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FORMULATION AND EVALUATION OF POLYHERBAL TABLET FOR ANTI-INFLAMMATORY ACTIVITY

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❖ **ABSTRACT:**

Curcuma longa, Aloe barbadenis, Coriandrum sativam, Azadirachta indica, zingiber officinale, are the medicinal plant they are normally used as a traditionally from ancient year in various herbal medicine such as Ayurvedic, Siddha, and Homeopathic .It also used in cosmetic and the medicinal product preparation from the above 5 herbal plant .this research paper are useful to the study of anti-inflammatory activity. This polyherbal tablet were prepared by using the extract of given herbal plant product. This polyherbal tablet has reduces the inflammation and the symptoms of inflammation.

❖ **KEYWORDS:**
Herbal plant, anti-inflammatory activity, bulk density, development and formulation.

❖ INTRODUCTION :

Plants have played an important role since human evolution. Has been used as an importantsource in treatment of various diseases. Plants are an important source of chemicals for drug discovery. Many traditional drug systems based on medicinal properties have been developed worldwide. Therefore, it provides natural remedies for the treatment of various ailments. Paved the way for the new the discovery depends on the herb being marketed asa crude drug. Plant acted as an important source of basic chemical components from the development of modern medicines to the present day many active compounds isolated fromplants are used in modern medicine. From a huge variety of plants many pharmacologically important active compounds can be isolated. Many herbs have anti-inflammatory properties. [1] When a injure inflate up, convert red and hurts, it may be a sign of inflammation. Very normally speaking, inflammation is the body's immune system's response to an annoyance. The annoyance might be a germ, but it could also be a foreign object, such as a splinter in your finger.

➢ There are five symptoms are signs of an inflammation:

1. namely redness (*rubor*)
2. swelling (*tumour*)
3. hotness (*calor; only applicable to the body 'extremities*)
4. pain (*dolor*)

5. loss of function (*functio laesa*)

- The many causes of the inflammation may be classified as follows:

1. Microbes-e.g. bacteria, viruses, protozoa, fungi.
2. Physical agents- e.g. heat, cold, mechanical injury, ultraviolet And ionisingradiation.
3. Chemical agent- -organic: e.g.: microbial toxins, organic Posion -inorganic: e.g.:acids, alkalis.

➢ Inflammation are classified as *acute* or *chronic*.

- **Acute inflammation:** is the short duration process, the body's initial response to noxious stimuli and is achieved by increased migration of plasma and white blood cells (especially granulocytes) from the blood to damaged tissue. A series of biochemical events moto the spread and maturation of inflammatory responses involving different cells of the local vasculature, immune system, and damaged tissue.

- **Chronic inflammation,** is also called as *prolonged inflammation*, it is show the progressive shift inthe type of cells present at the site of inflammation, such as mononuclear cells, and is characterized by continuous destruction and healing of the tissue from the inflammatory process.[3]

In the development of mankind plants have played an most important role . They have been used as main sources in cure of various ailments. Plants serve as an important source of chemicals for evoluton of novel drugs. All over the world, many traditional systems of medicines have been formed depend on the medicinal properties of plants thus, providing natural remedies for cure of various diseases. A path has been laid for novel drug discovery depending on the Plant based medicines, whichare being dispensed in the form of crude drug. Plants serve as an main source in providing basic chemical moieties in evolution of modern drugs and yet many active compounds isolated from plants are being used in modern medicine. From major variety of plant kingdom many active compounds of pharmacological importance can beisolated. Many herbs possess anti-inflammatory activity. For the present study plants like **Curcuma longa(rhizomes),Aloe barbadensis miller(leaves), Coriandrum sativam(leaves),Azadirachta indica(leaves),Zingiber officinale(rhizomes)**, [5]

A) Curcuma longa:

fig.01: curcuma longa (rhizome)

Curcuma longa belongs to family Zingiberaceae.it is one of the mostly used Indian traditional medicines where, the active constituent like curcumin, has found to show a potent anti-inflammatory effect by inhibiting prostaglandin synthesis. [6]

B) Aloe Vera:

fig. 02: aloe vera(leaves)

Aloe Vera belongs to family Asphodelaceae. The chemical composition of the Aloe Vera gel is show complex. Aloe vera contains 75 potentially active constituents like Vitamins, Enzymes, Minerals, Sugars, lignis, saponims, salicylic acids and amino acids. [7] Shows Anti-inflammatory effect in steroids like cholesterol, Campesterol, B-Sitosterol & lupeol; Hormone like. Auxins & Gibberellins; Salicylic acid. [8]

C) Coriandrum sativum:

fig. 03: coriandrum sativum(seeds, leaves)

Coriandrum sativum Linn is commonly known as Dhania or Dhana belongs to family Umbelliferae. It yields 0.3 to 1% of volatile oil, 90% of D- linalool, coriandryl acetate, L-borneol, geraniol and pinene. Its leaves are rich source of Vitamin A . Traditionallyits fruits as well as volatile oil were used as an aromatic, carminative, stimulant and flavoring agent. Linalool and Linalyl acetate present are potential anti-inflammatory agents. [9]

D) Azadirachta indica (Neem leaves):

fig.04: neem (azadirachta indica leaves)

Neem (Azadirachta indica) belongs to family Meliaceae.it has been found to possess several types of chemicals that could be exploited for the pest management. Neem seeds contain mainly the complex tetranorterpenoid lactones azadirachtin, Nimbin, nimbidin, salanin and nimbolin B out of which azadirachtin is the most active component. The leaves of neem contain chemical constituent like azadirachtin, meliantrol, salanin, β-sitosterol, stimasterol and flavonoides. The fresh stem bark yielded the bitter principles, nimbin, 0.04%; nimbinin, 0.002%; and nimbidin, 0.4%. Another terpenic constituent, identical with Sugiol is determined to be presentin the stem bark. [10]

E) Zingiber officinale (rhizome):

fig. 05: zingiber officinale(rhizome)

Zingiber officinale belongs to family Zingiberaceae. It is widely used as a traditional Chinese medicine, has non- Steroidal anti-inflammatory effect. It is been used as an effectiveanti-inflammatory herb for arthritis and rheumatism which acts by inhibiting COX-2 and lipoxygenase pathways. Its Chemical constituents for anti-inflammatory activity is Oleoresin, 6-gingerol, 8-gingerol, 10-gingerol, 6-shogaol, 6-hydroshogaol, Ginger Oil. [11]

❖ Objectives:

1. The main objective of the research work is to formulate and evaluate polyherbal anti-inflammatory tablet. Polyherbal anti-inflammatory formulation consists of five herbs viz., Curcuma longa (rhizomes), Aloe barbadensis miller (leaves), Coriandrum sativam (leaves), Azadirachta indica (leaves), Zingiber officinale (rhizomes).

2. To study the evaluation of parameter like odour, colour, texture, weight variation, hardness, percentage friability, disintegration.

❖ MATERIALS AND METHODS:

A. Collection of plant extract:-

The Plant Extract Powdered of Curcuma longa (Rhizome), Aloe Vera (Leaf), Coriandrum Sativum (Leaves), Azadirachta indica (Leaves), Zingiber officinale (Rhizome) are bought from local area.

B. Chemicals:-

Starch, talc, magnesium stearate and lactose.

A. Development of Formulation:

Five formulations namely formulation 1, formulation 2, formulation 3, formulation 4 and formulation 5 were developed. The Plant Extract of Curcuma longa (Rhizome), Aloe Vera (Leaf), Coriandrum Sativum (Leaves), Azadirachta indica (Leaves), Zingiber officinale (Rhizome) had been dried. According to the formulation, required quantity of Ingredient are dried & Weighed separately. Then the ingredients were screened through sieve number 80. All the ingredients except talc and magnesium stearate were mixed together and milled in a mortar pestle. The milled mixture was passed through sieve number 80. Then acacia gum solution, was slowly added to the milled mixture. This powder mass was screened through sieve number 18to obtain granules. The granules weredried at 35°C in vacuum dryer. The dried granules were passed through sieve no. 18 in order to remove bigger granules and stored in desiccators.

The formulation details are mentioned in table no 1

Ingredients	Amount (mg) for one tablet				
	Formulation I	Formulation II	Formulation III	Formulation IV	Formulation V
CL	10	15	20	25	30
AV	10	15	20	25	30
CS	10	15	20	25	30
AI	10	15	20	25	30
ZO	10	15	20	25	30
Starch	20	20	20	20	20
Talc	5	5	5	5	5
Magnesium Stearate	5	5	5	5	5
Acacia Gum	5	5	5	5	5
Lactose	385	345	305	265	225
TOTAL WT.	500	500	500	500	500

table no. 01: formulation details of polyherbal tablet

D. Preparation of polyherbal tablets:-

Power blends according to the every formulation, were compressed to 500 mg tablet by using hand rotating single punch tablet presses with appropriate compression pressure. The granules when it mixed with talc which show property of lubricant, and magnesium stearate which show property as a glidant, before punching. The die cavity was adjusted for required weight and the Preformulation studies for various parameters were conducted before compression of the powder blend to tablets. [1]

E. Preformulations Study:-

The biologically potent polyherbal extract powder with a stand for varied physical properties and micromeritics properties. Extract powdered are heterogeneous because it was composed of individual particles of different sizes and shapes randomly interspersed with air spaces and becomes more complicated with polyherbal [16, 17]. Measurements were carried out in triplicate for each formulation and presented as the average±standard deviation (SD).

a. Angle of repose:

The flow properties of thoroughly mixed all polyherbal extract powder in the formulationwere identified by deliberating the angle of repose by the fixed height method. A funnel with 10 mm in diameter of the bottom was fixed at the height of 2 cm over the plain and smooth surface. About 10 gm of a thoroughly mixed sample was slowly passed beside thewall of the funnel until the tip of the pile formed and touches the bottom of the funnel. A rough circle drowned around the pile base, and the radius of the powder cone was measured [18]. The angle of repose was calculated by the average radius using the following formula given as eq. 1.

$$\tan\theta = h/r \quad \text{.....(1)}$$

Where,

0= angle of repose

h = height of the pile

r = average radius of the powder cone

b. Bulk density

The bulk densities (BD) of polyherbal powder mixture were calculated by pouring gently 25 gm of sample mixture through a glass funnel into a 100 ml graduated cylinder.The initial volumes occupied by the sample were noted. The bulk density was determine by using the following formula given as eq. 2.

$$BD = \frac{weight\ of\ the\ powde(g)}{volume\ occupied\ by\ the\ powder(ml)} \quad \text{.....(2)}$$

c. Tapped density

The tapped densities (TD) of polyherbal powder mixture were calculated by pouring gently 25 gm of sample mixture through by using a glass funnel into a 100 ml graduated cylinder. The cylinder was tapped from the height of 2 inches until a constant volume obtained andthen the average value of all formulation reported. The final volume occupied by the sample after tapping were recorded and tapped density calculated by using the formula given as eq.3

$$TD = \frac{weight\ of\ the\ powder(g)}{tapped\ volume\ occupied\ by\ the\ powder(ml)} \quad \text{.....(3)}$$

d. Compressibility

The Carr's compressibility gives a useful empirical guide. The compressibility of the polyherbal powder mixture was deliberate by comparing the bulk density and tapped density. The percentage compressibility of all formulation was calculated as eq. 4.

$$Carr's\ index = \frac{TD-BD\times 100}{TD} \ldots\ldots\ldots\ldots\ldots\ldots(4)$$

e. Hausner's ratio

It also array densification of herbal powder mixture which may outcomes from the vibrationof the feed hopper, which was deliberate by using the formula given in eq. 5.

$$Hausner's\ ratio = \ldots\frac{TD}{BD}\ldots\ldots\ldots\ldots\ldots\ldots(5)$$

Lower Hausner's ratio-Better flowability, Higher Hausner's ratio Poor flowability [14,15].

❖ RESULT AND DISCUSSION

❖ Result:-

Evaluation of formulated polyherbal tablet

Sr. No	Parameter	Result
1.	Colour	Brownish green
2.	Shape	Round , Biconvex
3.	Odour	Characteristics odour
4.	Taste	Pleasant taste
5.	Size in mm	
	I. Thickness	5.12±0.08 mm
	II. Diameter	12.17±0.01 mm

A. Physical properties of polyherbal tablets:

a. Weight variation

The weight variation of tablets was performed to ensure that, eachof the tablets containsthe proper amount of drug. The test was performed by weighing 20 tablets individually using an analytical balance, then calculating the average weight and comparing the individual tablet weights (table 1). The percentage weight variation is calculated by using the eq. 6.

$$\%\ \text{wt variation} = \frac{\text{Average wt} - \text{Individual wt}}{\text{Average wt}} \times 100$$

b. Hardness

The identification of tablets for the capping, abrasion or breakage under storage conditions,transportation, and handling before the use depends on tablet hardness (kg/cm^2). The hardness test was carry out by using Monsanto hardness tester (Harrison's). The instrument which are measures the force required to break the tablet when the force (Kilogram- force) generated by anvils to the tablet. The tablet was placed between two anvils; the force applied to the anvils, and the crushing strength that causes the tablet to break wasrecorded, and the crushing strength test was performed on 20 tablets of each formulation(table 1).

c. Friability

The friability test was done by using tablet friability tester (Veego). Taken Twenty tablets of each formulation were weighed and tested at a speed of 25 rpm for 4 min (100 rotations).After removing of dust, tablets were re-weighed, and friability percentage was calculated by the given eq. 7, and the average value of all formulation is given in table 1.

$$\% \text{ Friability} = \frac{\text{Tablet wt before friability} - \text{Tablet wt after friability}}{\text{Tablet wt after friability}} \times 100$$

Formulation code	Average weight (mg)	Weight variation (%)	Hardness (kg/cm^2)	Friability (%)
Formulation I	563.15±9.38	2.34	2.98±0.13	0.90
Formulation II	562.40±8.01	2.20	2.91±0.09	0.82
Formulation III	563.28±7.78	2.36	2.99±0.14	0.79
Formulation IV	565.31±8.11	2.71	3.00±0.12	0.86
Formulation V	560.80±10.2	1.93	2.94±0.13	0.90

table no.02: physical properties of polyherbal dispersible tablets

DISCUSSION ;-

The various components of the prepared polyherbal tablet formulations areshown in (table 1). The formulation containing polyherbal Drugs choose for preparing tablets were determined using published standard methods viz. powder characteristics, powder micro-meritics, properties of prepared polyherbal tablet show the brownish Green in color, almost round with characteristic odors and pleasant taste. The average thickness of tablets 5.12±0.08 mm and average diameter12.17±0.01 mm was noted during the period of evaluation and development of tablets The micromeritic properties of formulations containing extracts powder used for preparation of polyherbal tablets observed that, the Formulation III has passed and shows all excellent properties viz. bulk density (0.35±0.03 gm/ml), tapped density (0.49±0.07 gm/ml), compressibility (28.57%), Hauser ratio (1.40±0.13), and Angle of repose (24.35±1.00 °), which was comparable as per IP standard. Formulation III has also shows the best physical properties i.e. average weight (563.28±7.78 mg), weight variation (2.36 %), content uniformity(105.05%), hardness (2.99±0.14 kg/cm2) Polyherbal tablets containing of best polyherbal formulations Formulation III was recorded in the acidic buffer (1.10±0.10 min) and friability (0.79%) as compare to other fast dissolving tablets containing extract powder of polyherbal formulations .[16]

CONCLUSION

Herbal medicine is nature's gift for us.it is the oldest form of health care known to man. Various traditional herbs have been used to diagnose, preventand treat various diseases. Based on an extensive literature search, five raw materials were selected to formulate poly-herbal tablets for anti- inframammary activity.

The results from Preformulation study of the angle of repose, Carr's indexand Hausner's ratio showed that the powder mixtures possess good flow properties. The physical properties of Formulation-I to Formulation-V were determined for the uniformity in weight, hardness and friability which have complied with the official requirements, and comply with the official limits mentioned in IP 2010.

The Formulation III showed the best physical properties and satisfactory anti-inflammatory Activity and reported as the best formulation as comparedto other Formulation.

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