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FORMULATION AND EVALUATION OF HERBAL TABLETS CONTAINING NYCTANTHUS ARBOR TRISTIS.

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Abstract

This review article aims to summarize the formulation and evaluation of herbal tablets containing Nyctanthes arbor tristis, commonly known as the night-flowering jasmine. Nyctanthes arbor tristis has been traditionally used for its various therapeutic properties, including anti-inflammatory, analgesic, anti-pyretic, anti-microbial, and hepatoprotective effects. The review discusses the formulation aspects such as selection of excipients, optimization of tablet manufacturing process, and evaluation parameters including physical characteristics, drug release profiles, and stability studies. Various research articles and patents related to the formulation of herbal tablets containing Nyctanthes arbor tristis are reviewed to provide a comprehensive understanding of the topic. The review concludes with insights into the potential challenges and future directions for the development of herbal tablets utilizing Nyctanthes arbor tristis..

Keywords: Nyctanthes arbor tristis, herbal tablets, formulation, evaluation, excipients, drug release, stability studies.

1. Introduction :

All around the world, natural ingredients have been employed as medications and cures for a variety of illnesses.They may be able to create a brand-new medicinal substance with excellent advantages and desired effects. Medicinal plants and their active ingredients have been utilised to cure illness and as a source of biologically active substances for several decades. These bioactive substances are utilised to create novel medications with distinct physiological effects on the human body. Because they contain organic molecules that have been demonstrated to be advantageous when compared to synthetics, natural bioactive compounds are the sign of safety.[1-3]The focus of current study is on arthritis; it has been demonstrated that the leaves of Nyctanthes arbor-tristis can treat arthritis and provide relief from fever, discomfort, and inflammation. The entire plant possesses anti-fungal, anti-diabetic, and anti-oxidant properties [4,5]. Arthritis, which is defined as inflammation of the joints, is a chronic autoimmune illness that can affect people of any age. Rheumatoid arthritis and osteoarthritis are the two most prevalent types of arthritis. Pain, soreness, stiffness, and swelling in and around one or more joints are common symptoms of arthritic disorders. The onset of the symptoms may be gradual or abrupt .[6]

Materials And Methods:

Material Nyctanthes arbor-tristis leaves were collected from the local area dried, powdered and used as an antipyretic, analgesic, anti-inflammatory to cure arthritis, joint pains etc. The excipients used in the formulation are Methylcellulose is used as disintegrate, Magnesium stearate is used as a lubricant, Lactose is used as the diluent, Talc is used as a lubricant and gives the pleasant appearance to the tablet, and Acacia, HPMC-K4M, Sodium alginate these three excipients are used as the binder for the preparation of wet granulation.

Methods :

Prepration Of dry powder of nyctanthes arbor-tristis Leaves :

Collection of fresh leaves Nyctanthes arbor-tristis leaves from local area. Use distilled water to wash the leaves. For a few days, leaves are dried at room temperature. The leaves are dried completely in a hot air oven. To create a fine powder, the dried leaves are gathered and ground in a mixer.

Preparation of 2% acacia solution : Take 200 ml distilled water in a beaker. Take 2 gm of acacia powder and mix in 200 ml distilled water. Stir continuously until all powder was mix properly.

Preparation of 2% HPMC-K4M solution: Take 200 ml distilled water in a beaker. Take 2 gm of HPMC-K4M powder and mix in 200 ml distilled water. Stir continuously to form a jelly-like appearance.

Preparation of 2% sodium alginate solution: Take 200 ml alcohol in a beaker. Add 2 gm of Sodium alginate powder in 200 ml alcohol. Stir properly to mix well.

Formulation of Herbal Tablets:

The formulation was done by following the wet granulation process .

Wet granulation method:

Wet granulation is a common technique used in pharmaceutical manufacturing to form granules by adding a liquid binder to a powder mixture. For herbal tablets containing Nyctanthes arbor-tristis (also known as the night-flowering jasmine or Parijat), wet granulation can be employed to improve tablet compaction, flowability, and uniformity of drug distribution. It involves several steps:

Material Selection: Choose suitable excipients such as binders, fillers, and disintegrants. Common binders include starch paste, gelatin solution, or cellulose derivatives.

Powder Mixing: Blend the herbal powder of Nyctanthes arbor-tristis with other excipients uniformly.

Wetting : Add the liquid binder gradually to the powder mixture while mixing until the powder particles adhere and form granules.

Granulation: Continue mixing until the wet mass reaches the desired consistency. The wet mass is then passed through a sieve to obtain granules of uniform size.

Drying: Dry the wet granules using appropriate methods such as tray drying, fluid bed drying, or oven drying to remove moisture.

Sizing: After drying, sieve the granules to achieve the desired particle size range.

Tablet Compression: Finally, compress the dried granules into tablets using a tablet press.

S.No.	Ingredients	Quantity		
		F1	F2	F3
1	Nyctanthes arbor-tristis	250 mg	250 mg	250 mg
2	Methyl cellulose	180 mg	180 mg	180 mg
3	Magnesium stearate	20 mg	20 mg	20 mg
4	Talc	8 mg	8 mg	8 mg
5	Lactose	40 mg	40 mg	40 mg
6	Acacia	2%	-	-
7	HPMC-K4M	-	2%	-
8	Sodium alginate	-	-	2%

Formulation table :

Evaluation :

1]Bulk Density :

Densities in bulk and tapped The mass of an untapped powder sample divided by the volume (which includes the interparticulate void volume) is known as the bulk density of a powder. A glass funnel is used to carefully pour sample powder extract into a cylinder, and the volume occupied is noted. [7,8]

BD = weight of the powder / quantity of the packing.

2] Tapped Density :

The tapped density is the increased bulk density obtained by mechanically tapping a container containing the powder sample. The tapped density of powdered extract is determined by mechanically tapping a graduated measuring cylinder or vessel. After detecting the initial powder volume, the measuring cylinder or vessel is mechanically tapped, and volume is measured until a small volume change is detected.[9,10]

TD = weight of the powder / tapped quantity of the packing.

3] Compressibility index :

The interactions between particles that affect a Powder's bulking characteristics are also responsible for

impeding powder flow; the relative significance of these interactions can be determined by comparing the bulk and tapped densities. Such a comparison, such as the Compressibility Index .

The following equation is used to calculate the dried powdered extract sample's .[7,8,9,10]

Carr's index (%) = [(TD – BD) x 100] / TD

4] Hausner's ratio:

It is the ratio of tapped to bulk density and turned into calculated through the use of the equation.[11]

Hauser's ratio = TD/BD.

5]Angle of repose :

Angle of repose is the maximum possible angle between the surface of the pile of powder and the horizontal plane. A funnel with 10 mm diameter is fixed at a height of 2 cm over the plane. Sample powder is slowly allowed to pass through it till the pile touches the funnel stem then a rough circle was drawn around the pile base and the radius was measured of the circle . The angle of repose is calculated using below mentioned formula:[7,8,9]

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

M

Physical evaluation of tablets: The tablets were subjected to the following evaluation tests.

1) General appearance: The general colour and appearance of the tablets were determined visually.

2) Weight variation test : The weight fluctuation test was run using the guidelines provided. 20 tablets should be weighed separately and referred to as X1, X2, X3,... X20. Find the average weight of 20 tablets using the formula X= (X1+X2+X3+..+X20)/20. The weight of each individual was compared to both the upper and lower bounds. No tablet deviates from the average weight by more than twice the specified percentage error, and no tablet deviates from the weight average by more than two times that amount.

3) Hardness and thickness Test :

Tests for thickness and hardness Twenty pills were tested for thickness and hardness for each formulation. Vernier Callipers were used to measure tablet thickness, while Monsanto hardness testers were used to determine tablet hardness.

4) Friability Test :

Test for friability A Roche friabilator can be used in a laboratory to test the friability of tablets. The friabilator is made out of a plastic chamber that rotates at 25 rpm. The tablets are dropped into the chamber through a six-inch opening, and the device is then turned on for 100 revolutions. We weigh the tablets once more. It is deemed acceptable for compress pills to lose less than 0.5% to 1.0% of their total weight.

5) Disintegration time :

Disintegration duration The disintegration test measured simply the amount of time needed under specific conditions for a group of tablets to break down into particles; this test measured the amount of time needed for the tablet to separate into particles. This test was run to see if the tablet will dissolve within a given time frame.

Conclusion :

The Nyctanthes arbor-tristis was a traditional medicinal plant with a variety of uses, current studies have concentrated on its antipyretic, analgesic, and anti-inflammatory properties in relation to arthritis. Tablets were made with the powdered leaves. Wet granulation was carried out in three batches, designated F1, F2, and F3, utilising various binders. A pre-formulation investigation was conducted and the produced granules' flow characteristics were found to be good. The prepared tablet compression was assessed, and the findings were satisfactory. Comparing batch F3 to batch F1 and batch F2, the latter had a longer disintegration period. It is

determined from the findings that the formulation and evaluation are sound. To treat arthritis, a pharmacological examination is necessary.

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