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Research

Formulation And Evaluation of Instant Polyherbal Tea Powder: A Nutraceutical Solution For Modern Lifestyles

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Abstract

In response to the rising demand for health-oriented and convenient dietary supplements, this study aims to develop and evaluate an instant polyherbal tea powder dosage form. The formulation utilizes Microencapsulation Solid Dispersion Method, integrating herbal ingredients such as Garcinia cambogia, Moringa oleifera, Camellia sinensis, Citrus limon, and Stevia rebaudiana, renowned for their medicinal and nutraceutical properties. The powdered unit dosage form underwent pharmacognostic, physicochemical, and sensory evaluations, including organoleptic analysis, moisture content determination, extractive value, ash value assessment, pH testing, angle of repose, TLC, and HPTLC analyses. With its innovative design, this dosage form offers a convenient solution for modern consumers, ensuring ease of use, stability, and optimal health benefits.

Keywords: Powder Dosage Form, Herbal Tea, Nutraceutical, Garcinia cambogia, Lifestyle Adaptation, Obesity Management.

INTRODUCTION

Novel drug delivery systems are innovative approaches designed to enhance drug efficacy, minimize side effects, and improve patient compliance. These methods include advanced technologies such as nanoparticles, liposomes, transdermal patches, and solid dispersions, each offering unique advantages in targeted and controlled drug delivery.

Microencapsulation, a prominent technique within novel drug delivery, involves coating active compounds with a polymeric shell to improve stability, bioavailability, and controlled release. The process ensures environmental protection for the core material and facilitates delayed-release formulations, making it vital in pharmaceutical applications (Patel et al., 2023).

Similarly, solid dispersion technology enhances solubility and absorption of poorly water-soluble drugs by dispersing them in hydrophilic carriers. Polyethylene glycol (PEG) and polyvinyl pyrrolidone (PVP) are widely

used polymers, with PEG being preferred for its lower melting point and hydrophilic properties, allowing effective drug dispersion (Liu et al., 2023).
By integrating microencapsulation and solid dispersion techniques, novel formulations such as polyherbal tea powders can cater to modern lifestyles, providing convenient and health-promoting nutraceutical solutions.

Introduction to Medicinal Plants

Garcinia cambogia

Common Name: Malabar tamarind
Botanical Name: Garcinia cambogia
Phytochemical Composition: The fruit rind of *Garcinia cambogia* contains hydroxycitric acid (HCA), a key organic acid with potential anti-obesity effects. HCA regulates serotonin levels to reduce appetite, promote fat oxidation, and inhibit fat production. Phytochemical studies have also revealed xanthones (e.g., cambogiol) and benzophenones (e.g., garcinol) with antioxidant and anti-inflammatory activities.
Pharmacological Benefits: Anti-obesity, appetite control, anti-inflammatory effects, cholesterol reduction, and digestive health.
Example: HCA-enriched extracts are widely used in weight-loss supplements, showcasing a natural approach to obesity management.

Moringa oleifera

Common Name: Moringa, Drumstick tree
Botanical Name: Moringa oleifera
Phytochemical Composition: Rich in flavonoids, anthocyanins, alkaloids, and terpenoids, *Moringa oleifera* provides a broad spectrum of nutraceutical benefits. Its saponins and tannins further enhance its therapeutic potential.
Pharmacological Benefits: Skin and liver protection, anti-inflammatory effects, cardiovascular support, diabetes management, and cancer prevention.
Example: Moringa leaf powder is used in nutraceutical products to support cardiovascular health and improve glucose tolerance in diabetic patients.

Camellia sinensis

Common Name: Tea plant
Botanical Name: Camellia sinensis
Phytochemical Composition: Rich in polyphenols (catechins, flavonoids), alkaloids (caffeine, theophylline), and tannins. These compounds exhibit potent antioxidant properties, supporting overall health.
Pharmacological Benefits: Antioxidant effects, cancer prevention, antiviral activities, and immune system enhancement.
Example: Green tea made from *Camellia sinensis* leaves is widely consumed for its ability to combat oxidative stress and reduce the risk of chronic diseases.

Citrus limon

Common Name: Lemon plant
Botanical Name: Citrus limon
Phytochemical Composition: Contains monoterpenes (limonene), sesquiterpenes, citral, and esters. These compounds exhibit antimicrobial and antioxidant activities.
Pharmacological Benefits: Supports heart health, enhances immunity, improves digestion, aids in weight management, and reduces cancer risk.
Example: Lemon water, rich in vitamin C and citral, is commonly used to support digestion and boost the immune system.

Stevia rebaudiana

Common Name: Candy leaf, Sugar leaf
Botanical Name: Stevia rebaudiana
Phytochemical Composition: Enriched with diterpene glycosides, alkaloids, and flavonoids. These compounds provide a natural, calorie-free sweetness, making it ideal for dietary use.
Pharmacological Benefits: Diabetes management, weight control, antihypertensive properties, and oral health benefits.
Example: Stevia-based sweeteners are widely used as a natural alternative to sugar in beverages and confectionery, aiding in weight management and diabetes care.

Dosage Forms

Dosage forms refer to the physical forms of chemical compounds utilized as drugs or medications intended for administration or consumption. These forms ensure accurate drug delivery, tailored to meet therapeutic requirements.

Powder Dosage Forms

Pharmaceutical powders are solid, dry substances composed of finely divided particles, used for both internal and external purposes. These powders, prepared through processes like crushing and grinding, range in size from 10 nanometers to 1000 micrometers. They are recognized for their fine structure and elegant appearance, and powders are often observed to offer quicker drug absorption compared to liquid formulations.

Types of Powders

- Bulk Powder: Non-divided large quantities, used externally or as dietary supplements.
- Dusting Powder: Applied topically for skin protection (e.g., talcum powder).
- Douche Powder: Dissolved in water for cleansing purposes.
- Insufflations: Applied to body cavities such as the nose or throat.
- Divided Powders (Unit Dose): Pre-measured doses for precise administration.
- Powder Sprays: Delivered via aerosol containers for topical or inhalation use.
- Efflorescent Powders: Contain crystallized water and may release moisture upon exposure.

Advantages

- Versatility: Allows for the combination of multiple medicinal agents.
- Improved Stability: Powdered forms generally exhibit higher shelf life and physicochemical stability.
- Ease of Consumption: Suitable for individuals (e.g., children, adults with swallowing difficulties) who may struggle with tablets or capsules.

Disadvantages

- Taste Issues: Unpleasant flavours may affect compliance.
- Bulky Nature: Powders are less portable due to their weight and size.
- Hygroscopic Sensitivity: Drugs prone to moisture absorption are not ideal for powder formulations.
- Gastrointestinal Challenges: Powdered drugs unsuitable for those that degrade or irritate the stomach.

The Need for adaptation of Novel Dosage forms in Polyherbal Powder Unit Dosage form

Integrating solid dispersion and nanoparticles phytosomes into polyherbal powder unit dosage forms can address existing limitations, ensuring enhanced efficacy, stability, and patient compliance. This adaptation represents a significant step forward in the development of nutraceuticals tailored to modern consumer needs.

Medicinal Herbal Tea in Unit Dosage

A medicinal herbal tea enclosed in a porous tea bag offers a convenient method for preparing an aqueous solution for oral consumption. Designed for single-use, this unit dosage form caters to consumer preferences for ease, efficiency, and precision in medicinal tea preparation.

Advantages for Polyherbal Powder Unit Dosage Forms

1. **Enhanced Solubility:** Both solid dispersion and nanoparticles phytosomes improve the solubility of poorly water-soluble phytochemicals, ensuring higher absorption rates.
2. **Controlled Release:** Novel dosage forms enable sustained and consistent release of active compounds, maximizing therapeutic benefits.
3. **Stability:** Microencapsulation and lipid vesicle techniques reduce environmental degradation of herbal constituents.
4. **Improved Consumer Acceptability:** Masking taste and odor ensures greater compliance, particularly for pediatric and geriatric patients.
5. **Precision in Unit Dosage:** Unit dosage forms with novel technologies provide accurate dosing, reducing variability and enhancing patient convenience.

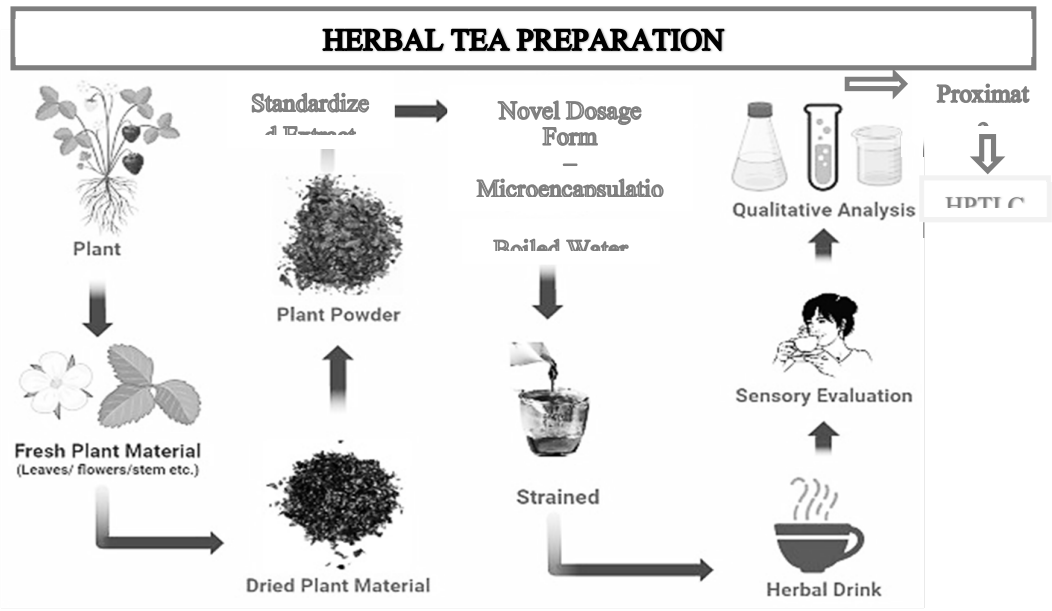


Fig. 1: Herbal Tea Preparation and Evaluation

MATERIALS AND METHODS

METHODS

Microencapsulation

Microencapsulation is defined as a process by which very tiny particles or droplets of liquids or solids material are surrounded or coated with a continuous film of polymeric material. Solid dispersion melt method was one of the microencapsulating processes. The basic principle of solid dispersion melt method is that a physical mixture of a drug and hydrophilic carrier is heated directly until they melt at a temperature slightly above their eutectic point. In this method the hydrophilic polymer poly ethylene glycol was melted above its eutectic point and required amount of drug was added. Then the melt is cooled and solidified rapidly in an ice bath with stirring. The final solid mass is crushed and sieved by using sieve no 18 and 44.

EVALUATION TEST

PRELIMINARY PHYTOCHEMICAL SCREENING

Preliminary phytochemical screening is carried out by different reaction, by various chemical reagents this enables to identify the presence of different chemical group in particular extraction.

Test for carbohydrate

1. Molisch test:

Mix 1ml reagent in 2ml of test solution. Add 1ml of concentrated sulphuric acid. Formation of violet ring indicates the presence of carbohydrates.

2. Fehling's test:

Mix 1ml of Fehling's solution A and 1ml Fehling's solution B and 1ml of test solution then boil. Reducing sugar gives red precipitate.

Test for alkaloids

1. Dragendorff's test: Few drops of dragendorff's reagent were added to the drug solution. Formation of orange brown colour precipitate indicates the presence of alkaloids.

2. Mayer's test: 2ml of mayer's reagent were added to 1ml of the test solution. Formation of white or cream precipitate indicates presence of alkaloids.

3. Wagner's test: To few amounts Wagner's reagent and few drops of drug solution. Formation of reddish-brown precipitate indicates presence of alkaloids.

Test for flavonoids

Alkaline reagent test: To the test solution, add few drops of sodium hydroxide solution. Formation of intense yellow colour change in to colourless on adding few drops of dilute acid indicate presence of flavonoids.

Test for saponin

Foam test: The drug extract was vigorously shaken with water. Formation of foam indicates presence of saponin.

Test for proteins

Biuret test: To 3ml of drug solution add 4% of sodium hydroxide and few drops of 1% copper sulphate solution. Formation of violet or pink colour indicates presence of protein.

Xantoprotien test: Mix 3ml test solution with 1ml concentrated sulphuric acid, white precipitate if formed then boil it precipitate turns yellow. Add ammonium hydroxide, precipitate turns orange.

Test for steroid

Salkowski reaction: To 2ml of extract, add 2ml of chloroform and 2ml concentrated sulphuric acid and shake well. Chloroform layer shows greenish yellow fluorescence indicates presence of steroids.

Test for glycoside

Anthraquinone glycoside-Bontrager's test: To about 3ml of extract, dilute sulphuric acid was added. It was boiled and filtered. To the cold extract add equal volume of benzene or chloroform was added. After shaking organic solvents were well separated then add ammonia. If ammoniacal layer turned to pink it indicates presence of anthraquinone glycoside.

Baljet's test – cardiac glycoside: Sodium picrate was added to the test solution. If yellow colour change to orange colour it indicates presence of cardiac glycoside.

Determination Of Moisture Content

The loss on drying is determined by heating a sample in an oven to a temperature below its melting point and includes all volatile substance, including water content and solvents. Weigh accurately 0.5g of finely powdered extract in a flat-bottomed dish. Dry it in oven at 100-105^{0}C for 3 hrs. Cool the desiccator over diphosphorous pentoxide or anhydrous silica gel. Calculate the percentage yield of the loss on drying

$$\textbf{Moisture content} = \frac{\text{initial weight of the sample- weight of the sample after drying}}{\text{Initial weight of the sample}} \times 100$$

Determination Of Ash Value

The ash value mainly represents the inorganic residues as phosphate, carbonates and silicates present herbal drug. The residue remaining after incineration is called physiological ash. The type of ash value determined is, Total ash value, Acid insoluble ash value, Water soluble ash value.

Total Ash value

Organic and carbon matter present in the drug is converted in to ash at a temperature 450^{0}C. It mainly contains carbonates, phosphates, silicates. Total ash value is used for the study of water soluble and acid insoluble ash value. Weigh accurately 2g of drug in a tarred silica crucible. Incinerate at a temperature not exceeding 450^{0}C until free from carbon. Then cool and weigh it, Collect the residue in an ashless filter paper and then incinerate the residue until the ash become white color. Add the filtrate to the dish, evaporate to dryness and ignite it. Calculate the percentage yield.

Water soluble ash value

It is done by separating the water-soluble material which is direct to yield water soluble ash. Boil the total ash obtained for few minutes with 25ml of water. Collect insoluble matter in a crucible or in ashless filter paper. Wash with hot water and ignite to constant weight at low temperature. Then subtract the weight of insoluble matter from the weight of the ash. Calculate the percentage yield.

Acid insoluble ash

It is done by total ash is treated with diluted hydrochloric acid which remove the inorganic salts to yield acid insoluble ash. Boil the ash obtained in the total ash value for few minutes with 25ml hydrochloric acid. Collect the insoluble matter in crucible or ash less filter paper wash with hot water and ignite to constant weight. Calculate the percentage yield.

DETERMINATION OF EXTRACTIVE VALUE

Determination of alcohol soluble extract: Macerate about 5 gm accurately weighed coarsely powdered crude drug with 100 ml alcohol in a stoppered flask for 24 hrs, shaking frequently during first 6 hrs. Filter rapidly through filter paper. Evaporate 25 ml of alcoholic extract to dryness in a tared bottomed dish. Dry & weigh. Calculate %w/w of alcohol soluble extract.

ANGLE OF REPOSE

Angle repose is defined as the maxima angle possible between the surface of a pile of a powder and the horizontal plane. $\tan \theta = h / r$, $\theta = \tan^{-1}(h/r)$.

A funnel is fixed at a particular height 'h' cm on a burette stand. A white paper is placed below the funnel on the table. The given powdered drug whose angle of repose is to be determined is passed slowly through the funnel, until it forms a pile. Further addition of drug is stopped as soon as the drug pile touches the tip of the funnel. Circumference of the pile of the drug is drawn with a pencil without disturbing the pile. The radius of the pile is noted down as 'r' cm. Angle repose θ degree of this drug is then calculated by using the formula.

Determination Of pH

Drop of the sample on the pH paper using a clean dropper. Observe the change in the colour of the pH paper. Now compare the colour obtained on the pH paper with the colour shades on the standard pH chart. Make a note on pH value obtained.

Determination By TLC

Thin layer chromatographic analysis is separation technique by which various components of a mixture are separated with respect to their adsorption capacity on stationary phase. The thin layer chromatographic analysis plates were coated with silica gel and activated. The mobile phase was prepared by using chloroform: ethyl acetate: methanol: formic acid (86: 6: 3: 5) and poured in to TLC analysis chamber and kept for saturation with filter paper in to it and closed the chamber. After a period of saturation for about 20min, the sample is spotted by using capillary tube, 2cm above the plate bottom, and spots were allowed to air dry at room temperature. The plate was placed properly in the chamber, the chamber was closed and kept for analysis until the mobile phase reach at least 2/3 rd of the plate height. The plate was then taken out; the solvent front was immediately marked and allowed to air dry for 15-20 min, then dried in an oven. The constituent separated were visualised by spraying with vanillin sulphuric acid. Rf value of spot developed was calculated using formula

$$\text{Rf value} = \frac{\text{Distance travelled by solute}}{\text{Distance travelled by solvent front}}$$

RESULTS AND DISCUSSION

Microencapsulation

Microencapsulation is defined as a process by which very tiny particles or droplets of liquids or solids material are surrounded or coated with a continuous film of polymeric material. Solid dispersion melt method was one of the microencapsulating processes. The basic principle of solid dispersion melt method is that a physical mixture of a drug and hydrophilic carrier is heated directly until they melt at a temperature slightly above their eutectic point. In this method the hydrophilic polymer poly ethylene glycol was melted above its eutectic point and required amount of drug was added. Then the melt is cooled and solidified rapidly in an ice bath with stirring. The final solid mass is crushed and sieved by using sieve no 18 and 44.

Fig 2: Solid dispersion melting, Solidification & Sieving of microencapsulation

Table 1: Preliminary Analysis of Phytochemicals (Drug)

Constituents	Test	Observation	
		Drug with PEG	Drug without PEG
Carbohydrates	Molishes Test	+	+
	Fehlings Test	-	-
Alkaloids	Mayers Test	+	+
	Dragendorffs Test	+	+
	Wagners Test	-	-

Flavanoids	Alkaline Reagent Test	+	+
Saponins	Foam Test	-	+
Protiens	Baljet Test	-	-
	Xanthoprotien Test	-	-
Steroids	Salkowski Reaction Test	-	-
Glycosides	Anthraquinone Glycoside Borntragers Test	+	+
		+	+

+Present -Absent

ORGANOLEPTIC EVALUATION

Organoleptic evaluation can be done by means of organ of senses. This refers to the evaluation of drug by colour, odour, taste etc. The results are given in the table.

Table 2: Organoleptic properties of drug

Colour	Straw colour
Odour	Earthy aroma
Taste	Neutral taste

DETERMINATION OF MOISTURE CONTENT

Moisture content of the drug was determined and reported.

Table 3: Percentage Moisture Content of Drug

Calculation	Drug with PEG	Drug without PEG
Weight of drug	3 g	3 g
Wet weight	52.94 g	70.42 g
Dry weight	52.77	70.10
Moisture content= wet weight – $\frac{\text{dry weight}}{\text{Wet weight}} \times 100$	0.321%	0.454%

DETERMINATION OF ASH VALUE

Ash value, total ash, Acid insoluble ash, Water soluble ash was determined. The results are given below in the table.

Table 4: Percentage of Total Ash, Acid Insoluble Ash, Water Soluble Ash

Parameter	Drug with PEG	Drug without PEG
Determination of total ash:		
Weight of empty crucible (W1)	26.03 g	15.04 g
Weight of crucible + Drug (W2)	29.03 g	18.04 g
Weight of crucible + Drug after incineration (W3)	28.90 g	16.84 g
Weight of ash = W3 – W1	1.87 g	0.8 g
Percentage purity = $\frac{\text{Weight of total ash}}{\text{Weight of drug}} \times 100$	62.33 % (w/w)	26.66 % (w/w)
Determination of acid insoluble ash:		
Weight of acid insoluble ash	1.26 g	1.13 g
Percentage purity	42 % (w/w)	37.66 % (w/w)
Determination water soluble ash:		
Weight of water-soluble ash	1.13 g	1.06 g
Percentage purity	37.66 % (w/w)	35.33 % (w/w)

Fig 3: Drug after incineration

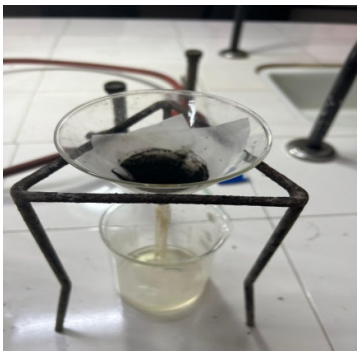


Fig 4: Filtration of ash

DETERMINATION OF EXTRACTIVE VALUE

Extractive value, alcohol soluble extract, water soluble extract value was determined. The results are given in the table.

Table 5: Percentage of Alcohol Soluble Extract, Water Soluble Extract And Angle of Repose

Parameter	Drug with PEG	Drug without PEG
Determination of alcohol soluble extractive value:		
Weight of residue	1.6 g	0.47 g
Extractive value	32%	9.4%
Determination of water soluble extractive value:		
Weight of residue	2.3 g	1.7 g
Extractive value	42%	34%
Angle of repose of the drug was determined.		
Radius	3.94 cm	3.06 cm
Height	2 cm	2 cm
Angle of repose	26.56^0	33.02^0

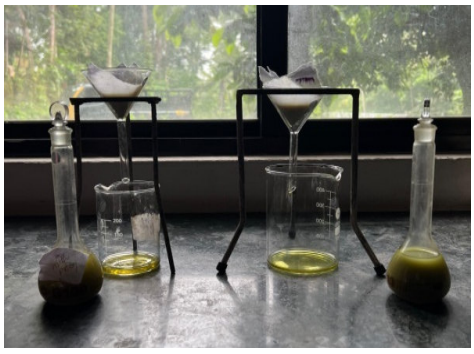


Fig 5: Extraction of drug

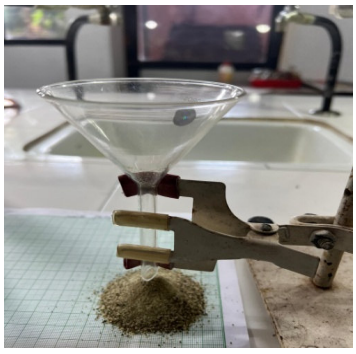


Fig 6: Angle of repose

MEASUREMENT OF pH

pH of the formulation was determined by using pH paper and it was found to be 8.

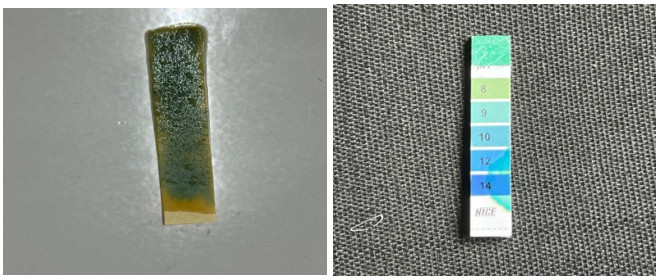


Fig 7: determination of pH using pH paper

DETERMINATION BY TLC & HPTLC

Mobile phase; chloroform: ethyl acetate: methanol: formic acid (86: 6: 3: 5), Rf value: 11

Fig 8: development of TLC plate

Chromatographic Condition: HPTLC Analysis

1. **Stationary phase**
   - Executed by avscmpr (Arya Vaidya Sala Kottakkal, Center for Med.Plants Res.)
   - Plate size (X x Y) 6.0 x 10.0 cm
   - Material HPTLC plates silica gel 60 F 254
   - Manufacturer E. MERCK KGaA
2. **Samples**
   - F1: phpdf
   - F2: mephpdf
3. **Sample application**
   - CAMAG Linomat 5
   - Instrument CAMAG Linomat 5 "Linomat5_160447" S/N 160447 (1.00.13)
4. **Linomat 5 application parameters**
   - Spray gas : Inert gas
   - Sample solvent type : Water
   - Temperature : 60°C
   - Time : 5 minutes
   - Dosage speed : 50 nl/s
   - Predosage volume : 0.2 ul
   - Syringe size: 100 µl
   - Number of tracks: 2
   - Application position Y : 10.0 mm
   - Band length : 8.0 mm
   - No. Appl. position Appl. volume Vial # Sample ID Active
     - >1 18.0 mm 10.0 µl 1 phpdf
     - >2 42.0 mm 5.0 µl 2 mephpdf

Scanning was performed using CAMAG TLC Scanner 3 at 254 nm, 366nm and operated by winCATS software (V 1.4.1, CAMAG). The scanner was set for maximum light optimization and with the follow-ing settings: slit dimension, 5.00 mm × 0.45 mm; micro scanning speed, 20 mm s−1; data resolution, 100 µm/step; and scanning wave length, 580 nm. All remaining measurement parameters were left at default settings. Regression analyses

and statistical data were generated by the winCATS planar chromatography version 1.1.4.0 software. Oven was used as drying device.

HPTLC Fingerprinting Anaysis

HPTLC was performed using Toluene: Ethyl acetate: Methanol (07: 03: 01) as a mobile phase. Rf value of marker compounds present in each standardised extracts and our formulation (powdered unit dosage form i.e., Polyherbal tea bags) were found. which indicates significant presence of active constituents responsible for claiming biological actions in formulation. The same were compared with the standard Rf values. Our study has two different sets of formulations i.e., powder unit dosage forms without microencapsulation techniques and with microencapsulation technique by using PEG polyethylene glycol by solid dispersion method for achieving better therapeutic efficacy.

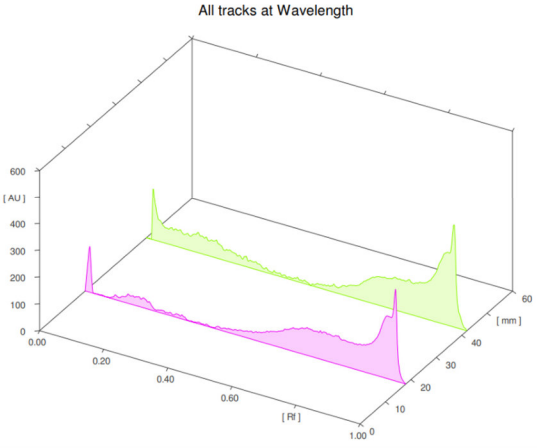
Table 6: Expected outcome and biological conditions to be claimed from formulation

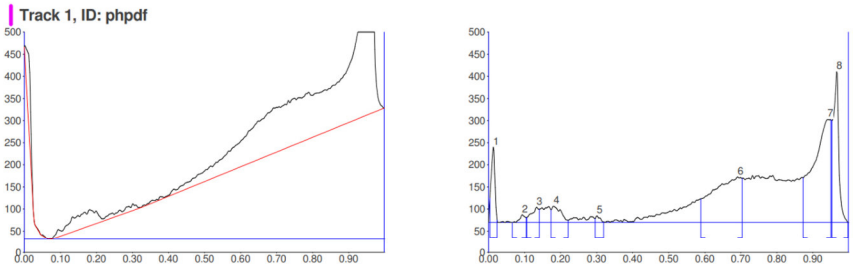
S.No	Herbal Ingredients as standardized extracts	Pharmacological actions
1	*Garcinia cambogia*	Weight loss, relief of joint pain, digestive symptoms and to improve athletic performance.
2	*Stevia rebaudiana*	Weight loss, hypertension, diabetic, digestion, skin care and wound healing, natural sweetener.
3	*Moringa oleifera*	Digestive disorder, diabetic, anti-inflammatory, pain relief, nutritional supplement.
4	*Citrus limon* (lemon peel)	Free radicle fighting, Antimicrobial, reduces intestinal inflammation, flavouring agent.
5	*Thea sinensis* (Tea powder)	Antioxidant, cns stimulant, synergistic action

Table 7: Interpretations of HPTLC Rf value data

Standardised herbal extracts	Powdered unit dosage form by using standardised herbal extracts as ingredients (polyherbal tea bags) Rf values PHPDF	Powdered unit dosage form with microencapsulation using standardised herbal extracts (polyherbal tea bags) Rf values MEPHPDF (Observed)	Standard markers Rf value as compared with our polyherbal formulation (Predicted)
Garcinia cambogia	*0.30*	0.34, 0.37 0.49	Hydroxy citric acid (0.34) HCA lactane (0.45)
Stevia rebaudiana	*0.30*	0.31 0.22	Stevioside (0.33±0.03) Rebaudioside-A (0.24±0.04)
Moringa oleifera	0.18 0.97	0.22, 0.26 0.58, 0.62 0.78, 0.96	Rutin (0.22±0.02) Gallic acid (0.64±0.02) Quercetin (0.80±0.03)
Citrus limon **(lemon peel)**	0.18 0.94	0.26 0.78, 0.96	limonene (0.24 ± 0.01) Ascorbic acid (0.87 ± 0.02)
Tea powder	0.13 0.18	0.11 0.62	Rutin (0.166) Gallic acid (0.65)
Microencapsulation (Solid dispersion)	-	Polyethylene glycol	PEG /EG (0.43) PEG 400 (0.44)

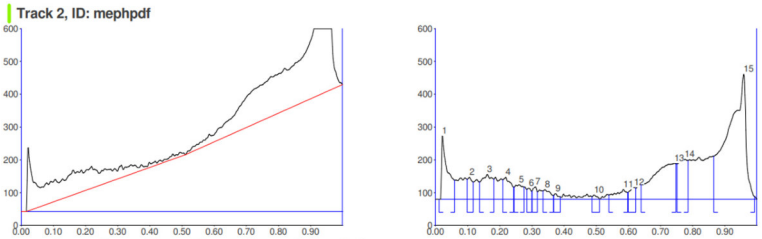
winCATS Planar Chromatography Manager





Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.00	54.9	0.01	170.1	17.90	0.02	6.0	1659.5	6.30	unknown *
2	0.07	0.1	0.09	17.3	1.82	0.11	10.8	236.9	0.90	unknown *
3	0.11	11.0	0.13	34.4	3.62	0.14	29.7	667.2	2.53	unknown *
4	0.17	28.7	0.18	36.4	3.83	0.22	4.7	901.2	3.42	unknown *
5	0.30	8.4	0.30	14.9	1.57	0.32	1.5	167.2	0.63	unknown *
6	0.59	53.2	0.69	102.7	10.81	0.70	99.6	7537.3	28.60	unknown *
7	0.87	101.0	0.94	233.1	24.55	0.95	232.1	10172.1	38.60	unknown *
8	0.95	230.8	0.97	341.0	35.90	1.00	0.0	5012.1	19.02	unknown *

winCATS Planar Chromatography Manager



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	0.0	0.02	192.3	15.26	0.06	57.9	3391.6	8.02	unknown *
2	0.10	60.9	0.11	66.9	5.31	0.12	52.4	967.4	2.29	unknown *
3	0.14	53.0	0.16	75.7	6.01	0.18	61.3	2389.1	5.65	unknown *
4	0.21	59.6	0.22	67.2	5.33	0.24	37.3	1513.7	3.58	unknown *
5	0.25	37.3	0.26	45.0	3.57	0.28	37.5	1060.3	2.51	unknown *
6	0.28	30.3	0.29	34.6	2.75	0.30	23.9	397.3	0.94	unknown *
7	0.30	25.0	0.31	38.5	3.05	0.32	22.9	450.8	1.07	unknown *
8	0.34	25.6	0.34	29.0	2.30	0.37	11.4	587.1	1.39	unknown *
9	0.37	11.8	0.37	17.7	1.40	0.39	7.5	201.9	0.48	unknown *
10	0.49	7.7	0.49	13.3	1.06	0.51	0.1	166.1	0.39	unknown *
11	0.54	13.1	0.58	30.3	2.40	0.60	20.9	933.0	2.21	unknown *
12	0.60	21.4	0.62	36.1	2.87	0.62	34.4	616.0	1.46	unknown *
13	0.64	44.6	0.74	110.3	8.75	0.75	108.9	7175.1	16.97	unknown *
14	0.75	108.4	0.78	121.8	9.67	0.79	118.3	3234.0	7.65	unknown *
15	0.87	132.0	0.96	381.4	30.27	0.99	8.5	19198.0	45.41	unknown *

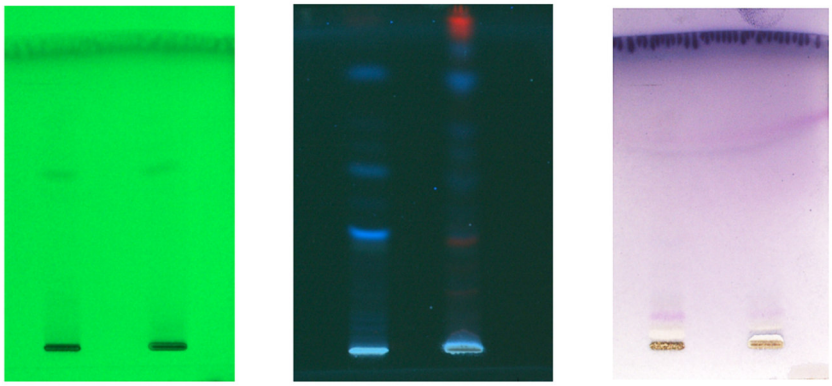


Fig 9: HPTLC at 254 nm, 366 nm & White light respectively post derivatisation

Track 1: phpdf (Polyherbal Powder Dosage Form)
Track 2: mephpdf (Microencapsulated Polyherbal Powder Dosage Form)

SUMMARY AND CONCLUSION

Herbal tea of *Garcinia cambogia, Moringa oleifera, Camellia sinensis, Citrus limon, Stevia rebaudiana* in bag dosage form was formulated by using microencapsulation solid dispersion method (NDDS). Formulation of novel drug dosage form was followed by preliminary analysis of phytochemicals, organoleptic evaluation, determination of moisture content, ash value and extractive value, measurement of angle of repose, pH value identification of active constituents by TLC and HPTLC. From the results obtained from the evaluation tests mentioned above, the biochemical properties of the drug formulation were ensured. From the references, the novel drug dosage form of *Garcinia cambogia* found to have following properties; Anti-obesity activity, Appetite control, Anti-ulcer activity, Anti-diabetic activity, reducing high blood pressure, controlling blood sugar, Reduce cholesterol. Pharmacognostic and phytochemical evaluation of *Garcinia cambogia*, *Moringa oleifera*, *Camellia sinensis*, *Citrus limon* and *Stevia rebaudiana* was conducted. Hence, the novel drug dosage form of *Garcinia cambogia* was proved to be vital.

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