



International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 8, Issue 4, April 2025



**International Journal of Multidisciplinary Research in
Science, Engineering and Technology (IJMRSET)**
(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Formulation and Evaluation of Herbal Thyrocare Powder

Mr.Nikunj Panchal, Mr.Nripen Prakash Khare, Dr.Satyaendra Shrivastava

Parijat College of Pharmacy, Indore (M.P.), India

ABSTRACT: Herbal thyrocare powder is the type of powder dosage form in which the drug is administered through oral route. The powder contains various type of herbs which helps in regulation of thyroid hormone and anti-inflammatory, immunomodulatory, antibacterial, antioxidant, actions and improves body metabolism in patients suffering from thyroid hormone deficiency and thyroid hormone imbalance which results to goiter, exophthalmos, grave's disease, thyrotoxicosis etc conditions cretinism, epiphyseal dysgenesis and thyroid gland cancer like serious conditions faced. The drugs included are *bauhinia variegata*, *withania somnifera*, *emblica officinalis*, *terminalia bellerica*, *terminalia chebula* *Coriandrum sativum*.

KEYWORDS: Herbal Thyrocare Powder, Thyroid Hormone Imbalance, Bauhinia Variegata.

I. INTRODUCTION

Thyroid disease is any dysfunction in the thyroid gland is known as thyroid disease or disorder. Thyroid gland located in thoracic cavity & having butterfly like structure. Thyroid gland was discovered by Thomas wharton in 1656. The thyroid gland activated by hormone TSH (thyrotropin) which is secreted by anterior lobe of pituitary gland also known as master gland controlled by hypothalamus. Thyroid gland secretes 3 hormone thyroxine (T4), Tri-iodothyronine (T3) & Calcitonin. The two are formerly produced by thyroid follicles cells have similar biological activity & the term thyroid hormone "is restricted to these only. Calcitonin produced by **interfollicular "C"** cells and biologically different. The physiological significance of thyroid gland was recognized only after Grave's & Basedow in 1835. Thyroxine was the first hormone to be synthesized in the laboratory. T3 (tri-iodothyronine) was discovered in 1952. It is more potent. Both T4 & T3 are iodine containing derivatives of thyroxine which is a condensation product of two molecules of the amino acid tyrosine (MIT & DIT). Thyroxine is 3,5,3,5-tetraiodothyronine (T4). Tri-iodothyronine (T3) is 3,5,3 tri-iodothyronine. The thyroid hormone are synthesized & stored in the thyroid follicles of thyroglobulin molecule which is glycoprotein synthesized from thyroid cells. Molecular weight 660 K da contains 10% sugar. Thyroid hormone interact with the cells at three thyroid receptor (TR) sites. The nucleus where they cause transcription of m-RNA necessary for the synthesis of proteins (genomic actions). The affinity of T3 for TR's is tenfold higher than for T4. The thyroid hormone receptors are classified as TR α & TR β . TR α are responsible for regulation of heart rate, body temperature, skeletal muscle function and bone & intestine development. the normal range is 04 - 4.0 m IU/L.

TR β are involved in liver metabolism, negative feedback mechanism (athypothalamus- pituitary thyroid axis), retina and ear development. The non-genomic actions of thyroid hormone at the plasma membrane and mitochondria occur early in the course of exposure of cells to thyroid hormone. T3 acts on TR involved in cellular metabolism. It also stimulates NO (nitric oxide) productions which is responsible for vasodilation. T4 binds to plasma membrane receptors to activate MAP (mitogen-activated protein) kinase. Uncoupling of oxidative phosphorylation is not a physiological effect of thyroid hormone but plays a role in their calorogenic actions in patients with thyrotoxicosis. Difference between T3 & T4 overall effect of T4 & T3 are qualitatively similar.

Physiological and pharmacological actions of thyroid hormone

Calorigenic actions: The thyroid hormone stimulate oxygen consumptions and heat productions in all tissue except the brain, gonads, lymph nodes, spleen, thymus, dermis, Thyroid is used in hypothyroidism individuals.

Growth: The thyroid hormone are essentials for intrauterine tissue differentiations & as well as extrauterine.

1. Intrauterine thyroid deficiency causes defective brain development leading to cretinism with mental retardation.

2. Deficiency of thyroid hormone appearing after birth leads to physical growth retardation characterized by a marked delay in the bone maturation (related bone age).

A characteristic epiphyseal dysgenesis where calcification appears as multiple, small irregular foci causing stippled,



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

porous, fluffy in X-rays is also seen. It is associated with significant decrease in the serum alkaline phosphatase level.

Conditions

Exophthalmos:- (Bulging eyes) is an auto-immune inflammation of periorbital tissues that affects the thyroid gland and can cause hyperthyroidism.

Grave's disease:- is an immune system condition that affects thyroid gland enlarged, shrinks become firm and less vascular. Most common in women under the age of 40 and symptoms like puffy eyes etc.

Thyrotoxicosis:- is due to excessive secretion of thyroid hormones. The main causes are grave's disease and IgG class of antibodies to the TSH receptor are detected in blood.

Cretinism:- intrauterine thyroid deficiency causes defective brain development with mental retardation.

Epiphyseal dysgenesis:- deficiency of thyroid hormone appearing after birth leads to physical growth retardation.

Non-toxic goiter:- It may be endemic or sporadic. Endemic is due to iodine deficiency which may be accentuated by factors present in water, food, milk (excess calcium, goitrin, thiocyanates).

Thyroid nodule:- Certain benign functioning nodules regress when TSH is suppressed by T4 therapy. Non-functional nodules should not be treated with levothyroxine.

Goitrin:- Found in plants (cabbage, turnip, mustard etc.) is the cause of goiter in cattle who feed on these plants. May contribute to endemic goiter in certain iodine deficient regions.

1. Hypothyroidism: Hypothyroidism is a condition in which the thyroid gland does not produce enough thyroid hormones, leading to a slowdown in the body's metabolism. It is commonly caused by an autoimmune disorder called Hashimoto's thyroiditis, where the immune system attacks the thyroid.

Hypothyroidism Symptoms: Fatigue Weight Gain Cold Intolerance Dry Skin Hair Thinning Depression

Hypothyroidism causes: Iodine Deficiency Certain Medications Previous Thyroid Surgery. Pregnancy Tumors Sugar Intake Radiation Therapy

Hypothyroidism Diagnosis:

Hypothyroidism is usually diagnosed through blood tests measuring thyroid hormone levels and is managed with hormone replacement therapy to restore normal function.

2. Hyperthyroidism: Hyperthyroidism is a condition where the thyroid gland produces excessive amounts of thyroid hormones, speeding up the body's metabolism.

Hyperthyroidism symptoms

Unexplained Weight Loss Rapid Heart Beat Anxiety Irritability Excessive Sweating Heat Intolerance.

Hyperthyroidism causes

The most common cause of hyperthyroidism is graves' disease, an autoimmune disorder where the immune system over stimulates the thyroid. Other causes include thyroid nodules or inflammation (thyroiditis).

Iodine excess medications pregnancy tumors sugar intake radiation therapy

Hyperthyroidism Diagnosis Diagnosis is typically made .

Through blood tests that's how elevated thyroid hormone levels (TSH, T3, T4 etc.).

Treatment

Anti-thyroid drugs

By convention only the hormone synthesis inhibitors are called anti thyroid drugs. Anti-thyroid drugs bind to the thyroid peroxidase and prevent oxidation of iodide/iodotyrosyl residues. Inhibits iodination of tyrosine residues in thyroglobulin. Inhibit coupling of iodotyrosine residue to form T3 and T4.

Thioamides—Do not interfere with trapping of iodide and do not modify the action of T3 and T4 on peripheral tissue or on pituitary . propylthiouracil , methimazole , carbimazole neo- mercazole

Ionic inhibitors—Certain monovalent anion inhibits iodide trapping by NIS- sodium/iodide symporter into the thyroid because of similar hydrated ionic size T4/T3. Cannot be synthesized . perchlorates.

Iodine and iodides—Though iodine is a constituent of thyroid hormone. It is the fastest acting thyroid inhibitor. lugol "solution , colossal , iodide (sodium&pot.).

Radio active iodine—The stable isotope of iodine is 127 I. Its radio active isotopes of medicinal importance is 131 I physical half life 8 days .the chemical behavior of 131 I is similar to the stable isotopes .

B-adrenergic blockers—Propranolol have as an important form of therapy to rapidly alleviate manifestations of thyrotoxicosis that are due to sympathetic over activity, viz-palpitation, tremor, nervousness, severe myopathy, sweating.



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Non selective B-blockers–Propranolol are the most valuable measure .they afford dramatic symptomatic relief. they reduce peripheral conversion of T4 to T3, 1-2 mg i.v. & 40-80 mg oral every 6 hours. propranolol .

Propylthiouracil:-200-300 mg oral 6 hours reduce hormone synthesis as well as T4 to T3 conversion .

Corticosteroids:-hydrocortisone 100 mg i.v.8 hourly followed by oral prednisolone.

Iponic acid:-0.5-1g OD oral or Iodate are iodine containing radio constant media .They are potent inhibitor of thyroid hormone release from thyroid.

Diltiazem:-60-120 mg BD oral may be added if tachycardia is not controlled by propranolol alone or when it is contraindicated.

Epidemiology- Thyroid disorders are highly prevalent in India, with estimates suggesting that about 42 million people suffer from thyroid diseases. This prevalence is influenced by factors such as genetics, iodine deficiency, and increasing awareness and diagnosis. Thyroid disorders disproportionately affect women compared to men. Conditions like hypothyroidism and thyroid nodules are more prevalent among women, especially in reproductive age groups and during pregnancy. Thyroid diseases, particularly hypothyroidism and hyperthyroidism, represent a significant health burden in India. Here are some key points about the thyroid disease burden in India. There are significant geographical variations in the prevalence of thyroid disorders in India. Iodine intake have higher rates of hypothyroidism, of autoimmune thyroid disorders like Graves' disease.

Management

Stress Management Chronic stress and inadequate stress management techniques can adversely affect thyroid function. Stress activates the hypothalamic-pituitary-adrenal (HPA) axis, which can disrupt the hypothalamic-pituitary-thyroid (HPT) axis, leading to alterations in thyroid hormone levels.

Physical Activity and Exercise Regular physical activity is associated with improved overall health, including metabolic function and hormone regulation. Exercise can help in maintaining a healthy weight, which is crucial as obesity is linked to an increased risk of thyroid disorders, particularly hypothyroidism.

Sleep Patterns Quality sleep is crucial for overall health, including hormone regulation. Sleep deprivation and poor sleep quality can disrupt the HPT axis, affecting thyroid hormone production and metabolism. Disorders like sleep apnea have also been linked to thyroid dysfunction.

Smoking and Alcohol Consumption Tobacco smoking and excessive alcohol consumption have been associated with an increased risk of thyroid disorders. Smoking, in particular, has been linked to autoimmune thyroid diseases and thyroid cancer. Alcohol can interfere with thyroid hormone synthesis and metabolism, contributing to thyroid dysfunction.

Kachnar

Kachnar is commonly called as Orchid Tree, Varigated *Bauhinia* different languages it is called as: Kachnar consists of the dried, stem bark of *Bauhinia variegata* belonging to a medium sized. There are two varieties, red and white. The bark of both is alternative, tonic astringent.

Synonym:Kachna

Family:Leguminosae

Common Name:Kachnar

Part used:Bark

Amla: Large deciduous trees, with distichous, linear oblong leaves. flowers greenish yellow, infascicles on leafless branches, fruits globose, fleshy; seeds bony.

Synonym:Phyllanthus emblica L.

Family:Euphorbiaceae

Common name :Amla

Parts used: Pericarp of dried matured fruits

Bhibhitaki :It is botanically known as **Terminalia belerica**.

Family:Combretaceae

Shape:spherical to ovoid ,curved pieces , irregular shapes,convex external surface

Colour:Wrinkled, grey and brown, pale yellow

Taste:Astringent



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Harad :It is botanically known as **Terminalia chebula**.

Family: Combretaceae

Colour: Yellowish brown

Taste: Astringent and bitter

Aswagandha: It is used as a general health tonic for elderly persons and lactating women. It is known for antiseptic properties and can be used as narcotic anti- epileptic, against female sterility.

Synonym: **Withania somnifera**

Family: Solanaceae

Common name: Asgandh

Parts used: dried roots

Shape: smaller size ,straight unbranched

Colour: outer surface is buff to grey yellow with wrinkles

Odour: characteristics

Taste: bitter and acrid

Preformulation studies :

1.Organoleptic properties

a)colour- The herbal Thyrocure powder was generally white to off-white in colour when seen from naked eyes.

b)Odor-The odour of thyrocure powder is aromatic .

c)Taste –The taste of Thyrocure powder is slightly bitter to pungent.

d)Particle size- The size of the powder can be analysed by electron microscope.

2)Angle of repose: With care ,dynamic angle of repose measurement can be replicated with relative deviation of approximately 2% they are particularly sensitive to change in particle size distribution and to moisture content and they provide rapid means of monitoring significant batch difference in these respells.

$$\theta = \tan^{-1} h/r$$

Where,

θ =Angle of repose

H=Height of the pile

R=Radius of the base of the conical pile.

Angle of repose was determined by using funnel method .powder was paired from a funnel that can be raised vertically until a maximum cone heights,it was obtained . Diameter of heap,d was measured.The angle of repose calculated by above formula.

Angle of repose as indicating of powder flow-properties

Angle of repose	Types of flow
<20	Excellent
20-30	Good
31-39	Passable
>40	Very poor

Table no.05

3)Bulk density-bulk density is of great importance when one considers the size of dosage form product me homogeneity of how dose formulation in which where is large difference in drug and Excepiant density is determined by pouring pre-sieved (40 sieve) bulk drug into a graduated cylinder via a large and measuring the volume and weight .The bulk density was calculated using equation:

$$pb = MV$$

where pb= Bulk density,

M=Mass of the granules in gram.

V=Final tapped volume of granules in ml.



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

4) Tapped density: After 50 and 100 taps the corresponding reading was observed to the nearest milliliters .The taped volume was eorded when the difference between the two volume was smaller than 1 ml.

5) Hausner's ratio: Flow property was defined according to the Hausner ratio .Hausner ratio= (Tapped density) (Bulk density) Flow of powder was measured using a standard funnel .In a dry funnel ,whose bottom opening has been blocked,the sample was introduced without compacting .After removing the blockage from the bottom opening of the funnel ,the time taken for the entire sample to flow out through the funnel was measured

Hausner ratio = (Tapped density/Bulk density)

6)Compressibility index This was measured for the property of a powder to be compressed ,such they are measured for relative importance of inter –particulate interactions .compressibility index was determined by foloowing equation. Compressibility index was determine according to carr's index

Carr's index =(Tapped density) –(Bulk density)*100 (Tapped density)

7)Solubility Profile:- By determining the solubility index of a sample ,it is possible to determine to what extent a pure substance can be dissolved in a solvent.

Water	Soluble
Methanol	Fully soluble
Chloroform	Slightly soluble
Iso-propyl	Insoluble

Formulation of Herbal Thyrocure Powder

Batch of ingredient	F-1 (mg)	F-2 (mg)
Kanchnar bark powder	24 gm	24 gm
Ashwagandha powder	2.5 gm	2.5 gm
Triphala Powder	7.5 gm	7.5 gm
Ginger Powder	2.5 gm	2.5 gm
Coriander powder	2.5 gm	2.5 gm

Method Of Preparation: After performing preformulation studies and phytochemical screening of all the crude powdered drug . Get the drugs in the above measure,firstly triturate all the materials and sieve them to obtain a fine powder, and then fine powder of all ingredients are mixed together in given quntity measure and after evalute the powder then transferred to a well closed container and packed and labelled carefully.

Preparation of ethanolic, acetonic and aqueous extracts of ARP (Ashwagandha Root Powder) The powdered Ashwagandha root samples (50 g/250 mL) were extracted successively with methanol, acetone and water using soxhlet apparatus at 55-850C for 8-10 h in order to extract the polar and non-polar compounds (Elgorashi and Staden, 2004) [4]

Phytochemical Screening of extracts

1. Test for Alkaloid Wagner's test: About ten mg of extract was taken and few drops of Wagner's reagent (Dissolve 2 g of iodine and 6g of KI in 100 cm³ of water) was added and the formation of a reddish brown precipitate indicates the presence of alkaloids.

2. Test for Flavonoid Lead acetate test: Ten mg of extract was taken and few drops of 10% lead acetate solution was added. Appearance of yellow colour precipitate indicates the presence of flavonoids.

3. Test for Tannin Ferric Chloride Test: To 5 ml of the sample, a few drops of 0.1% ferric chloride were added. The presence of a brownish green or blue black colour indicated that the material possessed tannins.

4.Test for Saponin Foam test: 0.5 mg of extract was diluted with 20 ml distilled water and shaken well in a graduated cylinder for 15 min. The formation of foam to a length of 1 cm indicated the presence of saponins.



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

5. Test for Carbohydrates Fehling's test: Five ml of Fehling's solution was added to 0.5 mg of extract and boiled in a water bath. The formation of yellow or red precipitate indicates the presence of reducing power.

6. Test for Glycosides Glycoside test: 0.5 mg of extract was dissolved in 1 ml of water and then aqueous NaOH solution was added. Formation of yellow colour indicates the presence of glycosides. 2.6 Physical.

Evaluation of herbal thyrocure powder

Physical properties of thyrocure powder

Sr.no.	parameter	observation
1	Colour	Buff to grey
2	Taste	Acrid, astringent
3	Odour	Characteristic, aromatic
4	Consistency	Fine powder

Sr.no	Parameter	values
1	Loss on drying at 1050 C (%w/w)	74%
2	2 Total Ash Value(%w/w)	5%
3	pH (5% Aqueous)	8.3
4	Tapped density	2.68 gm/ml
5	Bulk density	1.96gm/ml
6	Particle size	98.1% (35.5 micron)
7	Solubility	Sparingly Water
8	Angle of repose	20°

Phytochemical screening of thyrocure powder

Sr.no.	Test	Observation
1	Wagner's test	Alkaloid present
2	Lead acetate test	Flavanoid present
3	Ferric chloride test	Tannin present
4	Fehling's test	Carbohydrate present
5	Glycoside test	Glycoside present



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



II. RESULT AND DISCUSSION

The stem bark of Kanchanar and other herbs was collected and analysed the various standardization parameters preliminary phytochemical result showed the presence or absence of certain phytochemical in the drug the test performed using extracts through maceration and decoction phytochemical test revealed the presence of alkaloids flavanoides ,carbohydrates glycosides the deterioration time of the plant depend upon the amount of water present in plant material if the water content is high the plant can be easily deterioration due to fungus the loss on drying , Ash value ect. also result the water soluble extractive value was indicating the indicating the presence of sugar acids and inorganic compounds the alcohol soluble extractive value indicated the presence of Polar constants like phenols steroids the presence of pesticide Residue organ of chlorine pesticide organ of phosphorus pesticides and pirates for not detected in the plant samples.

III. CONCLUSION

Any formulation used medicinally requires a detailed study prior to its use. The therapeutic efficacy of the drug depends on the quality of the ingredients used for the preparation of the medicinal product. Kanchanara, triphala, ashwagandha, ginger, coriander powder was pharmacologically subjected for physicochemical, qualitative and analysis in accordance to standard operating procedures at a pharmacy. Raw materials of the drug were identified and authenticated prior to the preparation. The drug was subjected pharmacologically to physicochemical analysis, qualitative analysis. The groundwork for standardization of Kanchanara and other herbal drugs powder has been attempted in this study. The study concludes the standard organoleptic, physiochemical, phytochemical parameters of Kanchanara and other herbs mixture contained in thyrocure powder which will be helpful in future studies regarding to Kanchanara.



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

REFERENCES

1. Gunjan and Prabhat kumar dwivedi et'al (2023) Action of kanchanar guugulu in the management of hypothyroidism International journal of Advance research page.no. 951-958.
2. Shailesh veer ,Sawate AR et'al (2019) Studies on quality assesment of ashwagandha root powder International journal of chemical studies page no .556-562.
3. Rupa Sengupta and Drashti desai et'al (2015) Physicochemical and preliminary phytochemical studies on kanchanar bark, Scholars research library page no. 67-75
4. Poonam G.Daswani et'al (2011) Preparation of Decoction of medicinal plants:A self –help measure ?,the journal of ternative and complementary medicines. page no.1099-1108.
5. Prachi Vishwakarma et'al (2022) Pharmaceutical analysis of Kanchanar & nano kanchanar stem bark powder in hypothyroidism, international journal of ayurvedic medicines.page no 384-387.
6. Aswini Pavithran et'al (2024) Role of triphala on gut microbiota in the treatment of obesity and its complications, International Journal of Ayurveda and Pharma Research page.no 97-110.
7. Critical Review on Galganda (hypothyroidism), by Chinmayee Mohanty.et al., published in IAMJ July 2022.
8. Sir Stanley Davidson. Davidson's Principles and Practice of medicine, edited By Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston, 20th edition. Elsevier Limited; 2010. Page no 750, page no 748
9. S. Chandra et al, Conceptual study of hypothyroidism and Agnimandya, International General of Ayurvedic and Herbal medicine5:4 (2015) 1932-1931
10. Susrutha, Susrutha Samhita, with Nibandha Samgraha commentary of SreeDalhana Acharya and Nyayachandrika Panchaka of Sri Jayadasa Acharya and edit- ed by Vaidya Acharya Tri Vikram Ji Yadav Ji, Chaukamba orientalia, Varanasi, edition-2019, Ni- danasthana 11/29, page no 315.
11. Agnivesha, Charaka Samhita with Ayurveda Deepika commentary of Chakrapanidatta revised by Charaka and
12. Dridhabala, edited by Vaidya Yadav Ji Trivikram- ji Acharya, published by Chaukamba publishers, edition 2020 sutrasthan, 20/17, pg. no.-115.
13. Shukla V and Tripathi R, Editors, Charak Samhita, vol. 2, Chikitsasthana, Chapter 12, Verse 79, Delhi: Choukhambha Sanskrit Pratisthan, reprint edition 2012; p-284.
14. Kaviraj -Sri Govind das Sen virachita Bhaishajya ratnavali edited with 'Siddhi Prada' Hindi commentary by Prof. Siddhinanadan Mishra, Chaukham bhasur bharti prakashan Varanasi, edition: 2017,
15. Galaganda prakarana kanchanara Guggulu page no.
16. Sarngadhara Samhita of Pandita Sarngadharacarya, annotated with Dipika Hindi Commentary, by Dr. Brahmanand Tripathi , Madhayam khanda chapter 7th, verse 95-100, vatak Kalpana.



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com