

FORMULATION AND EVALUATION OF MORINGA – AMLA CHOCOLATE

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ABSTRACT

Chocolate is the favorite food of children to old aged people. This formulation is a an effort to combine the chocolate with health benefits of Two very nutritious drugs sehjan and amla along with its chocolaty taste. First nutritious values of both the drugs were analyzed, then was combined in different proportions to develop a palatable, homogeneous and tasty product of Moringa-Amla Chocolate. Different combination (In terms of ratio and proportion of Amla, Moringa, Chocolate and sugar were tried).These combinations were got tasted by the Young students in the campus as younger generation is crazy about chocolate and run away from the taste of herbal medicine. Based on their feedback, the four formulations were dropped as the youngster did not like its taste. There after the fifth formulation was prepared by the extract of the Moringa and Amla and finalized, the product was liked by abundant number of students in the campus. Then the evaluation of final product was done.

KEYWORDS: Moringa, amla, chocolate, nutritious valuesyounger generation.

INTRODUCTION

The present invention provides a novel herbal chocolate comprised of *Amalaki*, (*Emblica officinalis*), *Sehjan* (*Moringa olifera*). This nutritious composition is rich in minerals, vitamins and proteins fortified with standardized herbs with proven pharmacological activities such as anti-oxidant and immune-enhancing properties.

This innovation comprises of adding two herbal drugs i.e *Amalki* and *Sehjan* to the dark chocolate. Chocolate having sweet and specific charming taste is popular among all ages and is consumed with pleasure. But the taste of *Sehjan* and *Amla* is bitter to sour and is consumed as medicine with not so happiness, although they both have immense health benefits. So we combined all the three ingredients to get good taste as well as the good health benefits. Chocolate is an adaptable food that can be combined to create completely different taste. It is also known that it is good for health and increases glucose level in body. *Amla* as rich source of vit. C is a well-known immunity booster and *Sehjan* is an anti-oxidant, so it is desirable to blend modern knowledge with traditional Indian system of medicine. Both the ingredients when combined with chocolate will provide immense health benefits with acceptable taste for children, teenagers and old aged people. This medicated chocolate is prepared by using chocolate base and the herbal drugs are incorporated into it. The usage of *Amla* and *Moringa* for the said purpose can-not be overemphasized.

OBJECTIVE

- Will protect from common ailments like cold and cough.
- Enhance immunity.
- It will provide Natural form of minerals and vitamins
- provide desirable sweet taste of chocolate
- There is a sizable population in habit of eating chocolate and this habit will be utilized to healthify their body.

MATERIAL AND METHOD

Description of ingredients used in herbal chocolate.

DARK CHOCOLATE

Chocolate contains flavonoids which act as an antioxidants, help lower blood pressure and balance certain hormones in the body. Dark chocolate contains a large no. of anti-oxidants far more than milk or white chocolate. Chocolate abundantly contains compounds such as saturated fat, polyphenols, sterols, di and triterpenes, aliphatic alcohols and methylxanthines. The beneficial compounds in chocolate are flavanols, polyphenols and theobromine.

MORINGA (*sehjan*)

Moringa oleifera is a fast growing drought resistant tree of the family *moringaceae* native to the Indian subcontinent. *Moringa* grows in the himalyan foothills. Common names include *moringa*, *drumstick tree*,

horseradish tree (from the taste of the roots, which resembles horseradish) and ben oil tree. It is widely cultivated for its young seed pods and leaves used as vegetables and for traditional herbal medicine.. In addition to amino acids and antioxidants, moringa is a source of helpful vitamins and minerals like beta-carotene, vitamin B6, vitamin C, riboflavin, vitamin E, and iron. It contains flavinoids like quercetin,

isothiocyanates. Helps in maintaining healthy vision, and immunity, protects body from pollutants and toxins. That is why it is called a "powerhouse" of nutrients.

Moringa leaves used in this formulation contains following nutrients

All values are in 100 g per plant material (leaves).

Table no. 1.

Sr.no	Nutrients	Fresh leaves	Dry leaves
1	Calories (cal)	92	329
2	Protein (g)	6.7	29.4
3	Fat (g)	1.7	5.2
4	Carbohydrate (g)	12.5	41.2
5	Fibre (g)	0.9	12.5
6	Vitamin B1 (mg)	0.06	2.02
7	Vitamin B2 (mg)	0.05	21.3
8	Vitamin B3 (mg)	0.8	7.6
9	Vitamin C (mg)	220	15.8
10	Vitamin E (mg)	448	10.8
11	Calcium (mg)	440	2185
12	Magnesium (mg)	42	448
13	Phosphorus (mg)	70	252
14	Potassium (mg)	259	1236
15	Copper (mg)	0.07	0.49
16	Iron (mg)	0.85	25.6

Dry leaves of moringa has more nutrient value than fresh leaves. we have used dried moringa leaves in this formulation. The presence of minerals and vitamins help in boosting the immune system and cure a large no. of diseases. Beneficial for those who are malnourished. The presence of flavanoids in leaves gives them anti diabetic and antioxidant properties.

From an Ayurvedic perspective, moringa is considered to have bitter *rasa* (taste), an *ushan viriya* (potency) and with *katu* (bitter) *vipaka*. As mentioned previously, moringa has deep cleansing and detoxifying effects. In *Bhava Prakash*, a historical Ayurvedic text moringa is called "*sigru*," which translates to "moves like an arrow." This is in reference to moringa's ability to quickly penetrate the *dhatu*s (tissue layers of the body) for deep cleansing. It has a particular affinity for *rakta dhatu* (blood) and *meda dhatu* (fat).

Hence moringa is richest source of potassium, phosphorus, copper, iron and a host of vitamins further as mentioned in *bhav prakash* it has affinity for *raktdhatu* (blood) which helps in acting in quick action in assimilation in body *dhatu*s.

Identity, purity and strength

Foreign matter not more than 2%

Total ash not more than 10%

Acid insoluble ash not more than 1%

Alcohol-soluble extractive not less than 1%

Water-soluble extractive not less than 5%.

Properties and action

Rasa (taste): *Katu* (bitter), *Tikta* (pungent), *Madhura* (sweet).

Guna (properties): *Laghu* (lightness), *Tikshan* (sharpness), *Ruksha* (dryness), *Pichhila* (sliminess), *Sara* (mobility).

Veerya (potency): *Ushna* (hot).

Vipaka (taste conversion after digestion): *Katu* (bitter).

AMLA

Amla is the most used *ayurvedic* ingredient. It is both a food and medicine. It is stuffed with the innumerable health benefits. The word *amla* means sour, which is its predominant taste. In Ayurveda *Amla* is a well known *Rasayana* and immunity booster, rich source of vit.-C, polyphenols.

Benefits of Amla

- Helps fight the common cold.
- Builds immunity
- Supports digestion, metabolism, and normal liver function.
- Excellent for hair and skin.
- Improves eye sight.
- It burns fat.
- Relieves pain owing to its anti-inflammatory properties.

Macroscopic description

Dried *amla* consists of curled pieces of epicarp and mesocarp either whole or as separated single segment 1 to 2 cm long or united a 3 or 4 segments, bulk colour grey to black, pieces showing a broad, highly shriveled and wrinkled, external convex to somewhat concave, transversally wrinkled showing a few whitish specks with sour and pungent taste.

Microscopic description

TS of pericarp of fruit shows epicarp consisting of a single layer of epidermis, cell appearing tabular and polygonal in surface view, cuticle present, a few small rosette crystals of calcium oxalate present in epidermal cells, mizocarp cells tangentially elongated parenchymatous and cells with walls showing irregular thickening, ramified vascular elements occasionally present lignified, having wide lumen, stone cells present, pitted fibers with walls appearing serrated due to the pit canals leading in to lumen present.

Identity, purity and strength

Foreign matter not more than 3%
(including seed and seed coat)

Loss on drying not more than 12%

Total ash not more than 7%.

Acid-insoluble ash not more than 2%.

Alcohol soluble extractive not less than 40%

Water soluble extractive not less than 50%.

Properties and actions

Rasa (taste): *Amla* (sour), *Kasaya* (astringent), *Madhur* (sweet), *tikta* (pungent), *katu* (bitter).

Guna (property): *Ruksha* (dryness), *Laghu* (laghu).

Veerya (potency): *Sheeta* (cold).

Vipaka (taste conversion after digestion): *Madhur* (sweet).

METHOD OF PREPARATION**Extraction of moringa leaves**

- The fresh leaves of *sehjan* (moringa) were collected from the in house botanical garden and washed with water to remove dust.
- Further leaves were dried in shade for 15 days. (covered with muslin cloth)
- After that leaves (100gm) were crushed and soaked in distilled water (2.5 lt.) for 48 hours. Kept stirring in between at the intervals of few hours.
- After 48 hours leaves were mashed properly and solution was filtered through filter paper.
- Afterwards the solution was subjected to evaporate the water by using electric water bath so as to get crude extract in form of paste.

Extraction of dry Amla fruit

- Dried *amla* fruits were cleaned to make it dust free then dried in oven for 3 to 4 hrs at 30 degree centigrade to remove moisture.
- *Amlas* were made powder in grinder.
- *Amla* powder (100gm) was soaked in distilled water (2.5lt.) for 48 hours. Kept stirring in between at the interval of few hours.
- After 48 hours solution was filtered and solution was subjected to evaporate the water by using electric water bath so as to get crude extract in form of paste.

PREPARATION OF HERBAL CHOCOLATE

Electric water bath was set in such a way that water become hot having temperature about 50°C. Then chocolate base was melted in porcelain dish till it become free flowing. Appropriate quantity of sugar and drugs extract i.e., paste of crude extract of *sigru* and *amla* was added to it and stirred continuously. Then the content obtained was poured in a silicon chocolate mould and refrigerated till it become in solid form (approximate 3-6Hrs.).

Five different formulations of Moringa - Amla Chocolate were formed.

Formulation 1.

Sr. No.	Name of Ingredients	Quantity 50gm	Taste	Time line
1	Dark Chocolate	34gm	Bad taste and smell → rejected	15 days for drying and cleansing the leaves and 5 days for making extract of Herbal drugs. Total days = 20
2	Amla extract	1gm		
3	Sehjan extract	6gm		
4	Sugar	9gm		

Formulation 2

Sr. No.	Name of Ingredients	Quantity 40gm	Taste	Time line
1	Dark Chocolate	30gm	Very sweet taste with no taste of herbal drugs	5 days
2	Amla extract	0.45gm		
3	Sehjan extract	1gm		
4	Sugar	9gm		

Formulation 3

Sr. No.	Name of Ingredients	Quantity 40gm	Taste	Time line
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1	Dark Chocolate	30gm	Slight taste of herbal drugs but too much sweet with pungent taste of amla	5 days
2	Amla extract	0.60gm		
3	Sehjan extract	2gm		
4	Sugar	8gm		
Formulation 4				
Sr. No.	Name of Ingredients	Quantity 50gm	Taste	Time line
1	Dark Chocolate	30gm	Good taste of herbal drugs but very sweet.	5 days
2	Amla extract	0.312gm		
3	Sehjan extract	5gm		
4	Sugar	14.688gm		
Formulation 5				
Sr. No.	Name of Ingredients	Quantity 50gm	Taste	Time line
1	Dark Chocolate	33gm	Good taste with adequate sugar and chocolaty taste.	5 days
2	Amla extract	0.312gm		
3	Sehjan extract	7gm		
4	Sugar	9.688gm		

Formulations 5 of the amla- moringa chocolate was selected and following parameters were checked.

Organoleptic properties

Parameter	Result
Color	Brown
Odor	Chocolaty
Taste	Sweet and pleasant with slight pungency for the natural ingredients
Mouth feel	Initially hard, after crushing with teeth in mouth becomes smooth.
Appearance	Good texture

Physical stability

To check the physical stability sample of chocolate was kept in closed container for 1 month at 28°C After one month interval, test samples of chocolate was observed for physical appearance and drug degradation.

Result: No change in colour, smell, taste, mouth feel or appearance was found.

Bloom test

Test sample of chocolate was subjected to 30 °C for 11 hours

Shifting of temperature for 1 hour

18 °C for 11 hours

Shifting of temperature for 1 hour

Observed the test sample of chocolate whether blooming has taken place.

Result: No fat bloom or sugar bloom.

The final sample was then sent to NABL certified lab. for authentication. (reports attached).

RESULT AND DISCUSSION

The organoleptic properties of chocolate are excellent for masking unpleasant flavors associated with moringa and amla. This chocolate formulation provides a palatable means for boosting immunity. The drug extracts which are used in the dose range are safe for consumption and can be swallowed without any risk of side effects. Value addition in chocolate has been done by this effort.

Beneficial in general debility. Natural source of vitamin-c. quickly replenish in the form of natural mineral like magnesium, phosphorus, potassium copper, iron etc.

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