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## Research Article

# Galacta Momma Tea for Mother's Milk Booster: Development of Herbal Galactagogue Tea for Breastfeeding

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## Abstract

**Background and Objectives:** Herbal galactagogues are substances used long time ago to help in continuation and improving breast milk production. The present study was to develop a new herbal galactagogue tea product that can improve the production of milk output. *Trigonella foenum-graecum* (Fenugreek), *Foeniculum vulgare* (fennel) and dates are galactagogues that originated from Europe and southwest Asia, respectively, helps in improving the production of breast milk. **Materials and Methods:** The development of herbal galactagogue tea can be achieved by brewing the ingredient. The energy and nutrient content of the herbal galactagogue tea were analyzed using the Malaysian Food Composition Table and the degree of acceptance of the product is achieved through sensory evaluation by using 9-point Hedonic Scale questionnaire. **Results:** The result of this study showed that in herbal galactagogue tea that contains 24 g of dates produce high calories (75 kcal), 17.5 g carbohydrate, 0.8 g protein and 0.3 g fat and there was a significant difference in the acceptance of the taste between 18 g of dates sample and 24 g of dates sample with mean score of  $5.67 \pm 1.67^a$  and  $6.30 \pm 1.53^a$ , respectively ( $p < 0.05$ ). **Conclusion:** The development of herbal galactagogue tea is the easiest and convenient to be consumed by the mothers as the alternative for increasing their milk supply and contain high carbohydrate and low protein and fat which can be considered as the energy booster for the mothers who breastfed their infants. This study has created an initiative to support breastfeeding in Malaysia.

**Key words:** Herbal, galactagogue, *Trigonella foenum-graecum*, fenugreek, *Foeniculum vulgare*, fennel, dates, breastfeeding, milk booster

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**Competing Interest:** The authors have declared that no competing interest exists.

**Data Availability:** All relevant data are within the paper and its supporting information files.

## INTRODUCTION

Breastfeeding is considered the optimal infant feeding method. In general, mothers who are breastfeeding their infants were exposed to the positive outcomes of breastfeeding in short and long term. Breast milk offers both mothers and infants all necessary nutrients needed for the infant's growth progression and protection against various chronic illnesses<sup>1</sup>.

To prevent an increase in chronic diseases later in life, the government recommended mothers to start feeding the infants within 1 h of birth and that exclusive breastfeeding continues for the first 6 months. According to the National Health and Morbidity Survey 2016, the prevalence of exclusive breastfeeding below 6 months was 47.1% while continued breastfeeding<sup>2</sup> up to 2 years was 39.4%. Nonetheless, the efforts to breastfeed the infants seem to be failed as mothers face challenges. Shortage or insufficient breast milk is one of the factors of early cessation of breastfeeding.

Insufficient breast milk supply is one of the most common problems and factor that lead to early cessation of breastfeeding<sup>3-5</sup>. In addition, failure to breastfeed can cause serious problems to the infant such as inadequate calorie intake of the infants, dehydration, hypernatremia and hyperbilirubinemia in the early life of the infants<sup>6</sup>. Mothers with insufficient breast milk supply would consider the usage of galactagogue as one of the efforts to increase their milk supply. Special foods that contain galactagogue can improve production of breast milk and eventually support breastfeeding.

As quoted by Mortel and Mehta<sup>7</sup>, 'Galactagogues are substances thought to help in the initiation, continuation, augmentation and improving breast milk production.' The galactagogues include foods, preparation of natural herbal and artificial galactagogue.

This current research aims to develop a new herbal galactagogue tea product that can improve the production of milk output. At the same time, the acceptance of the new product will be determined by sensory evaluation.

## MATERIALS AND METHODS

**Study setting:** The study was conducted from 8th January to 23rd November 2018. The study was implemented at Food Preparation and Food Sensory Laboratory, Faculty of Health Sciences, UiTM Selangor, Campus of Puncak Alam.

**Herbs and ingredient content:** This study was conducted using *Trigonella foenum graecum* (Fenugreek), *Foeniculum vulgare* (fennel) and dates. The herbs were purchased in the form of seeds at the hypermarket. Fresh dates that were plump looking have a slightly glossy look to their skin and still attached to the stem was chosen as the ingredients.

**Development of herbal galactagogue tea:** Herbal galactagogue tea was developed from fenugreek seed (*Trigonella foenum-graecum*), fennel seed (*Foeniculum vulgare*) and dates as the main ingredient, honey, green tea and lemon juice. All the dry ingredients were mixed together. The ratio of fenugreek to fennel is 1:2 according to the safe dosage of these herbs<sup>8</sup>. The dry ingredient was then brewed in 250 mL of boiling water for about<sup>9</sup> 10 min. In the meantime, wet ingredients were added to the mixture and mixed well so that all the ingredients dissolve well in the water.

**Determination of energy and nutritional content:** The energy and nutrient contents of the product were analyzed using the Malaysian Food Composition Table<sup>10</sup>. The nutrient content of the product was calculated as per serving (30 g) and per 100 g of the product.

**Sensory evaluation:** About 30 semi-expert female panels were chosen to evaluate herbal galactagogue tea samples. Each participant was presented with two herbal galactagogue tea samples, with each sample contained 18 and 24 g of dates. Five important criteria were judged and self-administered by the participants such as colour, aroma, taste, aftertaste and overall acceptance of the samples by using the 9-point hedonic questionnaire scale ranging from dislike extremely to like extremely. The 9-point hedonic questionnaire are easy to use, clear and easy to understand for the participants. Participants instructed to cleanse their palates between samples with water provided.

## RESULTS

**Development of herbal galactagogue tea:** Three formula was chosen as the best formula during the formulation of herbal galactagogue tea. The amount of ingredient was listed in Table 1, 2 and 3. The best two formula were chosen to determine the nutrient content of the product. Selection of top two formula was done by choosing the most acceptable aroma and taste. Formula A (Table 1) produced less sweet and

Table 1: Amount of ingredients for herbal galactagogue tea of first formula (A)

Ingredients	Amount (g)/25.5 g	Percentage
Fenugreek	1.0	3.9
Fennel	2.0	7.8
Green tea	1.5	5.9
Dates	12.0	47.1
Honey	7.0	27.5
Lemon juice	2.0	7.8

Table 2: Amount of ingredients for herbal galactagogue tea of second formula (A1)

Ingredients	Amount (g)/30 g	Percentage
Fenugreek	0.5	1.7
Fennel	1.0	3.3
Green tea	1.5	5.0
Dates	18.0	60.0
Honey	7.0	23.3
Lemon juice	2.0	6.7

Table 3: Amount of ingredients for herbal galactagogue tea of third formula (A2)

Ingredients	Amount (g)/36 g	Percentage
Fenugreek	0.5	1.4
Fennel	1.0	2.8
Green tea	1.5	4.2
Dates	24.0	66.7
Honey	7.0	19.4
Lemon juice	2.0	5.6

Table 4: Energy and nutrient composition in herbal galactagogue tea (A1)

Nutrients	Per-serving (30 g)	Per 100 g
Energy (kcal)	74.5	248.3
Carbohydrate (g)	17.3	57.7
Protein (g)	0.9	3.0
Fat (g)	0.3	1.0

Table 5: Nutrient composition in herbal galactagogue tea (A2)

Nutrients	Per serving (30 g)	Per 100 g
Energy (kcal)	75.0	250.0
Carbohydrate (g)	17.5	58.3
Protein (g)	0.8	2.7
Fat (g)	0.3	1.0

Table 6: Sensory evaluation of herbal galactagogue tea (A1 and A2)

Attributes	A1	A2	p-value
Colour	6.20±1.42 <sup>a</sup>	6.17±1.18 <sup>a</sup>	0.92
Aroma	6.07±1.51 <sup>a</sup>	6.27±1.23 <sup>a</sup>	0.58
Taste	5.67±1.67 <sup>a</sup>	6.30±1.53 <sup>a</sup>	0.13
Aftertaste	5.53±1.68 <sup>a</sup>	6.40±1.43 <sup>b</sup>	0.04 <sup>*</sup>
Overall acceptance	6.00±1.53 <sup>a</sup>	6.23±1.50 <sup>a</sup>	0.55

\*Mean with different superscripts along the same row are significantly difference (p<0.05). \*Values represent Mean ± standard deviation (SD) from 30 panellists

spicy taste which will not acceptable for normal people preferences. Thus, Formula A was excluded from the determination of the nutrient content of the product.

**Energy and nutritional content:** Based on Table 4, the total energy content per serving (30 g) of the product (A1) is 74.5 kcal. The carbohydrate, protein and fat content of per serving of the product (A1) are 17.3, 0.9 and 0.3 g, respectively.

Meanwhile, the total energy content of per 100 g of the product (A1) is 248.3 kcal. The carbohydrate, protein and fat content of per 100 g of the product (A1) are 57.7, 3.0 and 1.0 g, respectively.

Based on Table 5, the total energy content per serving (30 g) of the product (A2) is 75 kcal. The carbohydrate, protein and fat content of per serving of the product (A2) are 17.5, 0.8 and 0.3 g, respectively. Meanwhile, the total energy content of per 100 g of the product (A2) is 250 kcal. The carbohydrate, protein and fat content of per 100 g of the product (A2) are 58.3, 2.7 and 1.0 g, respectively

**Sensory evaluation:** Based on Table 6, the highest mean score for almost all the attributes is herbal galactagogue tea that contains 24 g of dates (A2). Herbal galactagogue tea that contains 24 g of dates (A2) got the higher mean score for the attributes of aroma, taste, aftertaste and overall acceptance. Herbal galactagogue tea that contains 18 g of dates got the higher mean score for the attribute of colour. There were significant differences (p<0.05) for the attributes of aftertaste between the two sample (A1 and A2). However, there was no significant difference (p>0.05) for the attributes of colour, aroma, taste and overall acceptance between the two sample (A1 and A2).

## DISCUSSION

There was a significant percentage of women used herbal galactagogue during breastfeeding. Several herbal galactagogues has been recognised to be useful for breastfeeding mothers in Malaysia. In the United States, it was predicted that there were about 15% of breastfeeding mothers have used herbal galactagogue<sup>11</sup>. In another study reported that there was a significant number (65 respondents) chose to used herbal galactagogue due to its natural characteristics of the ingredients in each preparation of the product<sup>1</sup>. Based on Mortel and Mehta<sup>7</sup>, the usage of herbal galactagogues outcomes addressing the effect on breast milk supply. The insider of the outcome includes the positive effect on the serum prolactin and oxygen levels, the volume of breast milk supply, weight of the infants, weight loss as a percentage of birth weight, duration to regain birth weight and chemical composition of breast milk. This can be said that herbal galactagogue can be used as an alternative way to solve inadequate breast milk production among breastfed mothers.

In this study, herbal galactagogue tea was developed by using three main galactagogues which were fenugreek (*Trigonellafoenum-graecum*), fennel (*Foeniculum vulgare*)

and dates. There were several factors in the selection of the ingredient of herbal galactagogue tea. The selection of the ingredient was made under the factors such as public acceptance, availability and suitability on the combination with others ingredient. Public acceptance for the choices of the ingredient made is important as the target of the product is the public itself especially woman on the age of pregnancy and breastfeeding.

In the recent research found that fenugreek consumption can affect the early stage of lactogenesis and prolactin level however at the later stage it did not affect the established breast milk volume and no change in the prolactin level<sup>12</sup>. However, over dosage of fenugreek may cause colic in infants. The combination of fennel and fenugreek are believed to relieve the colic incident in infants<sup>11</sup>. Traditionally, fennel act as carminative which assist with the flatulence control and at the same time increase production of breast milk<sup>13-15</sup>.

Upon digestion, carbohydrate will convert into glucose which it is a major source of energy for the body. This instead of the action of the product as galactagogue remedies, it also can act as an energy booster for the mothers who consume it. However, caution must be taken as high intake of glucose may lead increase blood sugar level which in turn lead to high risk of hyperglycemia<sup>16</sup>. In addition, intake of protein-rich food is believed to increase milk supply<sup>17</sup>. During lactation, the protein requirement is more than normal people which is the addition<sup>18</sup> of 13-19 g day<sup>-1</sup>. Both the product contain low in fat content as most of them come from plant-based sources. The fat content contributed only 9 kcal of energy for 100 g of herbal galactagogue tea which occupied only 3.6% of the total caloric value of the tea. By encouraging healthy dietary fat intake of the maternal it can help alters the saturated fatty acid profile of breast milk which in turn can improve dietary fat delivery to the breastfed infant<sup>19</sup>.

Additional energy requirement during the first 6 months of lactation is to support weight gain of the infants who only received food from breastfeeding. Thus, herbal galactagogue tea which contributes 3.4% of the standard total daily energy intake may help to increase the energy intake of mothers as close enough to the recommendation. Buntuchai *et al.*<sup>17</sup> reported that mother energy intake is related to breast milk volume ( $p < 0.05$ ) which can be concluded that low intake of energy by mothers who breastfeeding may lead to a reduction of breast milk supply. Segura *et al.*<sup>20</sup> also suggested that mothers who are breastfeeding should not consume less than 1,500 kcal per day as it may lead to a reduction in breast milk supply.

Sensory evaluation is one of the most test being done to determine the acceptance of new product development. The

9-hedonic test was chosen in the sensory evaluation as it is preferred among researchers and development scientists as well as marketing managers because it is believed to be sensitive to differences between the sample and is easy to interpret and analyse<sup>21</sup>.

The first thing that people notice on food is the colour and appearance of the people tend to predict the taste through the colour and appearance of the food before deciding to purchase it, even without tasting the food<sup>22</sup>. The result showed that there were significant differences ( $p < 0.05$ ) for the attributes of aftertaste between the two sample. Since the sample A2 content higher amount of dates than sample A1, it helps to omit the bitter aftertaste of the herbs. The overall acceptance of the product is influenced by all the other attributes which are colour, aroma, taste and the aftertaste. It can conclude that preferences and acceptance for both of samples are the same despite the difference in the degree of acceptance of the aftertaste of both samples.

## CONCLUSION

The development herbal galactagogue tea is the easiest and convenient to be consumed by the mothers as the alternative for increasing their milk supply. The herbal galactagogue tea contains high carbohydrate content with low protein and fat content which can be considered as the energy booster for the mothers who breastfed their infants. Besides that, the formulation of herbal galactagogue tea has created an initiative to support breastfeeding in Malaysia.

## SIGNIFICANCE STATEMENT

This study discovered the problems in decline exclusive breastfeeding among mothers in Malaysia and potentials of herbal galactagogue in increasing milk production that may benefits for future research and created an initiative to support breastfeeding in Malaysia. This study will help the researchers to uncover the potentials and acceptance of herbal galactagogue that many researchers may not able discovered. Thus, a new product that convenient for mothers in Malaysia is produced.

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