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Review Article

A Review on Moringa Olifera Effervescent Tablet

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A B S T R A C T

The D-optimal mix design was utilized in the new product development process of the Moringa oleifera effervescent tablet to optimize the acid-base ratio in the recipe. The antioxidant activity and chemical profile of the Moringa oleifera extract were assessed. Measurements were made on the physicochemical and sensory properties of the effervescent Moringa oleifera tablet. Because moringa leaves, which are a component of the Moringa Oleifera plant, have a high antioxidant content, they help the body fight off free radicals. Additionally, the contents of the leaves may be turned into effervescent granules, a functional drink. The kind and proportion of the effervescent agent have a significant impact on the granule's physical properties, stability, and acceptability. Because they both offer a texture and mouthfeel that is acceptable, sodium bicarbonate and citric acid were employed as the effervescent agents in this investigation. Three formulations (designated as F1, F2, and F3) with varying ratios of citric acid to sodium bicarbonate were chosen. The wet granulation process was used to create these formulations. The three formulations' effervescent granules demonstrated good particle size distribution and flow capabilities. Furthermore, an extract from Moringa oleifera displayed IC50 values of 320µg/ml. Acceptability-wise, all of the recipes had a somewhat bitter taste, which could be attributed to the extract's tannins and phenolic components. Addition of flavoring agents, such as lemon and strawberry, is unable to mask the bitter taste of the final tablet. Here in, the first Moringa leaves effervescent tablet prepared using wet granulation was successfully formulated.

Key words: Moringa Olifera, D-Optimal Mix Design, Aroma, Extract.

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INTRODUCTION

Analgesics, cough/cold formulations, and antacids are just a few of the pharmaceutical drugs that are commonly delivered by effervescent granules. These dosage forms are stable, fast dissolving, highly soluble, and convenient1. The release of carbon dioxide gas facilitates the extract's solubility in water and amplifies its taste-masking properties. When compared to other oral dose forms, effervescent granules offer the formulator the chance to enhance taste, a more delicate touch on the patient's tummy and promotional elements.[2] Moringa oleifera Lam. (MOL) extract is known to prevent a 50% drop in ferritin serum levels and to dramatically increase hemoglobin levels by 58% in pregnant women. [6,7]

Moringa oleifera is a potential source of antioxidants which is due to the presence of phenolics phytochemical compounds. Besides, other compounds which act as natural antioxidants are vitamin A, C, and E. The natural antioxidant content in dried weight basis of Moringa leaves includes 74-210 µmol/g for phenolics, 70- 100µmol/g for vitamin C, 1.1-2.8 µmol/g for carotene, and 0.7 1.1 µmol/g for tocopherols (vitamin E)[7,8,9]. The antioxidants in the leaves are higher than other vegetables and fruits such as strawberries, carrots, and soybeans. Therefore, Moringa leaves are a source of natural antioxidants which are useful for counteracting free radicals and inhibiting cellular oxidation 10, 11 . One of the suitable preparation forms to be developed with the main content of Moringa oleifera leaf extract is effervescent granules.[8]

Plant profile

Scientific classification: -

- Kingdom- Plantae
- Order –Brassicales
- Family – Moringaceae
- Genus - Moringa
- Species – M. oleifera

Height–10–12m(32–40ft).
Diameter–45cm (1.5 ft)
Color–Bark–whitish grey Young Greenish Flowers Fragrant.
Bisexual and surrounded
Flowers are about 1.0-1.5 cm (long) and 2.0 cm (broad).

Figure 1: Moringa Olifera [1]

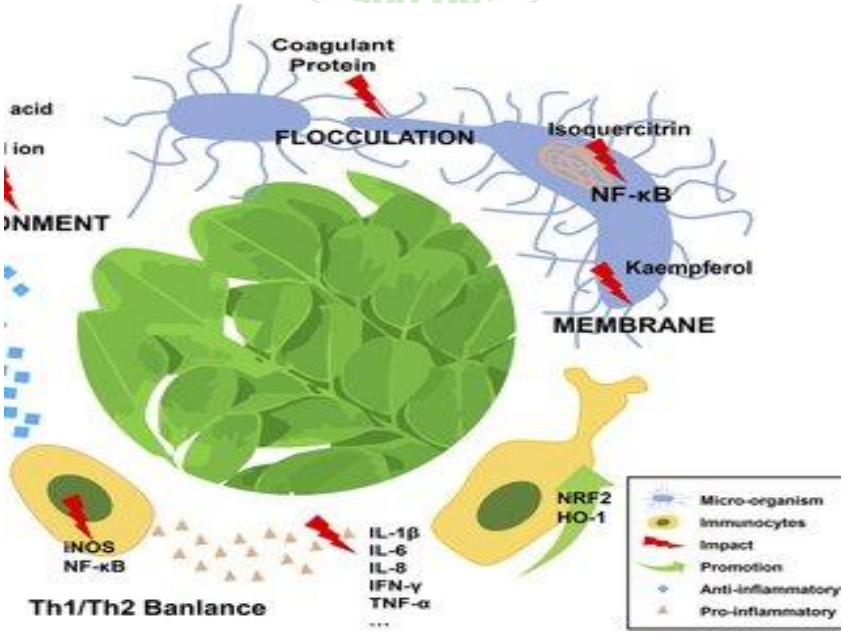

Figure 2: Schematic diagram of *Moringa olifera* Lam in dealing with immune disorders.[11]

Its composition makes it easier for the active substances to enter the paracellular route and aid in the absorption process. Patients also enjoy its pleasant flavor, which makes it more appealing than other oral dose forms. This product, which comes in a variety of flavors and contains sweetener, has the potential to increase patient compliance rates with medicine, particularly for pregnant women10. In this instance, we created and assessed physiochemically the anti-anemic dose formulation of an effervescent tablet using MOL leaf extract, which a pregnant mother can take in place of an iron tablet. Because of the carbonate content and the usual dosage form, this medicine is said to be more palatable, easier to absorb, and bearable for people with gastrointestinal tract issue FOR improve patient significance

MATERIALS AND METHOD

Collection and Extraction of Moringa oleifera Leaves:

We purchased moringa oleifera leaves from Cuddlier's local market. It was later verified using the 380/007/2022 number. Loba Chemical Pvt Ltd, located in Mumbai, provided all of the chemicals. For three days, the fresh Moringa oleifera leaves were shade-dried in the lab. Using a mixer grinder, the leaves' size was decreased and the stems were cut off. The dry powder's weight was recorded. After being macerated in hot water for 24 hours with a thermostat kept at 40°C, moringa oleifera leaf powder was filtered. By dividing the weight of the extracted material by the weight of the powder, the yield of the extract was calculated.

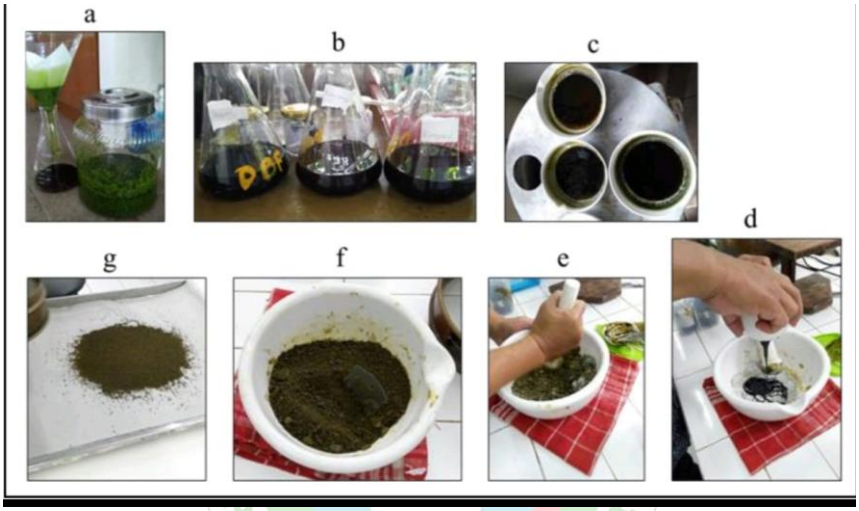

Figure 3: Step-by-step preparation of MOL leaves extract: the soaked (a), re-concentrated (b), and thickened (c) extracts, the mixing process between re-concentrated extract and other excipients (d) till homogenized (e) and being final granule (f), the granules were then sieved (g).[5]

Extraction process

Making MOL extract: With a few minor adjustments, the extraction technique from Mun'im and colleagues12 was used. First, the powdered leaves was steeped for 24 hours at room temperature in 2.5 liters of 70% ethanol in a covered container (Fig. 1a). The resulting extract was filtered using Whatman filter paper No. 1 and re-concentrated using 1.5 L and 1 L of 70% ethanol, respectively, by repeating the procedure twice every 24 hours (Fig. 1b). Until a thicker extract was achieved, the filtrate was evaporated over a water bath (Fig. 1c). After the leaves were finely dried, the ethanolic extract filtrate was weighed and utilized in additional research.[9]

Production of Moringa leaves effervescent granule

The granules were developed by the wet granulation method. This was carried out separately between the acidic and basic components (Budi et al., 2011). In this study, three molar ratios of effervescent agents (citric acid and sodium bicarbonate) were optimized, namely 1:3.11 (formulation 1), 1:3 (formulation 2), and 1:2.93 (formulation 3).

Phenolic Content of Moringa oleifera Leaf Extract

The phenolic content was calculated as Gallic acid equivalents GAE/g of dry plant material on the basis of a standard curve of Gallic acid (2- 64 µg/ml), $y = 0.0069x + 0.0673$, $R^2 = 0.9947$.

Total phenol content in Moringa oleifera leaf extract using the calibration curve, was found to be 4.19 mg of Gallic acid equivalents/g dry weight of extract. The result shows that natural polyphenols of Moringa oleifera can remove free radicals, activate antioxidant enzymes, and inhibit oxidases. [11,16,17.]

Table 1: Evaluation properties of moringa granules

Batch report	Angle of repose (^{0})	Lbd [b]	Tbd [c]	Carr's index	Housners ratio
F1	20.3	0.32	0.41	12.6	1.05
F2	20.9	0.32	0.43	11.5	1.06
F3	20.6	0.33	0.44	12	1.03

F4	19.2	0.32	0.40	15	0.99
F5	21.0	0.33	0.39	13.15	1.02
F6	19.8	0.31	0.42	12	1.01

Table 2: Evaluation properties of moringa effervescent tablet

Formulation	Friability	Hardness(kg/cm^2)	Drug content%	Moisture variation(mg)
F1	0.29	4	98.33	494
F2	0.27	5	99	502
F3	0.30	6	02	488
F4	0.33	4	100	501
F5	0.25	5	98.20	503
F6	0.23	5	100.2	498

RESULT AND DISCUSSION

The resulting MOL extracts were later discovered to be viscous brownish solutions with an odd flavor and smell (Fig. 1a). The following equation yielded a total of around 26.08% of extract; and stand for the final mass after extraction and the initial mass before extraction, respectively. First, based on variations in acid-base and flavoring components, four formulations were created (Table 1). The results demonstrate that, because of their superior granule mass and compatibility characteristics, the ideal acid-base compositions are 1:2 and 1:3. In this case, the acid components chosen are tartaric and citric acid in relation to the appropriate granule characteristic as mentioned in previous reference 14. Indeed, due to their acceptance and popularity among Indonesians and their frequent usage in earlier studies on effervescent beverages, orange and strawberry tastes were chosen to alter the formulation's taste[11'12'13'14'15]

CONCLUSION

The effervescent granule formula for moringa leaves that was created for this study met quality standards, had consistent particle size distribution, and had good flow characteristics. The panelists found all three formulae to be acceptable based on the findings of the organoleptic and sensory evaluation. However, formulation 3 (sodium bicarbonate: citric acid ratio 6:7) was the most palatable in terms of color, taste, scent, and texture. It has been successfully completed to produce the first report on MOL-based effervescent product made utilizing wet granulation process. In order to cover the bitter taste of the finished product.

REFERENCES

1. Divya K, Vamshi G, Vijaykumar T, Sandhya Rani M and Kishore B: Review on Introduction to Effervescent Tablets and Granules. Kenkyu Journal of Pharmacology 2020; 6: 01-11
2. Ali, Muhammad Azhar, Yusof YA, Chin NL and Ibrahim MN: Development and standardization of Moringa oleifera leaves as a natural dietary supplement. Journal of Dietary Supplements 2018; 1: 1–20
3. Hirani JJ, Rathod DA, and Vadalia KR, Orally disintegrating tablets: A review. Trop J Pharm Res, 2009. 8(2): 161-172.
4. Patel, Salim & Siddaiah, M. (2018). Formulation and evaluation of effervescent tablets: a review. Journal of Drug Delivery and Therapeutics. 8. 296-303. 10.22270/jddt.v8i6.2021.
5. Eoin GM, Nicolas ER and Mark AF: Powder and Reconstituted Properties of Commercial Infant and Follow-On Formulas. Foods 2020; 9(1): 84.
6. Elena G, Isabel U, Marta S and Pilar GS: Nutritional Value of Moringa oleifera Lam. Leaf Powder Extracts and Their Neuroprotective Effects via Antioxidative and Mitochondrial Regulation. Nutrients 2021; 13(7): 2203.2.
7. Lenin S, Sujatha R and Sundaram S: Nutritional Composition, Mineral analysis and Sensory Evaluation of Cake and Chocolate with Moringa oleifera Leaf Powder. Journal of Pharmaceutical Research International 2021; 33(60): 2367–2373
8. Hilda M, Irma S, Meutia F and Kevin K: Formulation of Effervescent Granule from Robusta Green Coffee Bean Ethanolic Extract (Coffea canephora). J Pharm Bioallied Sci 2020; 12(2): 743-746
9. Murdiana, Happy & Revika, Era & Rahmawati, Dewi & Puspitasari, Tetty & Darumas Putri, Athika & Tri Murti, Bayu. (2018). Moringa oleifera Lam.-Based Effervescent Tablets: Design, Formulation and Physicochemical Evaluation. 10.25258/ijddt.v8i4.9.
10. Hilda M, Irma S, Meutia F and Kevin K: Formulation of Effervescent Granule from Robusta Green Coffee Bean Ethanolic Extract (Coffea canephora). J Pharm Bioallied Sci 2020; 12(2): 743-746
11. Asare, G.A.; Gyan, B.; Bugyei, K., Adjei, S.A., Mahama, R.; Addo, P., Out-Nyarko,L.,Wiredu,E.K.andNyarko, A.Toxicitypotentialsof thenutraceuticalMoringaoleiferaAt supra-supplementationlevels. Journal of Ethnopharmacology2012; 139 265-272.
12. Mutahar, R. K. M., Nagesh, C., Ramesh, R., & Omer, S. (2008). Formulation , development and in vitro evaluation of effervescent tablets of niacin for dyslipidemia. 1(1), 107–114 Nambiar, V. S., & Parnami, S. (2008). Standardization and organoleptic evaluation of drumstick (Moringa oleifera) leaves incorporated into traditional indian recipes. Trees for Life Journal, 3(9), 2–6. https://doi.org/10.1111/j.1750-3841.2010.01990.
13. x Noval, N., Rosyifa, R., & Annisa, A. (2020). Effect of HPMC concentration variation as gelling agent on physical stability of formulation gel ethanol extract bundung plants (Actinuscirpus Grossus). Proceedings of the First National Seminar Universitas Sari Mulia, 1-15. https://doi.org/10.4108/eai.23-11-2019.2298326
14. Okoye, E. I., Awotunde, T. O., & Morales, T. G. (2013). Formulation and characterization of Moringa oleifera leaf granules. I: Micromeritic properties. Research Journal of Pharmacy and Technology, 6(1), 66–74
15. Olabode, Z., Akanbi, C. T., Olunlade, B., & Adeola, A. A. (2015). Effects of drying temperature on the nutrients of Moringa (Moringa oleifera). Direct Research Journal of Agricultural and Food Science (DRJAFS), 3(5), 117–122
16. Pandey, P., Sharma, P., Gupta, R., Garg, A., Shukla, A., Nema, N., & Pasi, A. (2013). Formulation and evaluation of herbal effervescent granules incorporated with martynia annua extract. Journal of Drug Discovery and Therapeutics, 1(5), 54–57 Rahmawati, P. S., & Adi, A. C. (2017).
17. Daya terima dan zat gizi permen jeli dengan penambahan bubuk daun kelor (Moringa Oleifera). Media Gizi Indonesia, 11(1), 86. https://doi.org/10.20473/mgi.v11i1.86-93