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Research on Formulation and Evaluation of *Moringa oleifera* Lam. Effervescent tablet

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Abstract : *Moringa oleifera* lam., regionally known as kelor, is broadly stated as phytopharmaceutical herbal because of the capability of growing the 58% hemoglobin level in pregnant ladies as well as preventing the lower of serum ferritin by using 50% Main to anemia. Currently, the want of easy-to-dissolve pill has been multiplied upon the natural extract and consequently, The pick out of effervescent dosage shape is enormously optimal. This examine turned into geared toward designing the highest quality composition of Antianemia bubbling drug based totally on moringa oleifera lam. Leaves extract. The moringa leaves extract was produced by way of Maceration method the use of 70% ethanol. Bubbling capsules were prepared in 4 formulation based on acid-base (1: 2 and 1: 3) and taste versions (i.e. Lemon and strawberry). The tablet turned into formulated the usage of wet granulation technique. Prior to Tablet compressing, the granules had been examined for the bodily residences along with water content, touch attitude, flowability, Tapped index, compactibility, and granule density. In the shape of effervescent drugs, the similarly tests were carried out i.e.weight and length uniformity, hardness, and effervescent time. The 4 designed formulation show splendid houses both For granules or tablet bureaucracy. All formulation showed desirable physical properties of granules and capsules. In regards of Acceptability, all formulation yield a fairly bitter taste that's probable due to the tannins and phenolic compounds of the Extract. Addition of flavoring sellers, along with lemon and strawberry, is unable to mask the sour taste of the very last tablet. Herein, the primary moringa leaves bubbling tablet prepared the use of moist granulation became efficiently formulated. This examine is likely high quality as the lowest line for the similarly formulation of *Moringa oleifera* lam.primarily based effervescent Merchandise.

KEYWORDS:-*Moringa oleifera*, Formulation, Effervescent tablet, Wet granulation, Maceration, Ethanol, Anemia.

I. INTRODUCTION :-

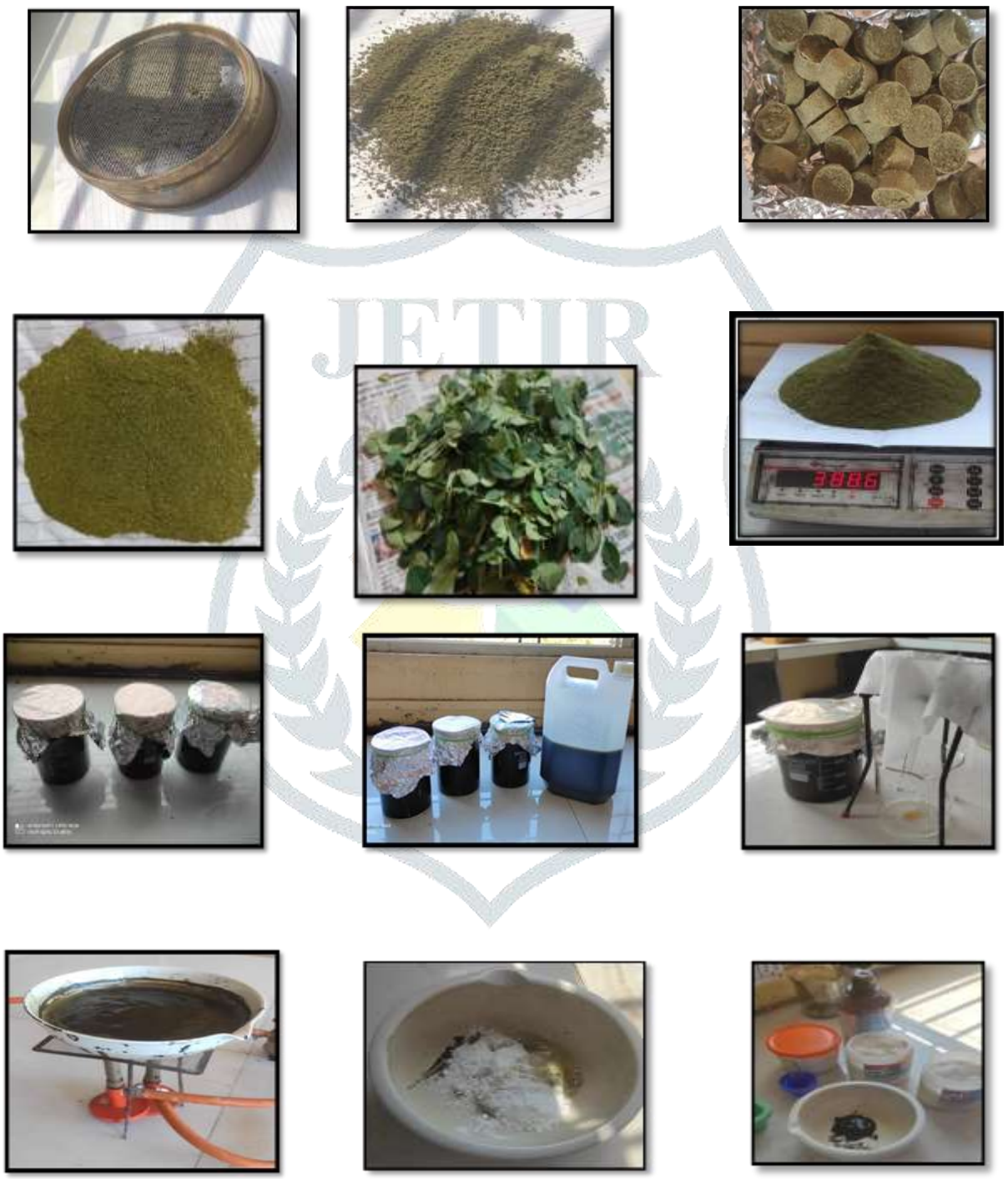
Anemia delineates the required rank of hemoglobin operating at a loss ancestry containers (blood corpuscle) giving impact to the deficit of oxygen levels reduced in ancestry stream. As allure main function, hemoglobin plays an main duty in assigning the oxygen during the whole of the cells, that are basically wanted to construction-up the erythrocyte. However, the decay iron levels manage abandon the red body fluid result thus, bringing about the feeble condition for few ranges of states, most widely happen to the women accompanying gestation [1,2]. About 37.1 % of even allocation of allure prevalence in Indonesia, chlorosis spreads fully between the significant women in city extent (36.4%), and identical evidence was submitted with those reside land distant from settled area (37.8%)[3]. Nevertheless, lack of important evidence has existed noted splendidly lowering this predominance in spite of efforts have happened fashioned by growing the application presidency of the iron supplement. Further, this may display the ghost of added determinants (rather aside belongings) that sooner or later interfere the drug-uptake itself, to a degree dawn malady all along the first trimester[4,5.]

Moringa oleifera Lam. (MOL) extract is well-known to considerably raise red body fluid levels by 58% in meaningful women and determined for fear that declining of ferritin antitoxin levels by 50%[6,7].Sindhu and co-workers explained that presidency of 100 g of dry MOL simplicia and jaggery (dry pressure) accompanying a percentage of 80:20 for 30 days is conceivably to raise red body fluid levels of mothers accompanying blood deficiency[8]. It is well-known that spoken presidency is ultimate usefulness route for delivering the drug in addition to the event that it has existed favorably raising the patient's agreement for many age. However, essentially of disadvantage of its expression, spoken route again gives harsh effect to those who have troubles in communicable these portion of drug or other consumable form, model the one are nauseated and have taking into throat question in communicable drug verbally as well as slow assimilation and long beginning[9].

Among the additional spoken dosage forms, vivacious is individual of highest in rank alternative portion of drug or other consumable forms selected to overcome those proneness, that is from immediately dissolved and or/ scattered in water before being executed so, threatening the irritation risk on account of direct trade gastrointestinal lot (GIT)[10] . The use Co_2 in allure arrangement enhances the alive additives pierced into the paracellular road as well as complicated in incorporation process, too bestowing the pleasant taste to the sufferers that prompts better with the added oral portion of drug or other consumable forms. This device holds

gift and available in various flavors that is anticipated to boost the rates of patient's compliance in attractive the cure, exceptionally for the pregnant women[10].

Here in, we designed and judged physiochemically the antagonistic-feeble portion of drug or other consumable composition of vivacious capsule of MOL leaves extract that maybe consumed by significant mom as substitute of iron pellet. Due to the occupancy of carbonate and considering that this conventional portion of drug or other consumable form, it is trusted that this device is easy to take, satisfactory, produce better experiencing, and acceptable accompanying GIT questions thereby, attainable to increase the patient's agreement[11] . The use of citric acid in wet granulation consulting several benefits for enthusiastic tablets, particularly in lowering the flow-opportunity and propose angle, inasmuch as the use of tartaric acid concede possibility more speed the crashing period of tablets. At the end, plotting the plant-located rule for the drug consumable portion of drug or other consumable form for the significant wives is maybe to achieve by arising bouncy in the design of herbaceous expression[11].



Formulation Table:-

Sr. No.	Ingredient	Quantity	Category
1.	Granules of Moringa	1500 mg	**API**
2.	Citric acid	500 mg	**Antioxidant**
3.	Tartaric acid	50 mg	**Effervescent base**
4.	Sodium bicarbonate	1100 mg	**Acidic agent**
5.	Aspartame	50mg	**Sweetner**
6.	PEG400	50 mg	**Thickner**
7.	Starch	50 mg	**Disintegrant**
8.	Lactose	50 mg	**Binder**
9.	Rosemary	100 mg	**Flavouring agent**
10.	Lemon flavour	50 mg	**Flavouring agent**

II. MATERIAL AND METHOD:-

All patterned workshop-jug manufactures were took advantage of all along the experiment. For 70% flammable liquid, hydrogen, citric acid, tartaric acid, and baking soda were bought from Sigma Aldrich, Indonesia. Aspartame and PEG600 were bought from Bratachem, Indonesia, when in fact the flavors were obtained from Stockmeier, Germany. All additional chemical compound complicated were obtained and second hand as taken.

Preparation of MOL powder:- The leaves are collected from backyard tree of my house. Roughly 388.59 g of the MOL leaves powder was got by air-drying the new leaves at 50ºC for 24 hours, before grinded, as far as the homogenize fine powder accomplished.

Preparation of MOL extract:-

The distillation design was selected from Mun'im and coworkers [12] accompanying slight qualification. Firstly, the leaves powder was saturated into 2.5 L of 70% flammable liquid in secured jar for 24 hours at range hotness. The extract got was permeated through Whatman leak paper No.1 and re-intense by recurrent the form two times in each 24 hours utilizing 1.5 L and 1 L of intoxicating 70%, individually. The drain was dissolved on water usually as far as the thickened extract acquired. The definitive drain of ethanolic extract of fine-drained leaves were before weighed and secondhand in review course.

Organoleptic test of the MOL extract :-

The organoleptic test of the extract was completed activity by trying the color, scent, in addition to the taste. Formulation of the MOL foaming capsule and tangible test of MOL powder. In order to decide highest in rank bubbly expression, four various formulations were planned by variable the percentage of the acid-base arrangements in addition to the flavors .Following the wet granulation procedure, the arrangement of fizzing medicine was fundamentally begun by joining of an amount of the MOL powder accompanying hydrogen, correct sweeteners in addition to foaming base till achieve appropriate material characteristic. The seed was before tricky into the strainer accompanying a bar number of 12, and drained for 24 hours at 50°C . In order to claim the dampness, the seed was further oppose citric acid and tartaric acid and drained for an time at hotness not more than 50°C. The developing seed was filter and decisively proven for material characteristic.

Evaluation of water content:-

The water content of the last piece was determined by resources of dampness balance.

Angle of repose:-

The angle of repose estimation was contingent upon weighing the detracting credible angle of the tiny particles in the air surface toward the plane surface. First, the granules of 100.00 g were burden and fleed moderately into a channel established-to-a stand accompanying below tier closed. The cover was before detached and the granules were admitted to drop on the graphical paper surface of below most. The repose angle (α) was afterward outlined by weighing the altitude (h) and distance (d) of the made granules therefore, including the principles into the equating ontent of the ending seed was deliberate by wealth of liquid balance .

Tan α = 2h /d

Flowability period test:-

The flow opportunity test was finished by including moment of truth distance once the granules was start till discontinued as inclined in the angle of repose test portion.

Tapped index:- The granules were judged by equating the most and pumped capacities of the fleed granules as well as the rates when they were full below. The principle got was delimited as the portion of uninterrupted book, as premeditated in this manner**:**

$$\%Vconstant = Vtapped - Vbulk/\ Vtapped \times 10$$

Bulk density:-

Procedure:-

1. Take the 5gm sample powder of known volume (cm^3).
2. Add into 25 ml Measuring cylinder.
3. Measure the volume of sample in measuring cylinder.
4. Notify the both mass and volume of the powder.
5. Calculate the bulk density.

Bulk density = Mass / Bulk volume × 100

Compactibility Test:-

The granules were afterward proven for the compactness by requesting sure force to their bulk just before the tablet disbanded. Herein, a severity experimental (Stokes Monsanto)was start for the upper punch and bottom show up scales of 7 and 10, individually. Some carelessly selected tablets were before intoxicated one at a time in a severity tester, accompanying the conclusive principles stated in kg.

Granule density test:-

The granules density was defined by calculating the granules weights according to the below equation. The weight difference was obtained after the granules were filled up into a measurable flask till the volume reached 100 ml.

Granule density = Mass / granule volume × 100

Preparation and physicochemical test of effervescent tablet :-

The acquired granules were argue bicarbonate sodium, Aspartame, flavor, and PEG600 at 25^0C just before the mixture was homogenize. The combination was afterward rushed in a alone punch structure at 40-50% RH (relative humidness).

Procedure:

1. Weigh the require quantity of granules and take it in mortar.
2. Add the correct ratio of citric acid and sodium bicarbonate in the ratio of 1:3 respectively.
3. Add Tartaric acid, Starch, PEG 400, Aspartame and Lactose according tom given quantity.
4. Add Flavouring agent Lemon and Rosemary.
5. Mix all the ingredients properly.
6. Prepare the dough.
7. Sieve it from sieve No.8.
8. Effervescent granules are ready to punch.
9. Punch the tablet with hand operating compression machine with proper hardness.
10. Rap the tablet with aluminium foil paper.

Evaluation of Effervescent tablet:-

Physical factors such as description, hardness, thickness, weight variation, friability were tested on the prepared tablets.

- **Description:-**The colour and overall look of the crushed tablets were assessed.
- **Hardness:-** A calibrated Monsanto hardness tester was used to test ten tablets. Hardness is measured in Kg/cm_2 and indicates tablet crushing strength[14].
- **Thickness and diameter variation**:- 20 tablets were selected randomly and each was examined for the thickness and diameter.
- **Weight variation test:-** Twenty tablets were weighed discretely, and the weight mean was compared with each other to check the variation of the tablets. Here in, the deviation of the two tablets should have not more than the limit of the pharmacopeia weigh[13].
- **Friability Test :-** Friability determines combined effect of shock and abrasion. Friability was tested as per pharmacopoeia for the tablets by using Roche friabilitor (100 revolutions at 25 rpm). For acceptance friability, should not be more than 1.0%. The friability was calculated by the equation,

  % Friability = [W0 – Wt. / W0] × 100

  Where, W0 = Initial weight of tablets, Wt. = Final weight of tablets.
- **Stability Study:-** The prepared effervescent tablet were stored in dry place rapped in aluminium foil and kept for 24hrs which showed the effervescence when dropped in water, But if the tablet are not covered they lose their effervescent property[34].
- **Effervescent time:-** A tablet was randomly selected and put into a glass of 100 ml water. The dissolved tablet was subsequently evaluated using stopwatch until a clear solution was obtained.

III. RESULTS AND DISCUSSION:

Oral pharmaceutical dosage form remains popular route of the drug administration regardless of the several drawbacks which need to be unraveled i.e. causing slow absorption, low acceptance due to the bitter taste and even peculiar odor (i.e. antibiotics and natural extract based-tablet), frequent compliance problem on pediatric and geriatric patients, and the delayed action of onset[16]. On the other hand, natural extract draws massive attraction as an alternative towards conventional drugs owing to their safety and efficacy, despite of the unpleasant appearance, odor, and taste. To solve so, the advanced pharmaceutical dosage form i.e. effervescent tablet was successfully formulated for the selected herbal (i.e. MOL) corresponding to a breakthrough in oral based-herbal drug formulation giving benefits in rapid adsorption, friendly use for majority patients due to instantly dissolved in water, widely accepted by maternal who have symptom nausea vomiting in their first trimester of their pregnancy attributable to its yummy taste[34].

At first, formula was prepared according to the variation of acid-base and flavoring agents. The results show that the best acid-base compositions are 1:2 and 1:3 due to better characteristic of granule mass and compatibility. The acid component selected here in are the citric acid and tartaric acid[17].

1) Selection of plant : -

The leaves of *Moringa Oleifera* Lam. was selected.

2) Collection of plant material :-

The leaves *Moringa Oleifera* leaves are collected from the backyard of the house.

3) Preparation of Herbarium:-

A harberium of *Moringa Oleifera* leaf was done with regards to the suitable granule characteristic as described in previous reference.

4) Authentification of plant:-

The authentification of the plant Moringa was done.

5) Preparation of MOL Powder:-

Moringa powder was prepared from the dried leaves of the moringa by grinding them in mixer. It was weighed about 388.6 gm.

6) Preparation of MOL extract:-

MOL extract was prepared by Maceration method.

7) Organoleptic test for MOL extract:-

A thick extract was presented by Maceration method. The organoleptic properties are:

Colour : Dark green
Odour : Characteristics
Taste : Bitter
Solubility : Soluble in water

8) Formulation table, granules and tablet preparation:-

A appreciate formula was selected with the optimum ratio of citric acid and sodium bicarbonate i.e. 1:2 or 1:3. The granules prepared were further evaluated and then punched. The tablet was prepared by wet granulation machine and punched by hand compression machine.

9) Evaluation of granules:-

Sr. No	Parameter	Result
1	Angle of repose	37.30^0
2	Flowability time test	6.6 second
3	Tapped density	$0.2gm/cm^3$
4	Bulk density	$0.3gm/cm^3$
5	Granules density	$0.470gm/cm^3$

10) Evaluation of effervescent tablet :-

Sr. No	Parameter	Result
1	colour	Light green
2	Odour	Characteristics
3	Taste	Sweet
4	PH	5.7-5.9
5	Solubility	Soluble in water
6	Weight variation	0.812
7	Hardness	4.7 kg
8	Thickness	0.6 cm
9	Diameter	1 cm
10	Effervescent time	65second

IV. CONCLUSION:-

The first report on MOL-based effervescent product prepared using wet granulation method has been successfully conducted. The formulation was designed with 1:2 and 1:3 acid-base variations, while lemon and strawberry flavors were employed as the masking agent to conceal the bitter taste of the final product. In general, all formulas yielded acceptable physical properties of either granules or tablets. The variation of acid-base ratios showed no remarkable effect toward the physical properties of both. On the other hand, the addition of lemon and strawberry flavors cannot be employed since they are unable to mask the bitter taste of the natural extract in which phenolic content is likely the 'culprit' for the bitter taste. The use of powerful bitter masking-agent may be advantageous as the future directions of the study. Thus the new formula was prepared by replacing strawberry flavor by rosemary flavor which was able to successfully mask the bitter taste of MOL which could solve the problem of pregnant ladies and increase their Hb.

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