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STANDARDIZATION AND EVALUATION OF RAPID DISSOLVING MOULDED TABLETS CONTAIN TEA EXTRACT

The Healthy Way

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ABSTRACT

Research sets standards for fast-dissolving herbal tea tablets, addressing quality challenges. Hibiscus extract's varied applications and potential benefits, including stimulation and cardioprotection, are explored. Research establishes standards for innovative herbal tea tablets, emphasizing fast-dissolving types. Challenges in quality and potency are addressed through rigorous testing. The study explores hibiscus extract's diverse applications and potential benefits, including stimulation and cardioprotection. This research focuses on standardizing and evaluating herbal tea tablets, particularly novel fast-dissolving ones, addressing challenges in quality, potency, and dissolution. The study emphasizes rigorous testing of formulation parameters, dissolution characteristics, and bioavailability to establish reliable standards. Hibiscus extract, rich in antioxidants and used in skincare and teas, is explored for its diverse applications and potential advantages, including stimulation and cardioprotective properties.

Keywords:
Herbal tea tablets, standardization, fast-dissolving, quality challenges, hibiscus extract, applications, potential benefits, stimulation, cardioprotection.

INTRODUCTION.

Tea is an aromatic beverage prepared by pouring hot or boiling water over cured or fresh leaves of Camellia sinensis, an evergreen shrub native to East Asia which probably originated in the borderlands of southwestern China and northern Myanmar. Tea is also made, but rarely, from the leaves of Camellia taliensis[1]. After plain water, tea is the most widely consumed drink in the world. There are many different types of tea; some have a cooling, slightly bitter, and astringent flavour, while others have profiles that include sweet, nutty, floral, or grassy notes. Tea has a stimulating effect in humans primarily due to its caffeine content[2]. Tea plants are native to East Asia and the probable center of origin of tea is near the source of the Irrawaddy River from where it spread out fan-wise into southeast China, Indo-China and Assam. Thus, the natural home of the tea plant is considered to be within the comparatively small fan-shaped area between Nagaland, Manipur and Mizoram along the Burma frontier in the west, through China as far as the Chekiang Province in the east, and from this line generally south through the hills to Burma and Thailand to Vietnam. The west–east axis indicated above is about 2,400 km long extending from longitude 95°-120°E. The north–south axis covers about 1,920 km, starting from the northern part of Burma, latitude 29°N passing through Yunnan, Tongkin, Thailand, Laos and on to Annan, reaching latitude 11°N. Chinese (small-leaf) type tea (C. sinensis var. sinensis) may have originated in southern China possibly with hybridization of unknown wild tea relatives. However, since there are no known wild populations of this tea, its origin is speculative.The perceived effects of traditional tea consumption, like increased alertness due to caffeine content, can vary from person to person. Some individuals might notice effects more prominently after consuming tea multiple times, while others may experience effects sooner[3]. Factors such as individual sensitivity to caffeine, metabolism, and overall health

can influence how quickly someone responds to the components in tea. It's essential to be mindful of personal tolerance levels and enjoy tea in moderation. In this context, moulded fast-dissolving tablets present a breakthrough in herbal tea consumption. These tablets are designed to rapidly dissolve in the mouth, ensuring quick absorption of the herbal constituents, bypassing the need for conventional brewing and allowing for a more immediate and efficient delivery of the tea's active compounds. However, the standardization and evaluation of these herbal tea tablets pose significant challenges[4]. Ensuring consistent quality, potency, and dissolution profiles while maintaining the natural characteristics of the herbal extracts requires meticulous attention to formulation and manufacturing processes[5]. This research endeavors to address these challenges by focusing on the standardization and comprehensive evaluation of herbal tea tablets, particularly emphasizing the novel moulded fast-dissolving tablets. Through rigorous testing and analysis of formulation parameters, dissolution characteristics, and bioavailability, this study aims to establish reliable standards for the production of these innovative herbal tea formulations, ensuring both their effectiveness and consumer satisfaction[6]. Hibiscus extract is derived from the vibrant and colorful Hibiscus sabdariffa flower, known for its ornamental beauty and potential health benefits. Rich in antioxidants, vitamins, and minerals, this extract has gained popularity for its role in skincare, haircare, and even as a flavorful ingredient in teas. [7]Let's explore the diverse uses and potential advantages of hibiscus extract in various applications. Also hibiscus gives stimulation and cardioprotective properties.

MATERIALS AND METHODS

Raw Material Procurement[8]:

1. Herbal Tea Extracts: Source high-quality herbal tea extracts, emphasizing the target botanicals with desired flavor and health properties. Verify extraction methods and ensure compliance with quality standards.

2. Binding Agents: Procure binders that facilitate tablet formation and disintegration. Options may include hibiscus extract ensuring compatibility with herbal extracts.

3. Disintegrants: Obtain disintegrants such as hibiscus rapid tablet dissolution, enhancing the bioavailability of herbal compounds[9].

4. Quality Control Standards: Establish stringent quality control standards for raw materials, including testing for purity, potency, and absence of contaminants such as heavy metals or microbial impurities.

5. Packaging Materials: Select packaging materials that preserve the freshness and quality of herbal tea tablets, considering factors like moisture resistance and light protection.

6. Regulatory Compliance: Ensure that all procured raw materials adhere to relevant regulatory guidelines and certifications, guaranteeing the safety and compliance of the herbal tea tablets. Authenticate raw materials for herbal tea tablets by obtaining certificates of analysis (CoA) from suppliers[10]. Conduct tests for identity, purity, and potency. Utilize techniques like chromatography for active ingredient verification. Regularly audit suppliers to ensure adherence to quality standard[11].

PLAN OF WORK

PREPARATION OF GREEN TEA EXTRACT:

It is done by maceration process. Firstly green tea powder is added in beaker , after addition of tea powder , addition of 5% alcohol and 95% water takes place. The solution is heated for 10-15 minutes , after heating the solution needs to be cooled down till room temperature[12]. Then the beaker is covered with aluminium foil and keep it aside for two days. After two days filter the mixture and keep it on water bath for evaporation of water and then we get the extract of green tea.

PREPARATION OF NORMAL TEA EXTRACT:

It is done by maceration process. Firstly tea powder is added in beaker , after addition of tea powder , addition of 5% alcohol and 95% water takes place. The solution is heated for 10-15 minutes , after heating the solution needs to be cooled down till room temperature. Then the beaker is covered with aluminium foil and keep it aside for two days. After two days filter the mixture and keep it on water bath for evaporation of water and then we get the extract of normal tea.

PREPARATION OF HIBISCUS FLOWER EXTRACT:

The extraction of hibiscus is done by percolation method. Firstly boil the petals in water bath with volume ratio of 95:5 where 95% is water and 5 % is alcohol then it settled down for some time then the solution got filtered and kept on water bath for concentration .The concentrated solution is used for formulation[13].

Standardization Of Extract With Respect To Caffeine:

Experimental procedure for determination of caffeine by Uv-visible spectrophotometer method :

An accurately weighed 1mg Amount of caffeine powder was dissolved in 100 mL of Methanol on room temperature. This is used as a stock solution for every mixture. In Addition the solution was filtered by using filter paper to get rid of particle from the solution.

In a typical Experiment, the stock solution was mixed with Methanol by volume ratio 1:10 where 1 mL of stock solution mixed with 10 mL of Methanol. This is how first dilution got prepared. For second dilution, the volume ratio is 2:10 For third dilution ,the volume ratio is 4:10 For fourth dilution , the volume ratio is 6:10 For fifth dilution ,the volume ratio is 8:10 For unknown solutions the green tea extract and Normal tea extract got mixed in Methanol and after keeping for 15 to 20 mins. they got filtered using filter paper then the solutions got treated with Methanol Where the volume ratio is 1:10 for both extracts . Determination of caffeine content by Uv-visible Spectrophotmer method The absorbance got Measured at 273 nm using UV-Vis spectrophotometer. And Then the absorbance versus concentration graph (Fig.1) was Constructed to validate the UV-Vis absorption of caffeine in Terms of linearity, sensitivity, precision and for calibration purpose to determine the caffeine content in extracts.

PREPARATION OF TABLETS :

The process commenced with precisely weighing an appropriate quantity of both the extract on an electronic balance[14]. Subsequently, the concentrated solution of hibiscus was amalgamated, resulting in the formation of a cohesive dough. This mixture was meticulously pressed into tablet molds. The molded tablets were then placed in a hot air oven, undergoing a drying phase at 50 degrees Celsius for 10-15 minutes. This controlled drying process facilitated the absorption of moisture, ultimately rendering the tablets rigid and firm[15].

RESULT AND DISCUSSION

Stability Studies:

In the realm of tablet stability, a critical divergence emerges based on storage methods. Tablets housed in conventional containers find themselves susceptible to fungal attacks, primarily attributed to the presence of ambient air and the absence of preservatives within the storage environment. The intrusion of air provides a conducive setting for fungal growth, amplifying the vulnerability of the tablets[16].

Conversely, tablets encased within impermeable plastic barriers enjoy a superior level of preservation. The hermetic seal provided by the plastic impedes the infiltration of air, creating an environment less hospitable to fungal proliferation. Moreover, the inclusion of preservatives in the packaging serves as a protective shield, further enhancing the stability and longevity of the tablets. This stark contrast underscores the pivotal role of packaging methods in determining the stability and shelf life of pharmaceutical tablets[17].

Yield of Extract:

For Green tea,

The Weight of 1 green tea sachet is 2-3 gms.

Therefore, the weight of 10 green tea sachet is 20-30 gms.

The weight of solvent free extract is 9 gms.

For Normal Tea,

The weight of normal tea is 20-30 gms.

For Hibiscus flowers,

The weight of 1 flower is 3 gms.

So the weight of 5 hibiscus flowers is 15 gms.

To calculate the yield of green tea extract,

%yield = wt. Of solvent free extract /wt. Of dried extract = (9/30) X 100 = 0.3 X 100 = 30%

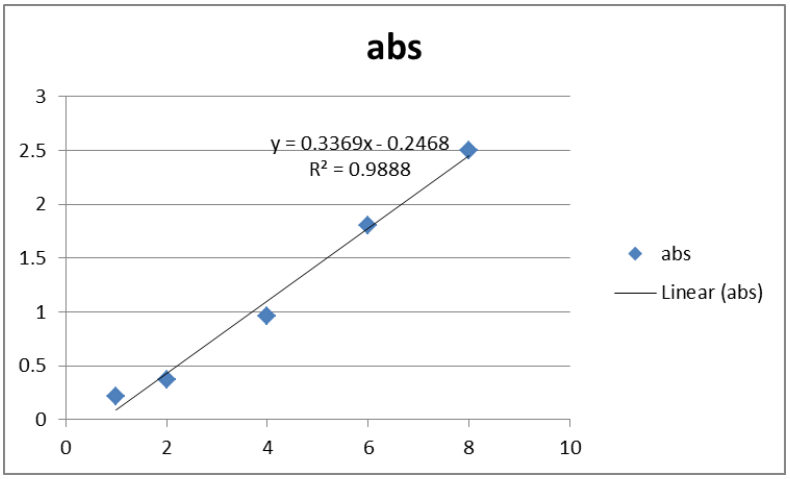
To calculate the yield of normal tea extract,

The weight of solvent free extract is 11 gms. **%yield = wt. Of solvent free extract /wt. Of dried extract** = (11/30) X 100 = 36.66%.

In summary, the green tea extract has a yield of 30%, calculated from 9 gms of solvent-free extract in 30 gms of dried extract. On the other hand, the normal tea extract has a yield of 36.66%, derived from 11 gms of solvent-free extract in 30 gms of dried extract[18].

Standardization result:

Standardization process is carried out for the determination of caffeine content in the tablets. The standardization process for determining caffeine content in tablets involves establishing a reference or standard solution of known caffeine concentration. This solution is then used to calibrate the analytical instrument, such as a spectrophotometer or HPLC, ensuring accurate measurement. Subsequently, the tablets are extracted or prepared for analysis, and their caffeine content is quantified by comparing the results to the standardized reference. This ensures consistency and reliability in determining the caffeine levels in the tablets[19].



conc	abs
1	0.213
2	0.371
4	0.957
6	1.8
8	2.5

Dissolution:

Dissolution properties of tablet deemed to be excellent. As the practical is directed towards development of rapidly dissolving tablets, therefore they have the highest rate of solution formation. The total dissolution time is 2 minutes for tablet[20].

Stability:

Stability studies are conducted for final product, and it came to highlight that intrusion of ambient air seeds for fungal attack, affecting the vulnerability of tablets. To stabilize the product it should be precautioned as packing in air tight container.

Standardization of extract with respect to caffeine:

The absorbance of light got measured at 273nm using UV – Vis spectrophotometer. Then the graph is constructed and it shows that caffeine has continously increasing absorbance value[21].

Preparation of moulded tablets:

The tablets are prepared by weighing both the extract residue accurately on an electronic balance. They are formed in dough and moulded in tablet form and kept for pulling out all the moisture in Hot Air Oven for 50°C for 10-15 min.

CONCLUSION:

The conclusion can be expressed as the thesis performed, can have beneficiaries in pharmaceutical industry. As this project is mainly focused on dissolution rate of tablet. This assignment is concluded with statement of showing rapid dissolving of tablets. Herbal rapid dissolving molded tablets suggests that they offer a promising alternative for drug delivery. Their quick dissolution, easy administration, and potential use of natural ingredients make them advantageous. However, further research is needed to assess their stability, efficacy, and long-term effects for broader pharmaceutical applications.

In conclusion, tea, derived from the Camellia sinensis plant, has a rich history originating in East Asia. With diverse flavors and a stimulating effect due to caffeine, tea is a globally consumed beverage. The study on novel moulded fast-dissolving herbal tea tablets addresses challenges in standardization, ensuring efficient delivery of active compounds. Hibiscus extract, known for its antioxidants and cardioprotective properties, adds versatility to teas and extends its applications to skincare and haircare. Overall, the research aims to establish reliable standards for innovative herbal tea formulations, emphasizing both effectiveness and consumer satisfaction. In summary, tea, originating from Camellia sinensis, is a globally consumed, diverse beverage with a stimulating effect from caffeine. Research on fast-dissolving herbal tea tablets addresses challenges in standardization for efficient delivery. Hibiscus extract, rich in antioxidants and cardioprotective properties, enhances tea's versatility in skincare and haircare applications. The study aims to establish reliable standards for effective and satisfying herbal tea formulations.

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