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FORMULATION ON MULTIFACEATED HINGWASHTAK DIGESTRY DRINK

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Abstract:

Ayurveda is traditional medicinal system of india , having unique approach and principle to study and treatment of various disorders . the hingwashtak churna digestery drink is used as a aliment for various gastro-intestinal diseases like acidity, gastric ulcer , bloating , joint diseases etc. Hingwashtak churna is also used as remedy for primary dysmenorrhoea .

Digestive drink formulation will be catering the weeds of people where consumption of churna is not palatable owing to its taste and its administration with warm water with ghee or lemon juice .

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INTRODUCTION:

Hingwashtak Churna is a polyherbal Ayurvedic medicine used to treat digestive disorders. It helps in managing conditions like bowel movement, flatulence ,indigestion ,and constipation. It helps in digestion without causing irritation in the stomach.

According to Ayurveda, Hingwashtak Churna has Deepan (appetizer) and Pachan (digestion) properties which help digest the food, providing relief from indigestion and flatulence.

These properties also help with the loss of appetite. Hingwashtak Churna also has Vata balancing property which helps manage abdominal pain.

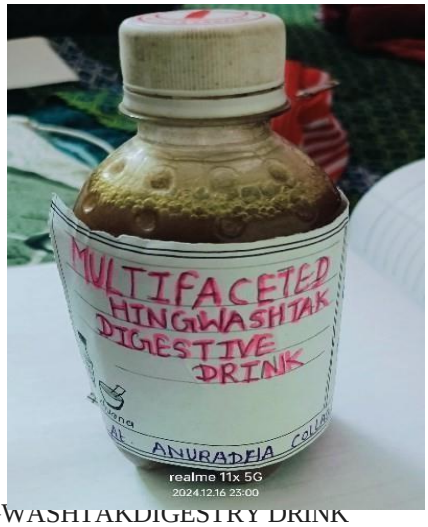
It also aids in managing the symptoms of rheumatoid arthritis-like joint pain and swelling. Hingwashtak Churna is generally well tolerated and does not have any side effects when taken At the recommended dose. However,it is advisable to consult the doctor before using Hingwashtak Churna.

The hingwashtak churna was prepared using sendha namak,ginger, long pepper, black pepper, hing , black cumin , jeera , ajwain .

Rock salt is used as home remedy for various digestive aliment including stomach worms heartburn,bloating,constipation,stomachpain,andvomiting.Ginger(zingiberofficinalis) is used as remedy to cure indigestion . black pepper (Piper nigrum) and long pepper (piper longum) it is used to prevent the formulations of gases in gastrointestinal tract or ease its passing . Hing (ferula foetida) and black cumin (nigella sativa) are used for treatment of several diseases of stomach . it is one of the best alternative available for the flatulence and is an important part of most of the digestive formulations . jeera (Cuminum cyminum) stimulate saliva production , secreation of digestive fluids and excreation of bile and additionaly , it provide increased movement of the intestine which generally improved digestion . Ajwain (trachysperm amme) is one of the best herbal wonder drug for gas , flatulence and indigestion , also used in treatment of hyperacidity .

HINGWASHTAKDIGESTERYDRINK;

As we know , the hingwashtak churna is not palatable owing to its taste , odour and its administration take more efforts and time hence we are formulating hingwashtak digestery drink which has benefits of hingwashtak churna with feel of soft drink .



HINGWASHTAKDIGESTRY DRINK

Plan of work:

a) selection of drug b)development of churna c)formulation of drink d)evalution of formulation

- SELECTION OF DRUGS
- BLACK PEPPER [MARICH];
- SYNONYMS; Madagacar ,pepper, Kali mirch, White pepper.
- Biologicalsource; pipernigrum

FAMILY;piperaceae CHEMICALCONSTITUENT;

i. PIPERINE;

-Main alkaloid in black pepper which gives it it 's pungent taste.

-Piperine have therapeutic properties including improved nutrient absorption and brain function .

ii. TERPENES;

-Main volatile flavor compounds in black pepper.

-Some of key odorants includes α and β piperine ,myrcene, α-phellandrene ,limonene ,linalool and methyl propanol.

OTHERCHEMICALCONSTITUENT

Black pepper also contain carbohydrates proteins, calcium, magnesium, potassium ,iron, vitamin c , tannins , flavonoids , and carotenoids .

iii. VOLATILEOILCONTENTS;

-Volatile oil content in dried black pepper berries ranges from 0.4-7 %.

-Main constituent of black pepper essential oil are sabinene ,3-carene, Dlimonene , α-pinene , caryophyllene etc.

PHARMACOLOGICALUSES;

PHYTOCONSTITUENTS;
Biologicallyactivepiperineandessentialoilconstituentsincludingβcareophyllene, limonine,α-pirene.

ADVERSEEFFECTS;
i. Digestiveissues
ii. Burning

LONGPEPPER;

SYNONYMS;
1.pippali
2.peperlongum
3.kana
4.Indian long pepper
5.magadhi
6. biba

BIOLOGICAL SOURCE ;Piper longum
Family; Piperaceae

CHEMICAL CONSTITUENTS;
ALKALOIDS;
Most abundant alkaloid is piperine , followed by methyl piperine ,pellitorine , iperonalline , piperettine ,
. asarinine,piperlongumine and piperlonguminine.
ESSENTIALOIL;
Fruit of piper longum contains an essential oil that is a complex mixture of sesquiterpene ,hydrocarbone, and other saturated aliphatic hydrocarbons.
LIGNANS;
Fruit of piper longum contains lignans such as sesamin, pulvuatilol, and fargesin.
VI)ESTERS ;
Fruit of piper nigrum contains esters such as Tri-dihydro-p-coumarate ,eicosanyl(E)p-coumarate and Z- 12-octandeconoic – glycerol – monoest
OTHERCOMPOUNDS;
Root of pipernigrum contains – dihydrostigmasterolasarinine ,brachystine, pipercide, piperderidine, piperundecalidine , methyl piperine and tetrahydropiperlongum.
PHARMACOLOGICALUSES;
Analgesic;
-Long peper root has weak opioid and potent NSAID-type analgesic activity. Anti-inflammatory ;
-piperine, alkaloid found in long pepper, inhibits IL6 and PGE2 response to proinflammatory mediators
.
Anti-arrythmic;
-piperine inhibits protein and m-RNA expression levels of IL6 COX-2 and MMP13. III)Parasite killer ;
-long pepper fruit and root contain chemicals that may help kill certain parasites IV)Swelling reducer ;
-long pepper fruit and root contain chemicals that may help to reduce swelling. V)Digestive aid ;
-It is an important constituent in digestive formulations in ayurveda. VI)Respiratory aid ;
-It is used as an “Rasayana” in treatment of respiratory disorders in ayurveda.
ADVERSE EFFECTS: Stomach discomfort, liver damage

- BLACKCUMIN

SYNONYMS;
-Jeera shaya -FennelFlower
-BlackCaraway -Nigella
-BlackSeed -NutmegFlower
-HimaliJira -KalaJeera

BIOLOGICAL SOURCE ;
-Cuminum cyminum FAMILY ; Apiaceae PHYTO CONSTITUENTS;-
alkaloids-resins
-Anthraquinone
-coumarin
-Flavonoids
-saponin
-Glycosides
- proteins

CHEMICAL CONSTITUENT;
Esential oil;
Contain thymoquinone ,thymohydroquinone ,thymol, carvacrol, nigellidine and α-hederin,.
Fatty acids;
Contains linolicacid, oleicacid ,palmitic acid.
Amino acid ;
Contain glutamic acid, arginine ,and aspartic acid. IV)Minerals ;
Contain calcium ,potassium, phosphorous ,magnesium ,sodium, iron ,zinc and copper. V)Alkaloids ;
Contain negelliamine ,negellicimine ,n-oxide ,nigelline and nigellicine.
Other volatile components ; Containo-cymene,β-thujene,cis-4- methoxythujene, longifolene, β-pinene , D-limonene.
PHARMACOLOGICALUSES;
Anti-microbial;
Black cumin has antibacterial ,antifungal, antiviral, and antiparasite properties. II)Anti-inflammatory ;
Black cumin has anti-inflammatory property.
III)Anti-oxidant;
It contains to copherol which has antioxidant effect. IV)Neurological condition ;
It may help with neurological condition like alzheimer'sdisease,Parkinson'sdisease,ischemicstroke, epilepsy.
Cardiovascular disorders;
It may help to prevent cardiovascular diseases.
The oil from cumin seeds may decrease blood pressure.
Other conditions ;
It may help with diabetes ,inflammatory condition, menopauses ,asthma ,bronchitis. ADVERSE EFFECTS;
-Allergicrashes
-stomachupset

GINGER;

SYNONYMS;
-Sunthi
-GingerRoot
-Zingiber
-Adrak
-Rhizome Zingiberis
BIOLOGICALSOURCE;
zingiberofficinalise FAMILY ;Zingiberaceae
PHYTOCONSTITUENTS;-
Shogaol
trans-1-8-cineole-3
-Gingerol
-6-dihydroxy-3-o-β-d-glucopyronacide

CHEMICALCONSTITUENTS;
Phenolic compounds ;
Gingerols ,shogoles ,paradols,quercetin,zingerone,gingerenone-A and 6-dehydrogingerdione.
Terpenes;
Zingiberene, β-bisabolene,α-farnesene,β-sesquiphellandrene,andα-curamene.
Othercompounds;
Carbohydrates, lipids ,amino acids, raw fiber, ash, proteins, phytosterols, vitamin and minerals.

PHARMACOLOGICALUSES;
Nausea and vomiting ;ginger can help with nausea and vomiting caused by motionsickness ,pregnancy and mild gastrointestinal infections.
Stomach issues;
Ginger can help with stomach upset, bloating ,and flatulence.
Menstrual cramps;
Some research suggest that ginger may help relieve menstrual cramps

ADVERSE EFFECTS;
Stomach issues Mouthirritation

ASAFOETIDA(HING)

SYNONYMS;-
Asant-hing-devil'sdung-stinkinggum
-foodofthegods -asafoetidagum BIOLOGICAL SOURCE;-Ferula asafoetida
FAMILY; umbelliferae
CHEMICALCONSTITUENTS;

Resin;
-the resin portion of asafetida contain ferulicacid, asaresinotannols, coumarin and other terpenoids
.II) Gum;
-the gum portion of asafetida contains glucose, galactose, I-arabinose ,rhomnose, glucuronicacid, polysaccharides and glycoproteins.
III)Volatileoil;
-The volatile oil portion of asfoetida contains Organosulphides such as 2-butyl-propenyl-disulphide, diallyl sulphide, diallyl disulphide and dimethyl trisulphide.
-this organosulphide are responsible for odour and flavor of asafoetida. Iv)Minerals and vitamins ;
-asafoetida contains calcium, phosphorous ,iron, ,carotene ,riboflavin and niacin.
PHARMACOLOGICAL USES;
Digestivestimulant;
-asafoetida stimulates saliva secretion and salivary amylate activity, whican help with digestion .it can also help with stomach pressure, flatulence and low stomach acid level .
antispasmotic ;
-asafoetida can help with gastrointestinal ldisorder, stomachaches.
Anti-viral, Anti-fungal and antioxidant ;
-asafoetida has been shown to have antiviral ,antifungal and antioxidant properties.
Cancer chemopreventive;
-asafoetida has been shown to have cancer chemopreventive properties.
Anti-diabetic;
-asfoetida has been shown to have anti-diabetic properties.
ADVERSEEFFECTS;
Gastrointestinal issues –asafoetida can cause gas, diarrhea ,stomachcramps ,nausea ,and vomiting.
this is because resin in asafetida can irritate the digestive system.
Headache and dizziness;
-consuming to much asafetida can cause headache and dizziness.

CARAWAY(JEERASHWEST);

SYNONYMS;-
-Genus Carum-Carum
-Herbaceous Plant-CarumCarvi
-Herb-CarawaySeeds
FAMILY; Apiaceae
BIOLOGICAL SOURCE; Carum Carvi
CHEMICALCONSTITUENT;
Essentialoil;
-caraway oil contains carvone ,limonene, b-myrcene ,transdihydrocarvone and transcarveol.
-caraway chaff oil contains more terpenes and less carvone. Fattyacids;
-caraway fruits contains petroselinic ,linoleic ,and oleic acid. Phenolic acid;
-caraway fruits contains caffeic acid. Flavanoids;
-caraway fruits contains quercetin and kaempferol.
PHARMACOLOGICAL USES;
Caraway is a plant that is grown in asia ,Africa and europe. The oil fruits and seeds are used in medicines .
The caraway oil might improve digestion and relieve spasma in the stomach and intestines.
SIDEEFFECTS;
-Burning
-HeartBurn
-nausea
ROCKSALTS;

SYNONYMS;
-
halite.n

-mineralsalt
-Sodiumchloride .n-seasalt
-tablesalt-native salt
BIOLOGICAL SOURCE;
-rock salt is primarily made up of sodium chloride(NaCl) ,but also contains other minerals like calcium, magnesium ,potassium, and sulphate
CHEMICALCONSTUTUENT;
-Rock salt is made up of 90-98% of sodium chloride.
-it also contains other minerals including calcium ,magnesium ,potassium and sulfate.
PHARMACOLOGICAL USES;
Digestion;
-rock salt can help with digestion by stimulating the production of digestive enzymes and biles
Sorethroat;
-gargling with lukewarm water and rocksalt can help

soothe a sore throat .
-the salt antibacterial properties can reduce inflammation and infection . Musclecramps ;
-rock salt can help with muscle cramps by restoring electrolyte balance Blood pressure;
-rock salt can help stabilize blood pressure because its high in potassium,which helps to balance sodium levels in the body .
Stress relief;
-adding rock salt to your bath water can help you relax and relieve stress.
SIDE EFFECTS;-
-skin irritation
-inhalingdust
-saltburn

AJWAIN(AJMODA);

SYNONYMS;
-Caromseeds -omam
-bishop'sweed -thymolseeds
-ajowancaraway -yavan iBIOLOGICALSOURCE;
-trachyspermum–ammi FAMILY;apiaceae

CHEMICAL CONSTITUENTS;
Thymol;
-the main component of ajwain oil making about 39.1% of its content .
-it is strong germicide ,antibacterial and fungicides. carvacrol;
-a component that exhibits anti microbial lactivity when combine with thymol .
-it is also reported to regulate health and pain sensation. other components;
-ajwain oil also contains other volatile oil such asparacymin ,β-pinene. Phyto chemicals;
-ajwain contains natural plant chemical called polyphenols including saponins, glycosides and flavanoids. vitamins and minerals ;
-ajwain is rich in vitamin and minerals like iron ,calcium
,phosphorous and B-vitamins.

PHARMACOLOGICAL USES;
Digestive issues ;
-ajwain is traditional remedy for gastro intestinal problems like indigestion and colic pain.
Respiratory issues;
-ajwaina helps to relieve cough and cold and reduce bronchial consumption and asthma syptoms
.Blood pressure;
-some research indicate that thymol is a major component of ajwain which may help to lower blood pressure levels .

ADVERSEEFFECTS;
MouthUlcer PepticUlcer
-SkinIrritatio

DEVELOPMENT OF CHURNA

Hing Churna is a traditional Ayurvedic formulation primarily used as a digestive aid. It is made using asafoetida (Hing) as the main ingredient, often combined with other digestive and carminative herbs. Here's a standard formulation and preparation method:

- *Ingredients of Hing Churna (Classical Ayurvedic Formula)*

Sr. No	INGREDIENTS	PART USED	QUANTITY
01	Sunthi	Rihzome	13g
02	Maricha	Fruit	13g
03	Pippali	Fruit	13g
04	Ajamoda	Fruit	13g
05	Saindhava lavana	-------	13
06	Shweta jeeraka	Seed	13g
07	Krishna jeeraka	Seed	13g
08	Hing	Exudate	13g

Method of Preparation

1. Cleaning & Drying: Clean all the herbal ingredients thoroughly and dry them if necessary.
2. Roasting (optional): Some recipes gently roast cumin, ajwain, and fennel seeds to enhance aroma and digestibility.
3. Powdering: Grind all ingredients into a fine powder separately .
4. Sieving: Sieve the powders to ensure uniformity.
5. Mixing: Mix all the powdered ingredients thoroughly in equal proportions.
6. Storage: Store the final Hing Churna in an airtight glass jar or container, away from moisture.

FORMULATION OF DRINKS

METHODS USED IN FORMUKATION

PULVERIZATION:

Pulverization is the mechanical process of breaking down or grinding a substance into a fine powder or dust-like form, typically using tools like mortars and pestles, mills, or grinders.

EXTRACTION:

Extraction refers to the process of removing active constituents (like alkaloids, tannins, essential oils, etc. from plant or animal materials using a suitable solvent.

MASERATION:

Maceration is a method of extraction where coarsely powdered plant material is soaked in a suitable solvent for a specified time (usually 3–7 days), with occasional stirring, to extract the soluble compounds.

CONCENTRATION OF EXTRACT:

Concentration of an extract refers to the process of removing the solvent (like water or alcohol) from a liquid herbal extract to increase the proportion of active constituents per unit volume or mass.

FORMULATION INTO DIGESTRY DRINK

PROCESS OF FORMULATION OF HINGWASHTAK DIGESTERY DRINK FORMULATIONS :

PULVERIZATION

Here the ingredients are powdered and passed through #20 sieve

⇩

EXTRACTION

the powdered churna is extracted with hydroalcoholic sovent

⇩

MACERATION

the hydroalcholic solution of powdered churna is macerated for two days and

filtered

⇩

CONCENTRATION OF EXTRACT

the filterate is concentrated on heating mental and the concentrated extract is obtained

⇩

FORMULATIONS INTO DIGESTERY DRINK

the concentrated extract is added into carbonated water base and the digestery drink is prepared

EVALUATION OF FORMULATION :

ORGANOLEPTIC EVALUATION :

Organoleptic Evaluation is the scientific method of assessing the sensory characteristics of products—especially food—using the human senses: sight, smell, taste, touch, and hearing. It helps in determining the quality, acceptability, and preference of a product.

Organoleptic evaluation includes evaluation of general charectriestic of formulation such as

- Description
- Colour
- Odour
- Test

MESURMENT OF PH :

Measuring the pH of a polyherbal formulation is a basic yet important test to assess the acidity or alkalinity, which can affect its stability, absorption, and compatibility with biological systems.

Materials Required:

- Polyherbal formulation (liquid, suspension, or powdered extract reconstituted in water)
- Distilled water

- pH meter (calibrated)
- Beakers (100 mL or appropriate size)
- Glass rod (for stirring)
- Filter paper (if needed)
- Volumetric flask
- Gloves and lab coat

Procedure:

1. Sample Preparation

If the polyherbal formulation is a liquid: Use it directly.

- If it is a solid/powder:
- Weigh about 1 g of the formulation.
- Dissolve it in 100 mL of distilled water.
- Stir well and filter if necessary to remove particulates.

2. Calibration of pH Meter

- Turn on the pH meter and allow it to warm up if needed.
- Calibrate the pH meter using standard buffer solutions (commonly pH 4.0, 7.0, and 9.2).
- Rinse the electrode with distilled water between buffer solutions and gently blot dry with tissue.

3. Measurement

- Pour the prepared sample into a clean beaker.
- Rinse the electrode with distilled water and immerse it into the sample.
- Stir gently using a glass rod to ensure homogeneity.
- Wait for the pH reading to stabilize.
- Record the pH value displayed on the meter.

4. Cleaning and Storage

- Rinse the electrode with distilled water.
- Store it in electrode storage solution (or pH 4 buffer) if not in use.

Precautions:

- Always calibrate the pH meter before use for accurate results.
- Use freshly prepared sample solution.
- Avoid touching the electrode bulb with fingers.
- Ensure there are no air bubbles around the electrode during measurement.

MEASUREMENT OF SPECIFIC GRAVITY:

Specific Gravity (SG) is the ratio of the density of a substance to the density of water at a specified temperature (usually 25°C). Measuring the specific gravity of a liquid herbal formulation helps assess concentration, consistency, and quality control.

Materials Required:

- Liquid herbal formulation
- Distilled water
- Specific gravity bottle (pycnometer) or a clean, dry 50 mL specific gravity bottle
- Analytical balance (accurate to at least 0.001 g)
- Water bath (optional, to maintain constant temperature)
- Thermometer (to record room/sample temperature)
- Gloves and lab coat

Procedure:

1. Clean and Dry the Specific Gravity Bottle

- Wash the bottle thoroughly with distilled water.
- Dry completely in an oven or air-dry at room temperature.
- Ensure the bottle is at room temperature before weighing.

2. Weigh the Empty Bottle

- Record the weight of the clean, dry empty bottle:
- W1 = weight of empty bottle (g)

3. Fill with Distilled Water

- Fill the bottle with distilled water up to the mark (at 25°C, if possible).
- Wipe the outside, ensure no air bubbles.
- Weigh the bottle with water:

W2 = weight of bottle + distilled water (g)

4. Clean and Refill with Herbal Formulation

- Empty and rinse the bottle.
- Dry if necessary.
- Fill it with the herbal formulation up to the same mark.
- Wipe the exterior clean and dry.
- Weigh the bottle with the herbal formulation:

W3 = weight of bottle + herbal formulation (g)

5. Calculate Specific Gravity

$$\textbf{Specificgravity} = \frac{W3 - W1}{W2 - W1}$$

Where:

= Weight of empty bottle

= Weight of bottle with distilled water

= Weight of bottle with herbal formulation

Precautions:

- Perform the test at room temperature (ideally 25°C).
- Ensure there are no air bubbles in the liquid when weighing.
- Use the same volume for water and formulation.
- Calibrate the balance before use.

ALCOHOL CONTENT TEST FOR METHANOL :

Methanol is a toxic alcohol that may be present as a contaminant or formed during improper fermentation or .Ingesting methanol can cause blindness, organ failure, or death.

Regulatory agencies (e.g., WHO, FDA) have strict limits for methanol in consumable herbal preparations.

Chromotropic Acid Method (Colorimetric) – Simpler, Field Use

Principle:

Methanol is oxidized to formaldehyde, which reacts with chromotropic acid in sulfuric acid to form a violet complex, measured at 570 nm using a UV-Vis spectrophotometer.

Materials Required:

- Chromotropic acid reagent
- Concentrated sulfuric acid (carefully handled)
- Potassium permanganate and sodium bisulfite
- Spectrophotometer
- Methanol standard
- Sample

Procedure Overview:

1. Oxidize sample with $KMnO_4$ → converts methanol to formaldehyde.
2. Add chromotropic acid + concentrated H_2SO_4 → violet color develops.
3. Measure absorbance at 570 nm.
4. Compare against standard methanol curve.

Limitation: Less accurate and specific than GC; used for screening.

Precautions:

- Handle sulfuric acid and potassium permanganate with extreme care.
- Ensure GC system is properly calibrated for accurate results.
- Avoid contamination from ethanol in herbal samples.

Regulatory Limits (Approximate):

WHO & FDA: < 0.02% v/v (200 mg/L) methanol in oral herbal products.

TEST FOR REDUCING SUGAR:

Benedict's Test for Reducing Sugars

Reducing sugars include all monosaccharides (like glucose, fructose, galactose) and some disaccharides (like lactose and maltose). Sucrose is not a reducing sugar unless it is hydrolyzed.

Materials Needed:

- Benedict's reagent (a blue solution containing copper(II) sulfate)
- Test sample (solution containing sugar)
- Test tube
- Water bath or Bunsen burner

Procedure:

1. Add 2 mL of the test solution to a clean test tube.
2. Add 2 mL of Benedict's reagent.
3. Heat the mixture in a boiling water bath for 2–5 minutes**.**

Fehling's Test for Reducing Sugars

Fehling's test specifically detects aldehyde functional groups, which are present in reducing sugars.

Materials Needed:

- Fehling's solution A: Copper(II) sulfate solution (blue)
- Fehling's solution B: Potassium sodium tartrate (Rochelle salt) in a strong alkali (usually NaOH)
- Test sugar solution
- Test tube
- Water bath or Bunsen burner

Procedure:

Mix equal volumes of Fehling's A and B just before use to form the active Fehling's reagent.

1. Add 2 mL of this freshly mixed Fehling's reagent to a test tube.
2. Add 1–2 mL of the test sugar solution.
3. Heat the test tube in a boiling water bath for 2–5 minutes.

TEST FOR NON-REDUCING SUGAR :

To test for non-reducing sugars (such as sucrose) in herbal extracts, you must first hydrolyze them into reducing sugars, then perform a test like Benedict's or Fehling's.

Test for Non-Reducing Sugars in Herbal Extracts

Materials Needed:

- Herbal extract (aqueous)
- Dilute hydrochloric acid (HCl, ~1M)
- Sodium hydroxide (NaOH) or sodium bicarbonate (to neutralize acid)
- Benedict's solution or Fehling's A & B
- Test tubes
- Water bath or heat source

Procedure:

1. Initial Reducing Sugar Test (Optional but recommended)

- To check if any reducing sugars are present before hydrolysis:
- Add 2 mL of herbal extract to a test tube.
- Add 2 mL of Benedict's or Fehling's reagent.
- Heat in boiling water bath for 2–5 minutes.
- If no color change (solution remains blue), proceed to hydrolysis.

2. Hydrolysis Step (to break non-reducing sugars into reducing sugars):

Take 2 mL of herbal extract in a test tube.

- Add 1 mL of dilute HCl.
- Heat in a boiling water bath for 5–10 minutes.
- (This hydrolyzes sucrose into glucose and fructose.)

3. Neutralization:

- Cool the mixture.
- Add NaOH or sodium bicarbonate dropwise to neutralize the acid (check with pH paper — aim for ~pH 7).

4. Benedict's or Fehling's Test:

- Add 2 mL of Benedict's or freshly mixed Fehling's reagent to the neutralized solution.
- Heat in boiling water bath for 2–5 minutes.

IDENTIFICATION TEST FOR ACTIVE CONSTITUENTS:

THIN LAYER CHROMATOGRAPHY (TLC) :

Thin Layer Chromatography (TLC) is a technique used to separate, identify, and analyze compounds in a mixture—commonly used for plant/herbal extracts, alkaloids, sugars, amino acids, essential oils, etc.

Basic Materials Needed:

- TLC plate (usually silica gel-coated on glass/plastic)
- Capillary tube or micropipette
- Solvent system (mobile phase)
- Developing chamber (jar or beaker with lid)
- Sample (e.g. herbal extract)
- UV lamp or staining reagent (for visualization)
- Pencil and ruler

Procedure:

1. Prepare the TLC Plate:

- Draw a pencil line 1 cm above the bottom (origin line).
- Mark small spots along the line for each sample.

2. Spotting:

- Use a capillary tube to apply a tiny drop of the herbal extract onto the plate at the marked spot.
- Allow to dry and repeat if needed for concentration.

3. Developing:

- Pour the mobile phase (solvent mixture) into the chamber to just below the origin line.
- Place the TLC plate vertically in the chamber.
- Cover the chamber and let the solvent rise (capillary action) until near the top.

4. Drying:

- Remove the plate when the solvent front is about 1–2 cm from the top.
- Mark the solvent front immediately with a pencil.
- Let the plate dry in air.

5. Visualization:

- View the plate under a UV lamp (if compounds are UV-active), or
- Spray with a detecting reagent (e.g., ninhydrin for amino acids, iodine vapors, or sulfuric acid-anisaldehyde for plant compounds).
- Heat if necessary to develop color.

Data anaiysis ; For each spot :

6. Rf value=Distance travelled by solute/Distance travelled by solvent

TEST FOR HEAVY METALS:

ARSENIC LIMIT TEST:

Purpose:

To ensure that the amount of arsenic (As) in herbal materials or extracts is within safe limit s for human consumption.

Permissible Limit (As per WHO / AYUSH):

Arsenic (As): ≤ 3 ppm (parts per million)

Method:

Pharmacopoeial (Classical) Arsenic Limit Test Also called the Gutzeit Method

Materials & Reagents:

- Herbal extract (prepared or digested)
- Stannous chloride solution (reducing agent)

- Zinc (granular) (arsenic-free)
- Acid solution (usually HCl or H_2SO_4)
- Lead acetate paper or mercuric chloride paper
- Standard arsenic solution (0.01 mg As for comparison)
- Glassware with a special arsenic test apparatus (with absorption tube or paper holder)

Procedure Overview:

1. Sample Preparation:

- Digest or dissolve the herbal extract in acid (usually HCl).

Transfer it to the arsenic test apparatus flask.

2. Reaction:

- Add potassium iodide and stannous chloride (to reduce arsenate to arsine).
- Add a small piece of zinc to generate arsine gas (AsH_3).
- Arsine rises and reacts with the test paper (held at the top of the apparatus).

3. Detection:

- Lead acetate or mercuric chloride paper changes color in the presence of arsine gas.
- The intensity of the stain is compared with a standard stain produced from a known arsenic

LEAD LIMIT TEST :

Purpose:

To ensure the lead (Pb) content in herbal products is within the safe limit, protecting consumers from toxic heavy metal exposure.

Permissible Limit (as per WHO / AYUSH / API):

Lead (Pb): ≤ 10 ppm (parts per million) Method: Pharmacopeial Limit Test for Lead

A qualitative comparison method using color development by lead ions with hydrogen sulfide.

Reagents & Materials:

- Herbal extract (or digested sample)
- Acetate buffer (pH 3.5–4.0)
- Hydrogen sulfide solution or thioacetamide reagent
- Standard lead solution (e.g., 20 ppm Pb)
- Nessler cylinders or clear test tube
- *Procedure:*

1. Sample Preparation:

- Take a known volume (e.g., 25 mL) of herbal extract (filtered or digested).
- Adjust the pH to ~3.5 using acetate buffer.

2. Add Reagent:

- Add hydrogen sulfide solution drop by drop with gentle mixing.

3. Color Development:

- A brown to black precipitate or coloration indicates presence of lead (Pb^{2+}).

4. Comparison:

- Prepare a standard lead solution (e.g., 25 mL of 20 ppm Pb).
- Treat it exactly the same
- Compare the color intensity of the test solution with the standard.

Precautions:

- Use only lead-free glassware and distilled water.
- Perform in a well-ventilated area (some reagents may produce gas).
- If herbal extract is not water-soluble, do acid digestion (e.g., nitric/perchloric digestion).

MERCURY LIMIT TEST

Purpose:

To detect and ensure that the mercury (Hg) content in herbal extracts is within the safe permissible limit to prevent toxicity**.**

Permissible Limit (As per WHO / AYUSH / Pharmacopoeias):

Mercury (Hg): ≤ 1 ppm (parts per million

Pharmacopoeial Method for Mercury Limit Test

This is usually done by a colorimetric reaction using reagents like diphenylcarbazone or modern instrumental techniques.

Reagents & Apparatus:

- Herbal extract (aqueous or acid-digested)
- Potassium permanganate solution (oxidizing agent)
- Potassium iodide solution
- Stannous chloride (reducing agent)
- Mercuric standard solution (e.g., 1 ppm)
- Nessler cylinder or test tubes
- Distilled water

Classical Color Comparison Method (Qualitative)

1. Sample Preparation:

- Digest the herbal sample with acid (usually nitric acid or a mixture of nitric + sulfuric acid) to convert mercury into ionic form.
- Dilute to a known volume with distilled water.

2. Reaction Steps:

- Add a few drops of potassium permanganate to oxidize organic matter and convert mercury to Hg^{2+}.
- Add potassium iodide to react with mercury to

form mercuric iodide (HgI_2).

- This produces a yellow or orange-red color depending on mercury concentration.
- Compare this color intensity with a standard solution containing 1 ppm mercury.

MICROBIAL CONTAMINATION TEST :

TOTAL BACTERIAL COUNT :

Purpose:

To determine the number of viable aerobic bacteria (colony-forming units or CFU) present in a herbal extract, to assess its microbiological safety.

Materials Required:

- Herbal extract (liquid or dissolved in sterile water)
- Nutrient agar or Plate Count Agar (PCA)
- Sterile Petri dishes
- Sterile pipettes or micropipettes
- Incubator (30–37°C)
- Sterile saline or peptone water (for dilution)
- Autoclave, laminar flow hood

Procedure (Pour Plate Method):

Step 1: Sample Preparation

- Take 1 g or 1 mL of herbal extract.
- Perform serial dilutions using sterile saline (e.g., 10^{-1}, 10^{-2}, 10^{-3}, etc.).

Step 2: Plating

- Take 1 mL from the appropriate dilution and pour into a sterile Petri dish.
- Add ~15–20 mL of molten nutrient agar (cooled to 45–50°C).
- Gently swirl to mix.

Step 3: Incubation

- *Incubate at 30–35°C for 48 hours.*

Step 4: Counting Colonies

- **Count the number of colonies on plates with 30–300 colonies.**
- **Calculate total bacterial count as :**

CFU = No.of colonie X Diution factor/ Volume plated (ml) Precautions:

- All glassware and media must be sterile.
- Use gloves, laminar airflow hood, and follow aseptic technique.
- Use negative control (blank) to check contamination.

TOTAL FUNGAL COUNT :

Purpose:

To determine the total number of viable fungi and yeasts present in a herbal extract. This ensures microbiological quality and prevents contamination by spoilage or pathogenic fungi.

Materials Required:

- Herbal extract (liquid or solid, prepared in sterile diluent)
- Sabouraud Dextrose Agar (SDA) – specific for fungi
- Sterile Petri dishes
- Sterile saline or 0.1% peptone water
- Micropipettes or sterile droppers
- Incubator (set at 25–28°C)
- Alcohol, gloves, sterile workspace

Procedure :

1. Sample Preparation

- Take 1 g or 1 mL of extract.
- Prepare serial dilutions (e.g., 10^{-1} to 10^{-4}) in sterile diluent.

2. Inoculation

Option A: Pour Plate Method

- Add 1 mL from each dilution to an empty sterile Petri dish.
- Pour 15–20 mL molten SDA (~45–50°C) into dish.
- Swirl gently to mix.

Option B: Spread Plate Method

- Pour SDA into sterile Petri dishes and allow to solidify.
- Pipette 0.1 mL of diluted sample onto agar.
- Use a sterile glass spreader to spread evenly.

3. Incubation

- *Incubate plates inverted at 25–28°C for 5–7 days.*

4. Colony Counting

- Count fungal colonies (typically white, green, or black, cottony or powdery).
- Select plates with 30–100 colonies for calculation.

Precautions:

- SDA should be free of antibacterial agents unless targeting fungi only.
- Use laminar flow hood to prevent contamination.
- Avoid over-incubation, which can cause colonies to merge.

RESULT AND DISSCUSION:

Sr. No	EVALUATION TESTS	RESULTS
01.	Colour	Light brown
02.	odour	Aromatic
03.	test	Astringent
04	Specific gravity	1.000
05	PH	3.78
06	Alcohol content Test for methanol	0.4%
07	Redusing sugar test (Benedict test ,fehlings test)	Reducing sugars are present
08	Non redusing sugar test	Non reducing sugar are absent
09	Identification Test (TLC)	-----
10.	Arsenic Limit test	0.1 ppm
11	Mercury Limit Test	0.05 ppm
12	Lead limit test	0.5 ppm
13	Total fungal count	8 CFU/ml
14	Total bacterial count	150 CFU/ml

IDENTIFICATION TEST (TLC) RESULTS :
Alkaloidal content in hingwashtak churna :
Flavanoidal content in hingwashtak churna :
Phenolic compaound content in hingwashtak churna :

Sr no	SAMPLE TYPE	RF VALUE
1.	Standard sample	0.52
2.	Test sample	0.49

Sr.No	SAMPLE TYPE	RF VALUE
1.	Standard sample	0.65
2.	Test sample	0.61

Sr No	SAMPLE TYPE	RF VALUE
1.	Standerd sample	0.48
2.	Test sample	0.44

CONCLUSION:

Hingwastak Churna is a potent ayurvedic digestive drink offering numerous health benefits, including relieves digestive issues (bloating, gas, indigestion) enhances gut health and immunity supports liver function and weight management, soothes stomach discomfort and promotes nutrient absorption, natural, vegan-friendly, and gluten-free ingredients.
Hingwastak Churna is a safe, effective, and natural solution for digestive wellness. Embracing ayurvedic wisdom, this drink promotes holistic health and well-being.

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