Name: Jeyavani S

LABRIUT NUTRIENTS (OPC) PVT.LTD.

Towards well-being

PROJECT REPORT ON INTERNSHIP FOR A PERIOD OF ONE MONTH

DECLARATION BY THE CANDIDATE

I hereby declare that the project report entitled "**Industrial Internship Report On Formulating a Sports drink"** submitted by me to Dr. Preethi Sudha, Labriut Nutrients, Bangalore, in partial fulfillment of the requirement for the award of the degree of **B.Tech Biotechnology** is a record of bonafide **Industrial Internship** work carried out by me.

Place: Bangalore
Date:14/07/2023

Signature of the Candidate
Jeyavani S

Signature of the Director
Dr. Preethi Sudha

I INTRODUCTION:

As a part of my curiculum I have done this internship for a period of one month in Labriut Nutrients, Bangalore. My project was to formulate a sport drink and an electrolyte drink.

Why choose Nutraceuticals?

Nutraceutical is a comprehensive term which includes substances that are considered as foods, parts of foods or dietary supplements that may claim to provide medical or health benefits – this includes the treatment of or prevention of disease. In addition to vitamins, they contain naturally occurring ingredients such as garlic, ginseng and other herbal products such as phytochemicals extracted from plants [23].

Nutraceuticals often target specific health problems or diseases. For example, there are items meant to help with joint health, digestive health, skin health, and more. This makes it possible for people to choose products that meet their needs as well as their preferences. Most of the time, they come in pills, tablets, powders, or liquids that are easy to take. The fact that they are easy to use makes it easier for people to add them to their daily lives without much work.

People may not get enough nutrients from their normal food alone in some cases. Nutraceuticals can help fill in these nutrition gaps by giving increased amounts of certain nutrients or bioactive chemicals. They can be a helpful part of a healthy diet to make sure you get enough nutrients.

Nutraceutical could be of food products purified, produced, or extracted from an animal or plant source (e.g., antioxidants from fish oils, blueberries, elk velvet), or produced from pressed, powdered, or dried plant material, vitamins and minerals [23].

Nutraceuticals are not meant to treat or cure any diseases or conditions; rather, their purpose is to promote overall health, prevent chronic diseases, delay the aging process, and hence extend life expectancy, or simply maintain the functioning and integrity of the body.

Dietary supplements are products that are meant to add to the diet and have at least one of the following ingredients: a vitamin, mineral, herb or botanical (including extracts of herbs or botanicals), amino acid, metabolite, or any mix of these. Dietary supplements include things like multivitamins, garlic pills, fish oil capsules, probiotics, natural weight loss aids, and some types of energy drinks [24].

Functional foods are new foods that have been made in a way that they contain substances or live microorganisms that may be good for health or help avoid disease. These substances or microorganisms must be safe and present in a percentage that is high enough to get the desired effect. Some of the added ingredients could be probiotics, nutrition, fiber, antioxidants, or other substances [25].

The behavioral choices that you make as part of your lifestyle in order to maintain good health, stay away from diseases and medical conditions that may be prevented, and maintain harmony in your body, mind, and spirit.

The term "preventive health care," which is sometimes referred to as "preventative care" and "preventive medicine," is the practice of taking precautions to avoid diseases, illnesses, or injuries before they manifest themselves or deteriorate into a more serious form. It encompasses a variety of techniques and treatments with the purpose of promoting and sustaining overall health and well-being, with the ultimate objective of preventing or reducing the effect of prospective health issues [27].

How biotechnolohy can help in Neutraceuticals?

Recombinant DNA methods are having a significant impact on enzyme technology used in the food industry. Some of the benefits include increased enzyme production, better thermostability,

and the ability to handle a wide range of pH. Biotechnology plays a significant role in the production of probiotics and the extraction of bioactive components through enzyme/fermentation technology and genetic engineering technology. In the food industry, the use of this technique for the production of enzymes and recombinant microorganisms has become popular due to shifting societal values, such as those regarding recombinant DNA, and the increasing need to investigate all alternative food sources [26].

What was my goal here?

To develop a simple formulation for well-being. I have prepared a protein drink for gym-goers and an electrolyte drink.

II LITERATURE SURVEY:

PROTEIN DRINK:

1. Introduction

1.1 What are proteins?

Proteins are biopolymeric structures that are made of amino acids. Proteins provide a variety of important functions, including providing structural support, acting as biochemical catalysts, acting as hormones and enzymes, serving as building blocks, and initiating the death of cells. There are 20 different amino acids that are often found in biological chemistry. [1] In the lumen of the gastrointestinal system, proteases and peptidases break down dietary protein to produce AA, dipeptides, and tripeptides. This process is called protein hydrolysis. These byproducts of digestion are either absorbed by enterocytes or used by the bacteria that live in the small intestine.[2] Dietary protein intakes of 1.0, 1.3, and 1.6 g per kg BW per day are advised for persons with little, moderate, and intensive physical activity, respectively, in order to satisfy the functional demands such as boosting skeletal-muscle protein accretion and physical strength in order to fulfil the functional needs.[2] Proteins are essential for life because they are involved in practically every chemical process that occurs in the body, they control the expression of genes, they are the primary building blocks of cellular structures, they help maintain immunological function, and they are the primary components of muscle.[3]

1.2 Protein sources

- Animal sources provide a complete source of protein, whereas vegetable sources generally lack one or more of the essential amino acids.
- Vegetarian diet: variety of plant sources, including legumes, soy products, grains, nuts and seeds. Benefits are reduced risk of chronic diseases such as diabetes and heart disease.[4]
- Non vegetarian's diet: meat, poultry, fish, legumes, nuts, vegetarian protein alternatives, dairy products, and eggs. Benefits are the EAA are easily obtained in diet compared to vegetarian diet.[5]
- Vegan diet: traditional legumes, nuts and seeds, are sufficient to achieve full protein adequacy in adult.[5]

1.3 Importance of protein to athletes

- Peri-exercise protein consumption may improve performance and recuperation.[6]

- Exercise decreases protein synthesis (creation) until it lasts longer than 4 hours, increases protein catabolism (breakdown), and boosts amino acid oxidation. Exercise also damages skeletal muscle subcellularly.[6]

1.4 Whey protein

Whey protein is the protein found in whey the watery content when milk separates to form curd. It is mostly taken as a protein supplement in sports in the form of protein shakes

Why whey protein?

It is a very good protein supplement and also improves muscle mass and helps in the immune system

Whey protein is one of the highest-quality proteins given its amino acid content (high essential, branched-chain, and leucine amino acid content) and rapid digestibility. Consumption of whey protein has a robust ability to stimulate muscle protein synthesis. In fact, whey protein has been found to stimulate muscle protein synthesis to a greater degree than other proteins such as casein and soy. This review examines the existing data supporting the role for protein consumption, with an emphasis on whey protein, in the regulation of muscle mass and body composition in response to resistance training, caloric restriction, and aging. Whey protein (WH)-enriched diets are reported to aid in weight loss and to improve cardiovascular health.

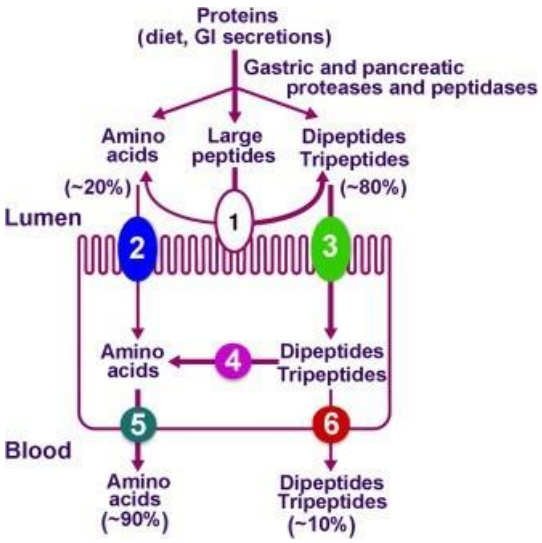
whey and its components α-lactalbumin and lactoferrin improve energy balance and glycemic control, and protect against the onset of neurological deficits associated with stroke and renal damage in male

Whey protein supplementation improves body composition by modestly increasing lean mass without influencing changes in fat mass. Body composition improvements from WP are more robust when combined with ER .

he data from trials currently available supports the use of WP to improve BC indicators. The benefits of WP on BC are expected to be greatest when combined with resistance training and a reduction in overall calorie consumption.

A commonly recommended dose is 1–2 scoops (25–50 grams) per day

2. Protein Absorption



Dietary proteins are first broken down in the lumen of the cell by proteases produced in the stomach and pancreas, and then their membranes are broken down by peptidases that are connected with the brush border membrane of enterocytes. The majority of the products of this digestion are composed of dipeptides and tripeptides, with some free amino acids also being produced to a lesser level. The proton-coupled peptide transporter is responsible for the absorption of peptides across the brush-border membrane, whereas numerous amino acid transporters are responsible for the absorption of free amino acids. Cytosolic peptidases are responsible for the hydrolysis of dipeptides and tripeptides into free amino acids once they have entered the cell. After then, amino acids leave the cell via specialised transporters that allow them to pass through the basolateral membrane. There are various hereditary illnesses that are linked to impairments in the intestine's ability to transport amino acids; the clinical implications of these deficiencies depend on particular amino acids whose absorption is hindered in each of these defects.[7]

3. Existing market

Time line	Market size
Protein powder market size - 2022	USD 22.3 billion
2032 projected market size	USD 36.6 billion
Estimated market growth rate (2022 – 2032)	7.3%

[8]

3.1 Top brands

World market

World Market					
Whey Protein					
Sl No.	**Brand**	**Product**	**Weight**	**Price (Rs)**	**Origin**
1	NOW	Whey Protein isolate	1.8 lbs(0.816 Kgs)	7,639	American, Illonis
2	Garden of Life	Protein chocolate flavor	1.85 lbs (0.840 Kgs)	7,899	American, Florida
3	Optimum Nutrition	100% whey gold standard	2 lbs (0.907 Kgs)	3,098	American, Illonis
4	Vital Nutrients	ProWhey Protein	1.1 lbs (0.5 kgs)	3,936	American, Middletown Connecticut
5	Orgain	Organic Whey Protein Powder	2.74 lbs (1.24 Kgs)	5,788	American, California

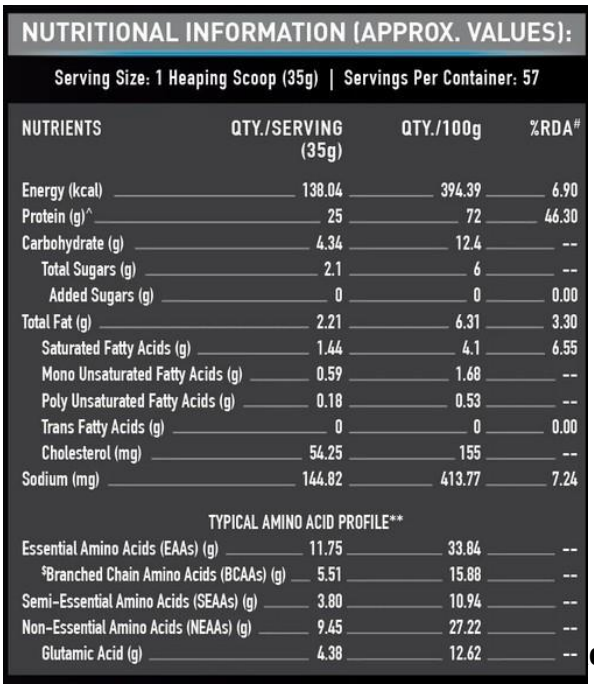
Indian market

Indian Market					
Whey Protein					
Sl No.	**Brand**	**Product**	**Weight**	**Price (Rs)**	**Origin**
1	MuscleBlaze	Biozyme Performace	2.2 lbs (1 Kgs)	2,199	Indian, Harayana
2	BigMuscles	Premium gold whey	2.2 lbs (1 Kgs)	1,599	Indian, Delhi
3	AS-IT-IS	ATOM chocolate Whey Protein	2.2 lbs (1 Kgs)	1,775	Indian (Melting Pot concepts prvt limited), Bangalore
4	Optimum Nutrition	Gold Standard 100% whey Protein	2 lbs (0.907 Kgs)	3,098	American, Illonis
5	Abbzorb	Whey Protein	2.2 lbs (1 Kgs)	2,099	Indian, New Delhi

[9], [10]

3.2 Composition of top two brands

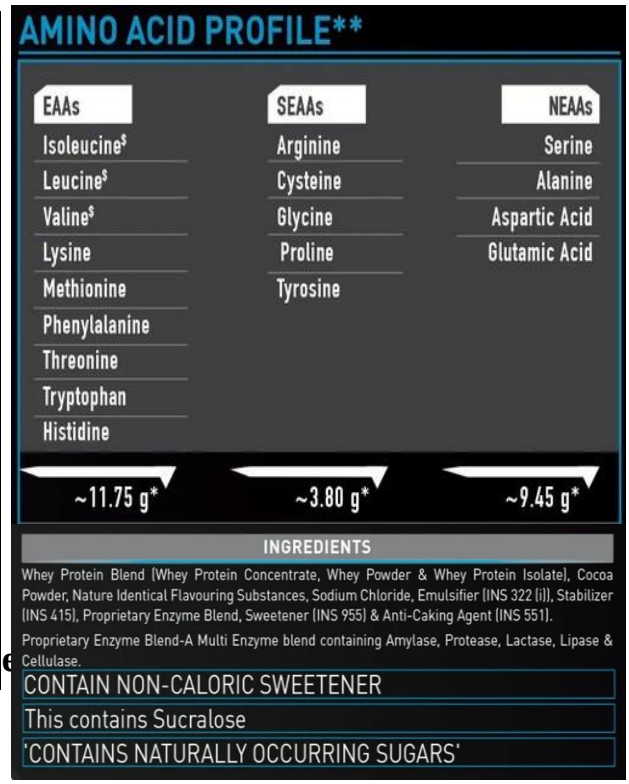
Muscleblaze contents [11]



NUTRITIONAL INFORMATION (APPROX. VALUES):

Serving Size: 1 Heaping Scoop (35g) | Servings Per Container: 57

NUTRIENTS	QTY./SERVING (35g)	QTY./100g	%RDA#
Energy (kcal)	138.04	394.39	6.90
Protein (g)^	25	72	46.30
Carbohydrate (g)	4.34	12.4	--
Total Sugars (g)	2.1	6	--
Added Sugars (g)	0	0	0.00
Total Fat (g)	2.21	6.31	3.30
Saturated Fatty Acids (g)	1.44	4.1	6.55
Mono Unsaturated Fatty Acids (g)	0.59	1.68	--
Poly Unsaturated Fatty Acids (g)	0.18	0.53	--
Trans Fatty Acids (g)	0	0	0.00
Cholesterol (mg)	54.25	155	--
Sodium (mg)	144.82	413.77	7.24
TYPICAL AMINO ACID PROFILE**			
Essential Amino Acids (EAAs) (g)	11.75	33.84	--
$Branched Chain Amino Acids (BCAAs) (g)	5.51	15.88	--
Semi-Essential Amino Acids (SEAAs) (g)	3.80	10.94	--
Non-Essential Amino Acids (NEAAs) (g)	9.45	27.22	--
Glutamic Acid (g)	4.38	12.62	--



AMINO ACID PROFILE**

EAAs	SEAAs	NEAAs
Isoleucine$	Arginine	Serine
Leucine$	Cysteine	Alanine
Valine$	Glycine	Aspartic Acid
Lysine	Proline	Glutamic Acid
Methionine	Tyrosine	
Phenylalanine		
Threonine		
Tryptophan		
Histidine		
~11.75 g*	~3.80 g*	~9.45 g*

INGREDIENTS

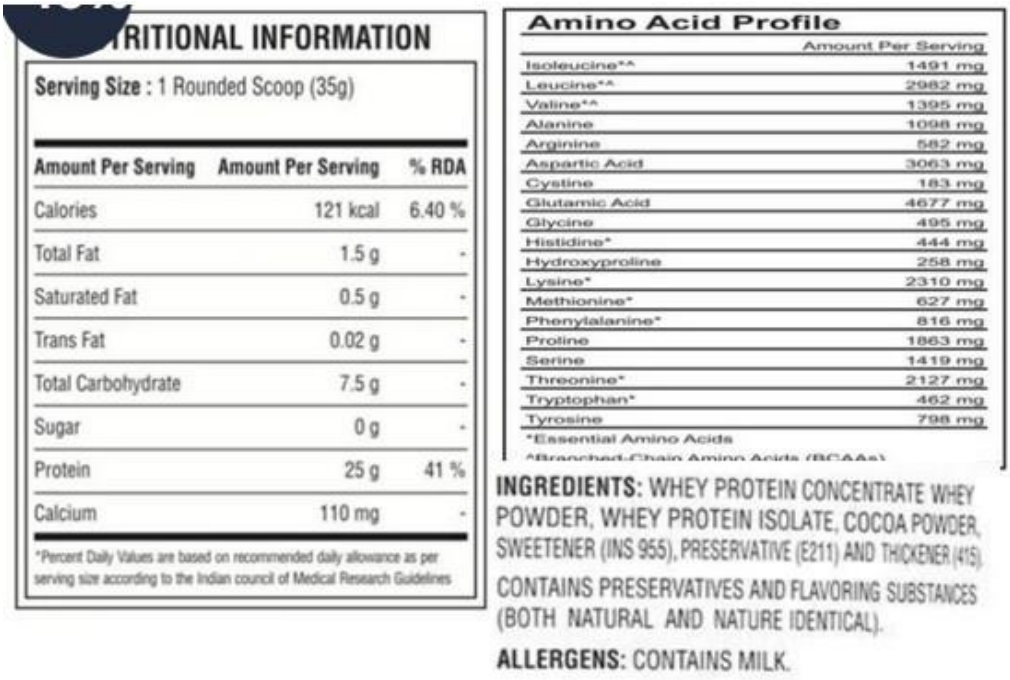
Whey Protein Blend [Whey Protein Concentrate, Whey Powder & Whey Protein Isolate], Cocoa Powder, Nature Identical Flavouring Substances, Sodium Chloride, Emulsifier [INS 322 (i)], Stabilizer [INS 415], Proprietary Enzyme Blend, Sweetener [INS 955] & Anti-Caking Agent [INS 551].

Proprietary Enzyme Blend-A Multi Enzyme blend containing Amylase, Protease, Lactase, Lipase & Cellulase.

CONTAIN NON-CALORIC SWEETENER

This contains Sucralose

'CONTAINS NATURALLY OCCURRING SUGARS'



RITIONAL INFORMATION

Serving Size : 1 Rounded Scoop (35g)

Amount Per Serving	Amount Per Serving	% RDA
Calories	121 kcal	6.40 %
Total Fat	1.5 g	-
Saturated Fat	0.5 g	-
Trans Fat	0.02 g	-
Total Carbohydrate	7.5 g	-
Sugar	0 g	-
Protein	25 g	41 %
Calcium	110 mg	-

*Percent Daily Values are based on recommended daily allowance as per serving size according to the Indian council of Medical Research Guidelines

Amino Acid Profile

	Amount Per Serving
Isoleucine*^	1491 mg
Leucine*^	2982 mg
Valine*^	1395 mg
Alanine	1098 mg
Arginine	582 mg
Aspartic Acid	3063 mg
Cystine	183 mg
Glutamic Acid	4677 mg
Glycine	495 mg
Histidine*	444 mg
Hydroxyproline	258 mg
Lysine*	2310 mg
Methionine*	627 mg
Phenylalanine*	816 mg
Proline	1863 mg
Serine	1419 mg
Threonine*	2127 mg
Tryptophan*	462 mg
Tyrosine	798 mg

*Essential Amino Acids

INGREDIENTS: WHEY PROTEIN CONCENTRATE WHEY POWDER, WHEY PROTEIN ISOLATE, COCOA POWDER, SWEETENER (INS 955), PRESERVATIVE (E211) AND THICKENER (415). CONTAINS PRESERVATIVES AND FLAVORING SUBSTANCES (BOTH NATURAL AND NATURE IDENTICAL).

ALLERGENS: CONTAINS MILK.

4. Different types of protein powder for the sport drink

DIET	PROTEIN POWDER
Vegetarian diet	Whey protein Soy protein Protein mix for atta Pea protein Hemp protein Almond protein Plant based protein Brown rice protein
Nonvegetarian diet	Casein protein Egg white protein
Vegan diet	Pea protein Hemp protein Almond protein Plant based protein Brown rice protein

Types of protein powder[13]

5. Available flavors in the market

- Peppermint Hot Cocoa

- Chocolate Caramel Sea Salt
- Iced Coffee
- Vanilla Horchata
- Chocolate Coconut
- Chocolate Peanut Butter
- Vanilla Bean
- Creamy Chocolate Fudge
- Peanut Butter
- Natural Unsweetened

6. Which protein is best at absorption

Whey is a “fast-acting” protein; its absorption rate has been estimated at ~ 10 g per hour. At this rate, it takes just 2 hours to fully absorb a 20 gram-dose of whey.

Protein source	**Absorption rate (g/hr)**
Whey isolate	10
Free amino acid	7
Casein	6.1
Soy isolate	3.9
Milk isolate	3.5
Egg protein cooked	2.8

Table for absorption rate of different protein source [14]

6.1 RDA of protein for different group of people (g/day)

Age	**Male**	**female**	**Pregnant**	**Lactating**

0-6 months	9.1 g	9.1 g		
7-12 months	11 g	11 g		
1-3 years	13 g	13 g		
4-8 years	19 g	19 g		
9-13 years	34 g	34 g		
14-18 years	52 g	46 g	71 g	71 g
19-70 years	56 g	46 g	71 g	71 g
70+ years	56 g	46 g		

Diabetes patient can have an allowance of **0.8g - 1g/kg** of body mass

Table for the RDA for different age group[15]

6.2 Why sports drink and not water?

- Before full rehydration, thirst may subside if plasma osmolality levels drop below threshold. Sports beverages have benefits that water cannot.
- Sports drinks include enough energy and electrolytes to speed up rehydration. [16]

7. Role of EAA:

Amino acid	Role
Isoleucine	Formation of hemoglobin; prevents muscle wasting in debilitated individuals
Leucine	Promotes healing of skin and broken bones; reduces muscle protein breakdown
Valine	Influences brain uptake of other neurotransmitter precursors (tryptophan, phenylalanine and tyrosine)
Histidine	Production of red and white blood cells; treatment of anemia
Lysine	Inhibits viruses; treatment of herpes simplex, Lysine and Vitamin C together form L-carnitine, a biochemical that enables muscle tissue to use oxygen more efficiently, delaying fatigue
Methionine	Increases the antioxidant levels (glutathione); reduces blood cholesterol levels
Phenylalanine	Production of collagen, precursor of tyrosine; enhances learning, memory, mood and alertness
Threonine	Prevents fatty build up in the liver; amino detoxifers
Tryptophan	Prevents fatty buildup in the liver; precursor of key neurotransmitter serotonin, which exerts a calming effect

7. Who shouldn't take whey protein?

[17]

8. Side effects of taking whey protein

Anything taken in extreme quantity is always a danger to your body.Whey protein taken in quantities more than required causes nausea, indigestion ,bloating .acne .tiredness ,headache etc.

Post-exercise supplementation with whey proteins when compared to carbohydrates or combination of proteins and carbohydrates did not have a major effect on muscle size or strength when ingested two to three times a week. However, whey proteins may increase abdominal fat loss and relative fat-free mass adaptations in response to resistance training when compared to fast-acting carbohydrates.

Whey protein is the most popular fast absorbing protein. Its absorption rate has been estimated at

roughly 10 grams per hour. At this rate, it takes just 2 hours to fully absorb a 20 gram-dose of whey.

Whey protein, amongst all other protein powders, can be great for children. Nowadays, many doctors recommend **whey protein for kids**, especially if they have a deficiency of this macronutrient.

9. How much concentration is safe for human?

- A safe intake level of 338 mg EGC/day for adults could be considered for GTE ingested as a concentrated solid bolus dose.[18]
- Sports beverage's sodium content maintains thirst. Sodium concentrations of 10–25 mmol/L. [19]
- 600-800 IU of Vitamins D, 400 to 3,000 mg of Vitamin C and 22 IU of Vitamin E are required for Gym Goers.

10. What happens if you take protein with citric acid

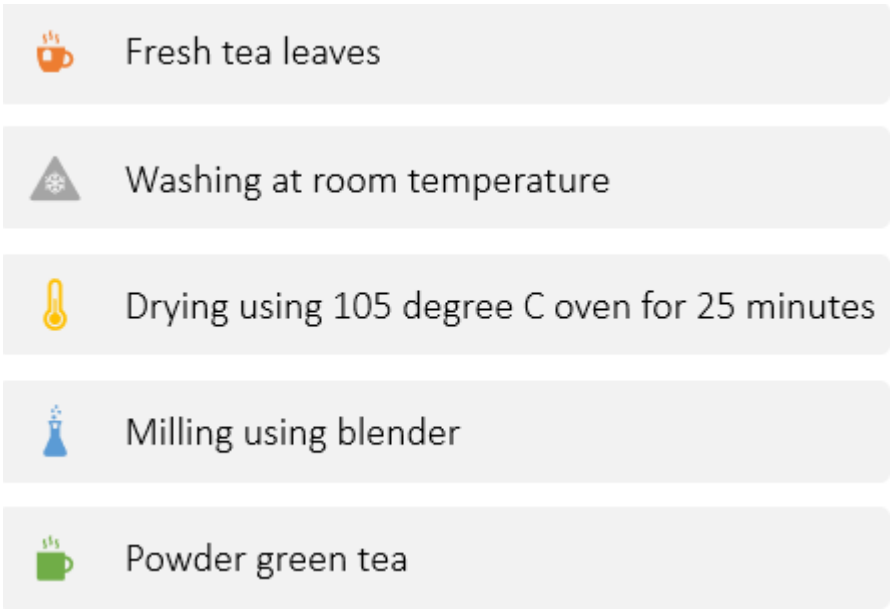
Citric acid induces WPI to cross link through the generation of disulfide bonds under non-acidic condition, and remarkably change its secondary and tertiary structures.[20]

11. Green tea extract

11.1 What are the composition of a green tea extract?

- 12.67 mg of amino acids/ 100 gms of green tea leaves.[21]

11.2 Making of green tea extract



Making of Green tea extract[22]

11.3 Uses of green Tea

- Assists weight loss
- Prevents tooth decay
- Lowers cholestrol and blood pressure
- Fights cancer
- Prevents inflammation
- Controls blood sugar level

III METHODS

1. Moisture test:

Aim:

To estimate the amount of moisture in the sample.

Materials required:

- Sample
- Moisture meter machine
- Aluminium foil

Procedure:

1. Place the sample in the sample moisture dish which is balancing on a tip.
2. Place the samples until the red pointer aligns with the zero needle.
3. Note down the initial temperature of the moiture meter thermometer.
4. Close the moisture meter top holder slowly with care.
5. Switch on the machine and wait until the temperature of the chamber reaches to the range of 95 degree celsius to 100 degree celsius.
6. Once the temperature is attained, read the value shown on the meter that aligns with the red pointer.
7. Switch off the moisture meter after reading the value.

Observation:

Moisture test		
Company	**Product**	**Test result(%)**
Nakoda	WPC	0.2
Nakoda	WPI	0.2

2. Microbial quality - Media preparation:

2.1 Nutrient agar:

Aim:

To prepare a nutrient agar media of 500ml.

Principle:

Nutrient agar is made with various nutrients which allow the growth of a wide variety of microorganisms that do not usually require specific nutrients or supplements.The primary constituents of the media are peptone, beef extract, and agar. In addition to these nutrients, some vitamins and some trace ingredients necessary for the growth of bacteria are also added.

Materials required:

- Peptone
- Beef extract
- Sodium cloride
- Agar
- Measuring cylinder
- Conical flask
- Autoclave
- Distilled water

Procedure:

1. In a conical flask, 1.5 g of beef extract, 2.5 g of peptone, 9 g of agar, 2.5 g of NaCl is added to 500 milliliters of distilled or deionized water.
2. The suspension is then heated to boiling to dissolve the medium completely.
3. The dissolved medium is then autoclaved at 15 lbs pressure (121°C) for 15 minutes.
4. Once the autoclaving process is complete, the beaker is taken out and cooled to a temperature of about 40-45°C.

Result:

Thus we prepared nutrient agar medium of pH 6.6-7.

2.2 Sabouraud Dextrose Agar (SDA):

Aim:

To preapare SDA media of 500ml.

Materials Required:

- Measuring cylinder
- Conical flask
- Autoclave
- Distilled water
- D-glucose
- Peptone
- Agar

Procedure:

1. In a conical flask, 20 g of D-glucose, 5 g of peptone and 7.5 g of agar is added to 500 milliliters of distilled or deionized water.
2. Adjust to pH 5.6 with hydrochloric acid and adjust final volume to 1 liter.
3. Heat to boiling to dissolve the medium completely.
4. Autoclave at 121ºC for 15 minutes.
5. Cool to ~45 to 50°C and pour into petri dishes or tubes for slants.

Result:

Thus we prepared Sabouraud Dextrose Agar of pH 5.6-7.

2.3 Saline (0.8%):

Aim:

To preapare 0.8% saline of 500ml.

Materials Required:

- Measuring cylinder
- Conical flask
- Autoclave
- Distilled water
- NaCl

Procedure:

1. In a conical flask, 4 g of NaCl is added to 500 milliliters of distilled or deionized water.

2. Heat to boiling to dissolve the medium completely.
3. Autoclave at 121ºC for 15 minutes.
4. Cool to ~45 to 50°C and pour into petri dishes or tubes for slants.

Result:

Thus we prepared the Saline of 0.8% concentration.

3. Autoclaving:

Aim:

To perform autoclaving for the glasswares and the Nutrient agars.

Material Required:

- Autoclave machine
- Glasswares

Procedure:

1. After cleaning the objects to be sterilized, place them inside the sterilization basket. Attach the chemical or biological indicators within the basket.
2. Place distilled or RO water, sufficient enough to submerge the water immersion heater. You can observe the level of water in the autoclave with the help of a water level indicator (mostly glass tube).
3. Then, place the sterilization basket within the autoclave.
4. Close the lid and tighten the screws to prevent leakage.
5. Turn on the power supply.
6. Open the steam release valve to release the air trapped within the chamber.
7. Observe the indicator of the pressure gauge.
8. When the indicator of the pressure gauge stops to increase, close the steam release valve.
9. When the vapor pressure within a vertical autoclave reaches 15 psi (121°C), the pressure regulating valve will release steam to maintain the pressure.
10. Continue operating the machine for 15 mins.
11. After 15 mins of operation, turn off the machine.
12. Then open the steam release valve.
13. Once, the indicator of the pressure gauge goes to 0, remove the lead of the autoclave.

Result:

The required material and equipments are autoclaved.

4. Solubility test

Aim:

To determine the solubility of sample.

Material required:

- Sample
- Glass beaker
- Stirrer
- Measuring cylinder

Procedure:

1. Using a graduated measuring cup, measure out 100 ml of water and pour into a beaker.
2. Measure out a teaspoon of sample and add it to the cup of water and stir using a stirrer.
3. If all of the sample disappears then the solute is said to have dissolved in the solvent and a solution is produce. An insoluble solute will settle out of the mixture. Insoluble solutes are usually found at the bottom of the cup or floating on the surface of the liquid.
4. Record the results of each test by writing the words "soluble" if the entire solid dissolves, "insoluble" if the solid does not dissolve, or "partially soluble" if some of the solid dissolves.

Result:

The solubility of the sample has been observed.

IV PRODUCT

AIM:

To develop a Sports drink and an Electrolyte drink.

APPARATUS REQUIRED:

- Glass beaker
- Blender
- Spatula

INGREDIANTS:

- Gremin
- Strwberry flavour
- Strawberry powder
- Yeast protein
- LN005/22
- Guar Gum(Xanthan Gum)
- Whey Concentrate
- Whey Isolate
- LN015/22
- LN013/22
- LN010/22
- Colour
- Soy protein

PROTOCOL DEVELOPED:

PROTEIN DRINK:

1. Take a clean glass beaker.
2. Weigh 0.2 g of gremin and add it to the beaker.
3. Weigh 0.5 g of Strawberry flavour powder to it and make sure to not contaminate the sample by using unclean spatula.
4. Weigh 3 g of Strawberry powder and add it to it.
5. Weigh 3 g of Yeast protein and add it to it.
6. Weigh 2 g of LN005/22 and add it to it.
7. Weigh 8 g of Whey Concentrate powder and add it to it.
8. Weigh 2 g of Whey Isolate powder and add it to it.
9. Weigh 1 g of LN015/22 and add it to it.
10. Weigh 0.07 g of LN013/22 and add it to it.
11. Weigh 1.5 g of LN010/22 and add it to it.
12. Weigh 0.05 g of Color and add it to it.
13. Weigh 1 g of Pea protein and add it to it.
14. Now mix the contents in a blender.
15. Add 250 ml of water to the content.

TRIALS:
SD(A) STRAWBERRY FLAVOR:

TRIAL1:

Content	Weight (g)	Vendor
Gremin	0.2	
Strwberry flavour	0.5	Lux
Strawberry powder	5	Mevive
Yeast protein	3	Angels
LN005/22	2	
Guar Gum(Xanthan Gum)	0.5	
Whey Concentrate	8	Nakoda Dairy
Whey Isolate	2	Nakoda Dairy
LN015/22	0.5	
LN013/22	0.07	
LN010/22	1.5	
Colour	0.05	
Soy protein	1	KP Manish
Total	**23.32**	

First we added 5 gms of strawberry powder, which gave highly sour taste and it lacked flavor.

TRIAL 2:

Content	Weight (g)	Vendor
Gremin	0.2	
Strwberry flavour	0.5	Lux
Strawberry powder	3	Mevive
Yeast protein	3	Angels
LN005/22	2	
Guar Gum(Xanthan Gum)	0.5	
Whey Concentrate	8	Nakoda Dairy
Whey Isolate	2	Nakoda Dairy
LN015/22	1	
LN013/22	0.07	
LN010/22	1.5	
Colour	0.05	
Soy protein	1	KP Manish
Total	**21.82**	

Now we reduced strawberry powder to 3 gms and increased LN015/22 , strawberry flavor powder to 1 gm. This resulted in a better taste.

SD(A) CHOCOLATE FLAVOR:
TRIAL1:

Content	Weight (g)	Vendor
Gremin	0.2	
Chocolate flavor powder	1	Kerry
Drinking chocolate powder	5	Kerry
Yeast protein	3	Angels
LN005/22	2	
Guar Gum(Xanthan Gum)	0.5	
Whey Concentrate	8	Nakoda Dairy
Whey Isolate	2	Nakoda Dairy
LN015/22	1	
LN013/22	0.07	
LN010/22	1.5	
Colour	0.05	
Cocoa Powder	2	Padmavathi
Soy protein	1	KP Manish
Total	**27.32**	

The characteristic of the drink was Antique brass color brownish in color (8581 asian paint color) in color, thick and had a chocolatey and milkish flavor to it. Earlier we added the powder to 200 ml of drinking water making it too thick, so we added an extra 50 ml of water and made it upto 250 ml.

TRIAL 2:

Content	Weight (g)	Vendor
Gremin	0.2	
Chocolate flavor powder	1	Kerry
Drinking chocolate powder	5	Kerry
Yeast protein	3	Angels
LN005/22	2	
Guar Gum(Xanthan Gum)	0.5	
Whey Concentrate	8	Nakoda Dairy
Whey Isolate	2	Nakoda Dairy
LN015/22	1	
LN013/22	0.07	
LN010/22	1.5	
Colour	0.05	
Soy protein	1	KP Manish
Total	**25.32**	

The characteristic of the drink was Mochaccino color brownish (8573 asain paint color), runny and was lacking the chocolate texture since we removed the cocoa powder and reduced the xanthan gum to 0.25 gms. So we freezed the content of xanthan gum to 0.5 gms as in trial1.

SD(A) COFFEE FLAVOR:

TRIAL 1:

Content	Weight (g)	Vendor
Gremin	0.2	
Coffee Flavour	1	JD chem
Yeast protein	3	Angels
LN005/22	2	
Guar Gum(Xanthan Gum)	0.5	Nakoda Dairy
Whey Concentrate	8	Nakoda Dairy
Whey Isolate	2	
LN015/22	1	
LN013/22	0.07	
LN010/22	1.5	
Soy protein	1	KP Manish
Total	**20.27**	

First we added 1 gm of coffee flavor and had brown color(523 asian paint color), this resulted in mild coffee smell and tasted sweet

TRIAL 2:

Content	Weight (g)	Vendor
Gremin	0.2	
Coffee Flavour	2	JD chem
Coffee powder	5	
Yeast protein	3	Angels
LN005/22	2	
Guar Gum(Xanthan Gum)	0.5	Nakoda Dairy
Whey Concentrate	8	Nakoda Dairy
Whey Isolate	2	
LN015/22	1	
LN013/22	0.07	
LN010/22	1.5	
Soy protein	1	KP Manish
Total	**26.27**	

And to this we added 2 gms coffee flavor powder and 5 gms of coffee powder, this resulted in better taste and still tasted sweet.

SD(B) MANGO FLAVOR:
TRIAL 1:

Content	Weight (g)	Vendor
Gremin	0.2	
Mango Flavor powder	1	Kerry
Mango powder	5	Mevive
Yeast protein	3	Angels
LN005/22	2	
Guar Gum(Xanthan Gum)	0.5	
LN015/22	1	
LN013/22	0.07	
LN010/22	1.5	
Soy Protein	10	KP Manish
Total	**24.27**	

The characteristic of the drink was Tangerine yellow color (9874 asian paint color) and had the mango flavor to it, the drink also tasted sweet and had the thick texture.

SD(A)+E-F COCONUT FLAVOR:
TRIAL 1:

Content	Weight (g)	Vendors
Gremin	0.2	
Tender coconut powder	5	Mevive international
Yeast protein	3	Angels
LN005/22	2	
Guar Gum(Xanthan Gum)	0.5	
Whey Concentrate	8	Nakoda Dairy
Whey Isolate	2	Nakoda Dairy
LN015/22	1	
LN013/22	0.07	
LN010/22	1.5	
Electrolyte	1	Amazon
Total	**24.27**	

The drink lacked the tender coconut flavor, so we need to add the flavor powder for the taste of coconut.

TRIAL 2:

Content	Weight (g)	Vendors
Gremin	0.2	
Cocnut Flavour	1	Kerry
Tender coconut powder	5	Mevive international
Yeast protein	3	Angels
LN005/22	2	
Guar Gum(Xanthan Gum)	0.5	
Whey Concentrate	8	Nakoda Dairy
Whey Isolate	2	Nakoda Dairy
LN015/22	1	
LN013/22	0.07	
LN010/22	1.5	
Electrolyte	1	Amazon
Total	**25.27**	

We added 1 gm of coconut flavor powder to the drink.

Vendor list for Protein drink:

Content	Vendor	Phone Number	Sample recieved(gms)	Cost/kg	COA Recieved	Vendor-2	Vendor-3
Gremin				-	-	-	-
Fruit flavour	Lux		200		-	Kerry	-
Fruit powder	Mevive	7676397967, 9500998150	30		Yes	Aarkay foods	Amazon-40gms
Yeast protein	Angels		-	-	-	-	-
LN005/22			-	-	-	-	-
Guar Gum(Xanthan Gum)			-	-	-	-	-
Whey Concentrate	Nakoda Dairy	8024489500	100	1500	Yes	Sri Durga	Shree Sallapuri
Whey Isolate	Nakoda Dairy		100	2000	Yes		
LN015/22			-	-	-	-	-
LN013/22			-	-	-	-	-
LN010/22			-	-	-	-	-
Colour	Indian platinum		-	-	-	-	-

II FINAL PROTOTYPES:

LABELS

SD(A):

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