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Design of Polyherbal Powder Drink Formulation as an Immunity Booster

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Immunity Booster Powder Drink, Nutritional Potential, Natural Alternative, Artificial Drinks

ABSTRACT:

Purpose: Now days, Immunity boosting or maintaining immunity system is becoming a first and most important priority. The main purpose of the study is to prepare a poly-herbal Immunity Booster powder drink. It was developed by using some traditional herbs having proved nutritional potential.

Methods: The key ingredients were selected as Bramhi, Ashwagandha, Curcumin, Almond, Flax seed, Jaggery, Coco powder which is used to improve immunity, give energetic feeling since ages.

Results: After many experiments, the most suitable combination is finally selected based on taste, physical and chemical properties.

Conclusion: Herbal drink is designed to offer consumers an affordable choice with great taste and health benefits. All herbs used in this preparation are easily available in all seasons and are not expensive. The prepared formulation is useful for all the people. It is made with natural herbs and therefore is less likely to cause side effects than soft drinks. These herbal energy drinks are a natural alternative to artificial drinks with many health benefits.

1. Introduction

After the outbreak of Covid 19, all people in the world are suffering; improving the immune system (immunity) plays an important role in healthcare. Covid-19 attacks people who are having weak immune systems, mostly the young and the aged. The immune system consists of bacteria that live in the intestines and shield the body from numerous diseases. When the immune system is weak, weakened or weakened, it can lead to infections such as coronavirus and diseases such as diabetes, heart disease or blood cancer. Plant-based foods increase the beneficial bacteria in your gut and support the overall health of the gut microbiome, which makes up 85% of the body's immune system. Too much animal food, on the other hand, destroys good bacteria in the body and increases inflammation, which is the root cause of diabetes, COPD, heart disease, hepatitis B, blood-eating cancer, and kidney disease.

We all know that prevention is better than cure. Although there is currently no cure for Covid-19, it is best to take precautions to improve protection during this period. "Immunization" is a hot topic regarding coronavirus, and it seems there are many treatments, cures, and prevention methods. For example, an investigation of Google Trends display that the terms "immunity" and "immunity" increased in February 2020, while concerns about worsening disease also increased during the same period. The best way to improve your immune system is to prevent disease. These ideas are supported by scientific evidence. Strategies used to improve immunity other than immunization or vaccination is generally referred to as "immunization".

Many medicines can be obtained from plants. Investigation of various strategies to determine the potential of plant-derived compounds their ability to treat various health disorders, and strategies for their production still today. Drugs derived from plants have been shown to have various immunomodulatory activities. From experimental studies, the immunomodulatory activities of various stimulatory and inhibitory properties are clearly noticeable. The immunomodulatory potential of herbal compounds has been demonstrated in various pathologies, including diseases and malignancies. The biological activity of

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botanical medicine utilizes pure isolated substances extracted from a plant/plant part or a mixture (mixture/powder) obtained from various sources, first by pressure. The use of extracts and combinations is common in traditional medicine such as Ayurveda and Traditional Chinese Medicine. Yet, today's doctors often recommend herbal preparations. The anti-inflammatory or anti-inflammatory properties of these herbs or compounds (Divyapeedantak-kwatha, Divya-SwasariVatia, Cyavanaprasa etc.) have been demonstrated by many studies on the host or hosts.

Published evidence supports the effectiveness of herbal preparations in pathological diseases associated with an inappropriate (internal or external) immune system. Although changes in the immune system have been observed in healthy individuals after taking herbs/preparations, most of the evidence comes from studies of pathological diseases.

One of the studies showed that consumption of the Ayurvedic preparation "Cyavanaprasa" reduced diseases in healthy children. Another study showed that cytokine expression profiles in healthy individuals were altered by "Polinacea" herbal syrup. These studies demonstrate the potential of herbal preparations to prevent infection and/or prevent increases in phenotypic cell function. Yet, it cannot be excluded that these preparations may only have immunomodulatory potential and/or additional essential properties necessary to demonstrate a positive immune response.

Interestingly, the ability of herbal preparations to control the immune system at work is often considered herbal "immune preparation". In addition, evidence also shows that a polyhedral preparation called "Immu-21" has the ability to improve the body's immune response to stimuli. Similar increases in immune cell reactivity have been reported in pathological conditions in human patients/animal models. This development shows that herbal preparations can stimulate the immune system, which may require short or low doses to achieve an effective immune response. This is part of the ability of infection or vaccination to boost immunity, but the evidence for this is very limited.

In addition, there is no specific antigen in this preparation of the immune system. Nevertheless, the establishment of a pre-activated (pro-inflammatory) or primed state of the immune system in individuals exposed to herbal preparations would underlie this strong response to activating stimuli. Nowadays, anti-inflammatory drugs have become necessary to keep your body strong. Natural and herbal products have a long history of use to treat respiratory diseases, and many are approved as over-the-counter medications or dietary supplements. Additionally, community members and scientists are working to find the best way to treat or prevent this disease, including the use of medicinal herbs.

A recent trend in society is the inclusion of certain anti-inflammatory drugs such as curcumin, Bramhi, Ashwagandha, turmeric, etc., which have been reported to be effective in disease detection. Turmeric has been traditionally used as a medicine or supplement in many countries in Asia due to its antioxidant, anti-inflammatory, anti- mutagenic, anti-cancer and anti-inflammatory properties. Many herbal products contain compounds that act as anti-inflammatory and anti-inflammatory agents.

Indian Ayurvedic doctors recommend some important herbs that provide good protection to the body. Nuts and seeds are full of powerful anti-inflammatory nutrients that can help control diabetes, prevent many diseases, and even boost your immune system. Magnesium is essential not only for heart health but also for strong bones, muscles and even brain power. Almonds and Jaggery are rich in magnesium and iron.

Polyherbal Powders drink formulation:

The Combining several herbs (polyherbs) in a single ratio will increase the need for treatment because the phytochemical properties of one herb are not sufficient to achieve the desired effect. (1, 2) Different medicinal plant species consist of two or more plant species with similar or different therapeutic properties, different botanical properties, which together produce the desired results when treating human diseases. (3, 4) The popularity of polyherbal preparations is important for their general treatment, i.e. their use is safe in low and high doses, but with fewer side effects when used incorrectly [5, 6] Powder is one of the oldest materials and can be taken internally or externally. Powdered materials are more stable than liquid materials. Incompatibilities vary less than liquid materials. The powder acts faster than other types of drugs like

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Tablets, capsules. Powders are easier to transport than liquid forms.

The present research work designed to formulate and evaluate a novel polyherbal powder drink preparation which consists of the drying and crushing of two or more plants and mixing them in certain proportions to obtain an herbal mixture. It can be taken directly by mixing with warm water and is available paper bags.

Herbal immunity boosters are the best alternative to energy drinks and cope with negative problems. The name of selected plants for the study Bramhi, Ashwagandha, Turmeric, Almond (genus prunus), Flax (Linum usitatissimum), Jaggery (sugarcane juice), Coco powder (Theobroma cacao). The quantity of drugs which are used in the formulation was taken into a consideration by their study of drug tolerance and effective dose on the basis of toxicity studies report. The specified quantity of crude drug powder, 20 g is being used in the formulation for making polyherbal powder drink. It can be drink with warm water or with milk. After many experiments, the most suitable combination is finally selected based on taste, physical and chemical properties. Herbal drink is designed to offer consumers an affordable choice with great taste and health benefits. All herbs used in this preparation are easily available in all seasons and are not expensive. The prepare formulation is useful for all the people. It is made with natural herbs and is therefore less likely to cause side effects than soft drinks. These herbal energy drinks are a natural alternative to artificial drinks with many health benefits.

2. Objectives

To develop, formulate and evaluate a polyhedral powder drink formulation for immunity boosting the potential for the treatment of various health problems.

The core purpose of the research is to formulate a multi-herbal energy supplement.

- To prepare immune boosting polyherbal powder drink.
- To evaluate the formulation with respect to various physical parameter.
- This study aims to assess the phytochemicals and mineral elements in the formulation

3. Methods

Ingredients used in the Formulation:

Table 1: List of Ingredients used in the Formulation

Name	Biological source	Family	chemical constituent	Medicinal uses
Bramhi	*Bacopa monnieri (Linn)*	Plantaginaceae	Saponins (bacosides), betulinic acid, D-mannitol, β-stigmasterol, and stigmastanol	Boost up immune system, brain function, Immune stimulatory potential.
Ashwagandha	*Withania somnifera (Linn)*	Solanaceae	alkaloids (anaferine, isopelletierine, etc.), steroidal lactones(withanolides, withaferins), saponins	Help calm the brain, reduce swelling, lower blood pressure, and alter the immune system.
Curcumin	Turmeric (Curcuma longa)	Zingiberaceae	α,β-unsaturated β-diketone moiety and an aromatic O-methoxy-phenolic group	Immunity Booster, Anti-Inflammatory Properties
Almond	Prunus amygdalus	Rosaceae	Protein, Vitamin and minerals, Fiber	Improve blood pressure, regulate blood sugar levels,
Flax seeds	*Linum usitatis*	Linaceae	Linolenic acid,	Improve digestiv

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	simum		linoleic acid, lignans, alkaloids, cyanogenic glycosides.	e health, Help reduce the risk of heart disease.
Jaggery	Sugarcane (Saccharum officinarum Linn.)	Poaceae	Sucrose, glucose, fructose, minerals and vitamins	Energy boost, improving bone health.
Coco powder	*Theobroma cacao*	Malvaceae	Theobromine, caffeine, flavonoids and phenethylamine	Improve cholesterol and blood sugar levels.

Formula:

Table 2: Formula

Sr. No.	Ingredients	Quantity Taken	Uses
1	Bramhi	250mg	Immunity booster, Brain tonic,
2	Ashwagandha	500mg	Antidepressant
3	Curcumin	250mg	Antibiotic, Anticancer
4	Almond	2gm	Protein
5	Flax seed	1gm	Protein
6	Jaggery	7 gm	Sweetening agent
7	Coco powder	4gm	Flavoring agent,, Preservative

Excipients:

Preservatives: - Formulation of drink requires the incorporation of preservative to maintain the quality and stability of the product. Some preserving action is obtained by the flavoring agent. E.g. Coco powder.

Flavoring Agent: - To formulate a drink, required flavoring agent to enhance its taste. Flavoring agents can include natural extracts, essential oils, and herbs depending on the desired taste profile of the drink. E.g. Coco powder.

Sweeting Agent: - Formulation of drink requires sweetening agent to provide sweetness with health benefits. Jaggery is a natural sweetener made from sugarcane juice. It has immunity-boosting properties like iron, calcium, magnesium, and potassium. E.g. Jaggery powder.

Proteins Source: - Formulation of drink required Proteins. Proteins play a crucial role in immune function. They are essential for repairing tissues, Including sufficient protein in your diet can help support a healthy immune system. E.g. Almond and flax seeds.

Solvent:- Ethanol, alcohol and water were employed in extractive activity. The analytical grade quality solvents were used, which were issued from the Institute. E.g. Ethanol, Alcohol and Water.

Procedure for Powder Formulation:

Accurately measure every component individually

⬇

Transfer the ingredient from sieve no.20.

⬇

Mix the ingredient thoroughly too uniformly distribute the entire ingredient.

⬇

Package the formulation in appropriate container.

Fig 1: Herbal Powder Formulation

Evaluation Procedure:

Organoleptic Evaluation: The product was evaluated on the basis of Colour, Odour, Taste, Appearance etc.

Physicochemical Evaluation: Various physicochemical test were performed such as angle of repose, bulk density, tapped density, moisture content, etc.

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Angle of repose: To evaluate the angle of repose, a fixed funnel method was selected for evaluation. A funnel was fixed at a predetermined height, over a grid paper placed on levelled surface. The tip of the funnel was blocked and the powdered formulation was filled in the funnel. After which the powder was allowed to flow from the funnel on to the graph paper, then mark was made on the paper along the circumference of the pile. The radius (r) of the pile and the height (h) was then measured. The angle of repose (θ) was determined by using:

Tan θ = height/radius

Where,
θ = angle of repose,
h= height of pile,
r= radius of pile.

Table 3: Angle of Repose Values

Value of angle of repose	Flow Properties
≤ 30°	Free flowing material
≥ 40°	Poorly flowing material
25°- 30°	Excellent flow properties
31°-35°	Good flow properties
36°-40°	Fair flow properties
41°-45°	Passable flow properties

Bulk Density:

The fine-grained formulation was put into a dry 100ml measuring cylinder without compaction. The powder was precisely flattened, ensuring that powder was not compacted and the apparent volume (Vo) was recorded. Formula for calculation of bulk density is as follows:

ρ (b) = M / Vo (gm/ml)

Where, ρ (b) = Apparent Bulk density, M = sample's weight, Vo = volume of sample.

Tapped Density: After the bulk density process, measuring cylinder containing the powder was tapped using Tap Density tester. The sample was tapped 100 times and the volume after tapping was recorded to the closest graduated unit, giving us the tapped volume (Vf). To calculate the tapped density we use the formula: **ρ (tap) = M / Vf (gm/ml)**

where, ρ (tap) = Tapped density, M = weight of sample, Vf = volume of sample.

Carr's Index (The Compressibility Index): Carr's Index is a measure of tendency of a powder formulation to be compacted, which is determined using the bulk and tapped densities. The less compactible the better flow property it is. It measure the interparticulate interaction of material. In free flowing powder, the values of bulk and tapped densities are closer in value as the interaction is very low. Whereas in poorer flow material, the contrast between bulk and tapped densities are much more significant. The formula used for calculation of Carr's Index is,

Compressibility Index = { [ρ (b) – ρ (tap)]/ ρ (tap)} * 100

Where, ρ (b) = Bulk density, ρ (tap) = Tapped density.

Table 4: Compressibility Index Values

Compressibility	Index Properties
≤10	Excellent
11-15	Good
16-20	Fair
21-25	Passable
26-31	Poor
32-37	Very Poor
>38	Very Very Poor

Hausner's Ratio: Hausner's Ratio is the secondary measure of property of bulk material, the number associated to flowability of a powder formulation. The formula is as follows:

Hr = ρ (tap)/ ρ (b)

ρ (tap) = Tapped Density,
ρ (b) = Bulk Density.

Table no 5: Hausner's Ratio Index

Hausner's Ratio	Flow Properties
1.00-1.11	Excellent
1.12-1.18	Good
1.19-1.25	Fair
1.26-1.34	Passable
1.35-1.45	Poor
1.46-1.59	Very Poor
>1.60	Very Very Poor

Moisture Content: Since large content of moisture can encourage hydrolytic reaction, causing microbial

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growth. Herbal powder then have a higher moisture content than its counterparts that is why it's important to know the moisture content, to select proper packaging for the product. The hot air oven air was used to calculate moisture content by placing a measured amount (W) of powder into a preheated porcelain dish, and weight the dish along with the powder (W1). The porcelain dish was then placed into a hot air oven at 60°C for 2 hours. After 2 hours, the porcelain dish is removed from the oven and weight again (W2). Then the moisture content was measured:

Moisture Content (% = [(W1 – W2)/ W]*100

Where, W= powder' weight (gm), W1 = weight of dish before drying (gm), W2 = weight of dish after drying (gm).

Ash content: It represents the inorganic residue such as phosphate, carbonate and silicate present in herbal drugs. It is important as it illustrates the quality as well as purity of herbal medicine. It calculated after removing all the organic matter traces from sample.

Total ash content – To a weighed crucible (W1), predetermined dry sample is added. The crucible is weighed again with the sample (W2). The crucible is then placed in a furnace until the organic matter is burned off. Then we weight the crucible along with the residue (W3). White colour of residue indicates absence of carbon.

Total Ash (%) = [(W3 – W1)/ (W2 – W1)]*100

Phytochemical Evaluation:

Evaluation of Brahmi:

Preparation of Brahmi Extract: The extract was prepared by adding 10gm of brahmi powder to 60ml of ethanol in beaker, which was then sealed and allowed to macerate at room temperature for 3 days. After 3 days the ethanol was separated from the powder using filtration. Thus, extract of brahmi was prepared.

Table 6: Phytochemical Testing of Brahmi Extract

Name of Test	Phytoconstituents	Procedure
Mayer's Test	Alkaloids	Few ml of sample extract, 1ml of Mayer's reagent was put in and observed
Hager's Test	Alkaloids	2ml of sample extract, 1ml of Hager reagent was put in and observed.
Wagner's Test	Alkaloids	2ml of sample extract, 1ml of Wagner's reagent was put in and observed.
Millon's Test	Proteins	To 3ml of sample extract, add 5ml of Millon's reagent, then heat the Resulting reaction product in water bath.
Legal's test	Glycosides	To 3ml of sample extract, add 1ml of pyridine and shaken. Then add 1ml of sodium nitroprusside.
Molisch Test	Carbohydrates	To 3ml of sample extract, we add few drops of alcoholic alpha naphthalol solution and shake well. Then 2ml of conc. Sulphuric acid is introduced precisely by the side walls of the test tube.

Evaluation of Ashwagandha:

Preparation of Ashwagandha Extract: Maceration was used to prepare extract, to a dry breaker add 5gm of Ashwagandha powder and 50ml of ethanol. Stir the mixture well and seal the beaker using aluminium foil. Allow the mixture to sit for 24 hours, with occasional stirring. After 24 hours, filter the mixture and the extract is prepared.

Table 7: Phytochemical Testing of Ashwagandha extract

Name of Test	Phytoconstituents	Procedure
Mayer's test	Alkaloids	Few ml of sample extract, 1ml of Mayer's reagent was put in and observed
Wagner's test	Alkaloids	2ml of sample extract, 1ml of Wagner's reagent was put in and observed.
Hager's reagent	Alkaloids	To 2ml of sample extract, 1ml of Hager reagent was added and observed.

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Dragendroff's test	Alkaloids	Test sample was treated with Dragendroff's reagent and observed.
Fehling's test	Carbohydrates	To 1ml of extract, 1ml of both Felhing's A and Felhing's B solutions were put in and heated in a water bath for 10 mins. After heating the extract was observed
Molisch Test	Carbohydrates	To 3ml of sample extract, we add few drops of alcoholic alpha naphthanol solution (Molisch Reagent) and shake well. Then 2ml of conc. Sulphuric acid is precisely introduced along the walls of the test tube.
Foam Test	Saponin Glycoside	Add few mls of extract to a test tube with water and shake the test tube vigorously.
Ferric chloride test	Flavonoids	Ferric chloride solution was put in the sample.
Liebermann-Burchard Test	Steroids	The extract was dissolved in 2ml of chloroform, and then 10 drops of acetic acid were added and shaken along with few drops of conc. H_2S0_4.

Evaluation of Curcumin:

Preparation of Curcumin Extract: To prepare curcumin extract, add 10gm of curcumin powder in 65ml of ethanol and allow it to stand for 48 hours in a sealed beaker. Then filter the solution, the resulting filtrate is the curcumin extract.

Table 8: Phytochemical Testing of Curcumin extract

Name of Test	Phytoconstituents	Procedure
Mayer's test	Alkaloids	Few ml of sample extract, 1ml of Mayer's reagent was put in and observed
Wagner's test	Alkaloids	2ml of sample extract, 1ml of Wagner's reagent was put in and observed.
Dragendroff's test	Alkaloids	Test sample was treated with Dragendroff's reagent and observed.
Ferric chloride test	Flavonoids	Ferric chloride solution was put in the sample.
Molisch Test	Carbohydrates	To 3ml of sample extract, we add few drops of alcoholic alpha naphthanol solution and shake well. Then 2ml of conc. Sulphuric acid is added carefully along the walls of the test tube.
Millon's test	Phenol amino acids	To 2ml of sample extract, add 2ml of Millon's reagent and heat the solution in a water bath.
Borntrager's test	Anthraquinone Glycosides	To 3ml of sample extract, add 5ml of dilute HCl and heat in a water bath for 10 mins. Filter the mixture using a filter paper. To the filterate add equal amounts of CCl4 and ammonia and shake the solution.

Evaluation of Almond powder:

Preparation of Almond powder Extract: To prepare extract of almond powder, macerate 10gm of almond powder with 60ml of ethanol in a sealed beaker for 36 hours. After which the solution is filtered and the resulting filtrate is the almond powder extract.

Table 9: Phytochemical Testing of Almond Powder

Name of Test	Phytoconstituents	Procedure
Mayer's test	Alkaloids	Few ml of sample extract, 1ml of Mayer's reagent was put in and observed

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Hager's reagent	Alkaloids	To 2ml of sample extract, 1ml of Hager reagent was added and observed.
Ferric chloride test	Flavonoids	Ferric chloride solution was put in the sample.
Lead acetate test	Flavonoids	Lead acetate solution was put in the sample.
Shinoda test	Flavonoids	To 1ml of sample extract, add few ribbons of magnesium and then add conc. HCl acid dropwise. Observe for colour change.
Ferric chloride test	Tannins	Ferric chloride solution was put in the sample.
Lead acetate test	Tannins	Lead acetate solution was put in the sample.
Foam Test	Saponin Glycoside	Add few ml of extract to a test tube with water and shake the test tube vigorously.

Evaluation of Jaggery powder:

Preparation of Jaggery powder Extract: The extract of Jaggery powder was prepared by adding 10gm of jaggery powder to 50 ml of water and thoroughly mixing it for 10mins. The resulting mixture is used as extract for evaluation.

Table 10: Phytochemical Testing of Jaggery Powder

Name of Test	Phytoconstituents	Procedure
Solubility test	Carbohydrates	To 0.5g of powder, add 5 ml of water and mix thoroughly.
Molisch Test	Carbohydrates	To 3ml of sample extract, we add few drops of alcoholic alpha naphthanol solution (Molisch Reagent) and shake well. Then 2ml of conc. Sulphuric acid is put in carefully along the walls of the test tube.
Fehling's test	Carbohydrates	To 1ml of extract, 1ml of both Felhing's A and Felhing's B solutions were put in and heated in a water bath for 10 mins. After heating the extract was detected
Benedict's test	Carbohydrates	To 5ml of reagent of Benedict's, add 8 drops of sample solution and mix well. Boil the solution in water bath for 2 mins.
Barfoed's test	Carbohydrates	To 2 ml of sample solution, add equal amounts of Barfoed's solution and shake. Boil the solution on water bath for 5 mins
Rapid Furfural test	Carbohydrates	1.5 ml of sample was put in 1 ml of alpha naphthol solution and 5ml of conc. H2SO4. Then boil the solution in water bath for 5mins.
+Iodine test	Carbohydrates	To 2ml of sample solution, we introduced 1-2 drops of iodine solution and changes were detected
Seliwanoff's test	Carbohydrates	To a test tube, add 1ml of sample solution and 2ml of Seliwanoff's reagent. Boil the test tube for 1 min in water bath
Starch test (A)	Carbohydrates	The 2ml of sample solution add 3ml of NaOH and starch powder. To the jelly like mass, add iodine solution
Starch test (B)	Carbohydrates	The resulting solution from Starch test(A),we add a few drops of NaOH solution.

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Evaluation of Cocoa powder:

Preparation of Cocoa powder Extract: To prepare the extract, 10gm of cocoa powder was added to 50ml of ethanol and allowed to macerate for 24 hours in sealed beaker. The mixture is then filtered and the resulting filtrate is used as extract.

Table 11: Phytochemical Testing of Cocoa extract

Name of Test	Phytoconstituents	Procedure
Dragendroff's test	Alkaloids	Test sample was treated with Dragendroff's reagent and observed.
Foam Test	Saponin Glycoside	Add few mls of extract to a test tube with water and shake the test tube vigorously.
Ferric chloride test	Tannins	Ferric chloride solution was put in sample.
Vanillin- HCl test	Condensed Tannins	Treat the sample solution with vanillin-HCl solution and observe.

4. Results

Organoleptic Evaluation Results:

Table 12: Organoleptic Evaluation Results

Parameter	Observation
Color	Brown
Odor	Chocolate
Taste	Sweet
Appearance	Chocolatey good

Physicochemical Evaluation Results:

The results of the physicochemical evaluation are as follows:

Angle of repose:

Height of pile (h) = 2.8 cm Radius of pile (r) =4.9 cm

Angle of repose = θ

Tan θ = h/r

= 2.8 /4.9

=0.5714

$\theta = \tan^{-1}(0.5714)$

=29.6°

Therefore, angle of repose is 29.6°

Thus, the flow property of powder is Excellent Flow Properties.

Bulk Density:

Sample powder weight (M) = 15 gm

Apparent Volume of Sample (Vo)= 28ml

Bulk density= ρ (b)

ρ (b) = M / Vo (gm/ml) ρ (b) = 15 / 28

ρ (b) = 0.5357gm/ml

Thus, the bulk density of powder was observed to be 0.5357 gm/ml.

Tapped Density:

Weight of Sample powder (M) = 15 gm

Volume of Sample after tapping (Vf)= 20 ml

Tapped density= ρ (tap)

ρ (tap) = M / Vf (gm/ml) ρ (tap) = 15 / 20

ρ (tap) =0.75 gm/ml

The tapped density of powder is found to be 0.75gm/ml.

Carr's Index:

Bulk density= ρ (b) = 0.5357 gm/ml

Tapped density= ρ (tap) = 0.75 gm/ml

Compressibility Index = {[ρ (b) – ρ (tap)]/ ρ (tap)} * 100

= {[0.5357 - 0.75]/ 0.75 }*100

= {0.14}*100

=14 %

Therefore, the value of Carr's Index is 14% thus, the index properties of powder is good.

Hausner's Ratio:

Bulk density= ρ (b) = 0.5357 gm/ml

Tapped density= ρ (tap) = 0.75 gm/ml

Hausner's Ratio= Hr

Hr = ρ (tap)/ ρ (b)

Hr = 0.75 /0.5357

Hr= 1.16

The Hausner's ratio value came out to 1.16 means flow properties of the formulation is good.

Moisture Content:

Weight of powder (W) = 30 gm

Weight of dish before drying (W1) = 70 gm

Weight of dish after drying (W2) = 65 gm

Moisture Content (%) = [(W1 – W2)/ W]*100

= [(70 -65)/30]*100

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= [5 /30]* 100
=[0.166]*100
= 16.666.
Thus the moisture content of powder is 16.666.

Ash content:
Weigh of empty crucible (W1) = 73.98 gm
Weigh of crucible with the sample (W2) =87.5gm
Weight of crucible with the residue (W3) = 76 gm
Total Ash (%) = [(W3 – W1)/(W2 – W1)]*100
= [(76 – 73.98)/(87.5 – 73.98)]*100
= [2.02 / 13.52]*100
= [0.149]*100
= 14%
Therefore, the total ash value was found out to be 14%.

Phytochemical Evaluation Results:

Table 13: Evaluation Result of Brahmi

Name of Test	Observation	Conclusion
Test for Mayer's reagent	Creamy coloured ppt.	Alkaloids are present
Test for Hager's reagent	Yellow coloured ppt.	Alkaloids are present
Test for Wagner's reagent	Reddish brown ppt.	Alkaloids are present
Test for Millon's reagent	Reddish ppt.	Proteins present
Legal's test	Formation of light pink colour	Glycosides are present
Test for Molisch reagent	At the junction of solutions, reddish violet ring is formed	Carbohydrate s present

Fig. 2 Phytochemical evaluation of Bramhi extract

Table 14: Evaluation Result of Ashwagandha

Name of Test	Observation	Conclusion
Mayer's reagent	Creamy coloured ppt.	Alkaloids are present
Wagner's reagent	Red - brown ppt.	Alkaloids are present
Hager's reagent	Yellow coloured ppt.	Alkaloids are present
Dragendroff's test	Orange red ppt.	Alkaloids are present
Fehling's test	Brick red ppt.	Carbohydrates are present
Molisch reagent	At the junction of solutions, red-violet ring is formed	Carbohydrates present
Foam Test	Foam created on shaking	Saponin Glycoside present
Ferric chloride test	Black-red colour not formed	Flavonoids absent
Liebermann-Burchard Test	blue – green colour to red shows presence	Steroids are present

Fig. 3 Phytochemical evaluation of Ashwagandha extract

Table 15: Evaluation Result of Curcumin

Name of Test	Observation	Conclusion
Mayer's test	Creamy coloured ppt.	Alkaloids test positive
Wagner's test	Reddish brown ppt.	Alkaloids test positive
Dragendroff's test	Orange red ppt.	Alkaloids test positive
Ferric chloride test	Blackish red colour formed	Flavonoids test positive

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Molisch Test	At the junction of solutions, red-violet ring is formed	Carbohydrates present
Millon's test	Orange colour formation	Phenol amino acids present
Borntrager's test	Formation of red colour in ammonical layer	Anthraquinone Glycosides present

Fig. 4 Phytochemical evaluation of Curcumin extract

Table 16: Evaluation Result of Almond powder

Name of Test	Observation	Conclusion
Mayer's test	Creamy coloured ppt.	Alkaloids present
Hager's reagent	Yellow coloured ppt.	Alkaloids present
Ferric chloride test	Black - red colours present	Flavonoids present
Lead acetate test	Orange-ish colour ppt.	Flavonoids present
Shinoda test	Pink colour observed	Flavonoids present
Ferric chloride test	Black colour observed	Tannins observed
Lead acetate test	White ppt. formed	Tannins present
Foam Test	Persistent foam observed	Saponin Glycoside present

Fig. 5 Phytochemical evaluation of Almond extract

Table 17: Evaluation Result of Jaggery extract

Name of Test	Observation	Conclusion
Solubility test	The powder is soluble	Monosaccharide and disaccharide observed
Molisch Test	At the junction of solutions, red-violet ring is formed	Carbohydrates present
Fehling's test	Brick red ppt.	Carbohydrates present
Benedict's test	Green, blue, or red ppt.	Reducing sugar present
Barfoed's test	White ppt formed	Disaccharide present
Rapid Furfural test	Deep purple colour formed	Ketose, fructose, sucrose present
Iodine test	Brown wine colour	Starch present
Seliwanoff's test	Reddish colour observed	Carbohydrates present
Starch test (A)	No blue colour	Starch present
Starch tes(B)	Blue colour	Starch present

Fig.6 Phytochemical evaluation of Jaggery extract

Table 18: Evaluation Result of Cocoa powder

Name of Test	Observation	Conclusion
Dragendroff's test	Orange red ppt.	Alkaloids present
Foam Test	Persistent foam formed	Saponin Glycoside present
Ferric chloride test	Blackish colour observed	Tannins present
Vanillin-HCl test	Pink colour is formed	Condensed Tannins present

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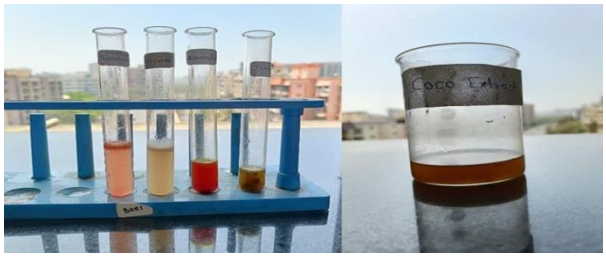

Fig.7 Phytochemical evaluation of Cocoa extract

5. Discussion

The formulation prepared was beneficial for boosting immunity activity. After many experiments, the most suitable combination is finally selected based on taste, physical and chemical properties. Herbal drink is designed to offer consumers an affordable choice with great taste and health benefits. All herbs used in this preparation are easily available in all seasons and are not expensive. The prepared formulation is useful for all the people. It is made with natural herbs and therefore is less likely to cause side effects than soft drinks. The formulation was prepared using products from plant sources, thus the chances of side effect are lowered. This drink is a better option to synthetic drink powders while providing boosting immunity activity. The ingredients were tested for optimum activity. Thus, the immunity boosting drink powder was formulated and prepared.

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