends to incorporate nutraceuticals (Doctoral dissertation, Rutgers University-Graduate School-New Brunswick).