REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 24, No.4 (2023)
http://www.veterinaria.org
Article Received: 02-04-2023; Accepted: 10-06-2023

Development And Sensory Evaluation Of Lactogenic Recipes Enriched With Harira Powder: A Traditional Approach To Postpartum Nutrition

Prajakta J. Nande[1*,]

[1*]Department of Home Science, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, Maharashtra-440033, India

ABSTRACT
Lactogenic foods or galactogogues contain nutrients that support the production of the hormone prolactin and therefore, boost lactation and breast milk supply. For the present study, mixture of herbs 'harira powder' was used for the lactogenic effect. The study aimed at designing and development of lactogenic recipes by using harira powder. Total six recipes were prepared namely laddoo, gruel, burfi, chutney, sweet dalia, and raab. All the recipes which were developed were safe for the consumption by lactating mothers. Lactogenic recipes were standardized at household level. Six judges were selected for conducting sensory evaluation of the recipes. Scores given by the judges were tabulated and means were derived. Nutritive values were calculated using standard composition tables. All the lactogenic recipes were prepared by using different ingredients and by using harira powder in each recipe. Recipes were well accepted by the judges for different sensory attributes like appearance, colour, texture, doneness, consistency, flavour and taste. Nutritional quality of all lactogenic recipes was good. These recipes can be given to the lactating mothers to increase their breast milk secretion.

Keywords: *lactogenic recipes, galactogogues, lactating mothers, harira powder, sensory evaluation.*

INTRODUCTION

Lactation is a critical aspect of maternal and child health, providing essential nutrients and immunological protection to infants. The promotion of breastfeeding is widely recognized as a key public health strategy for improving infant health outcomes globally. However, many mothers face challenges with lactation, leading to an increasing interest in natural lactogenic foods that can enhance milk production. Lactogenic foods, also known as galactogogues, are believed to stimulate or increase the production of breast milk through the presence of certain bioactive compounds (Peterson et al., 2018). Women with insufficient milk production who do not respond to lactation counseling, as well as adoptive parents seeking to induce lactation, may pursue therapy with herbal galactogogues. In times past, a good human milk supply for newborns and infants was crucial for survival. Historically, it is evident that nations, cultures, and tribes developed traditions based on herbs and foods being used to maintain and increase milk supply. Mothers are often concerned about inadequate quantity of breast milk. Many attempt to increase breast milk supply by taking herbs and foods categorized as galactogogues. These substances stimulate milk supply or oxytocin, which aids in breast milk ejection. Common herbs and foods used as galactogogues are numerous and varied and include almonds, anise, asparagus, borage, caraway, chaste tree fruit, chicken soup, cilantro, coconut, coriander, cumin, dandelion, dill, fennel, fenugreek, garlic, ginger, hops, lettuce, marshmallow root, millet, mushrooms, nettle, oat straw, papaya, pumpkin, red clover, red raspberry, rice, sage, seaweed soup, sesame seeds, sunflower seeds, thistles, vervain etc. (Nice, F. J., 2015 and Nice, F. J., 2011).

Lactation plays a crucial role in maternal and child health, providing essential nutrients, antibodies, and emotional bonding during the early stages of a child's life. However, many women face challenges such as insufficient milk production, which can hinder the breastfeeding process and impact infant health. To address these challenges, traditional medicine and herbal remedies have long been explored for their potential to enhance lactation. In this context, the development of lactogenic foods using herbal mixtures is of significant interest, particularly for their potential to support lactation while also providing nutritional benefits (Peterson et al., 2018). One such herbal formulation is harira powder, a mixture of 18 herbs traditionally used in various cultures for postpartum care. Harira powder is reputed for its efficacy in addressing postpartum weakness, increasing lactation, and alleviating backache—a common complaint among new mothers. The powder includes a diverse range of herbs such as *tamarix gallica* linn (jhau), *curcuma amada* roxb (mango ginger), *withania somnifera* dunal (ashwagandha), and *butea frondosa* koen (palash), among others, each contributing unique medicinal properties. For instance, *withania somnifera* is well-known for its adaptogenic and rejuvenating effects, making it a valuable ingredient in postpartum recovery (Singh et al., 2011). Similarly, *curcuma longa* (Turmeric) is widely recognized for its anti-inflammatory and antioxidant properties, which can support overall health during the postpartum period (Hewlings and Kalman, 2017). The inclusion of these herbs in harira powder is not arbitrary; rather, it reflects a deep understanding of the medicinal properties of each component. *Tribulus terrestris* Linn (gokshur), for example, is traditionally used to enhance reproductive health and has been shown to have lactogenic effects (Ghosh et al., 2014). Additionally, *piper longum* Linn (long pepper) is known for its bioavailability-enhancing properties, which can potentiate the effects of other herbs in the mixture (Wattanathorn et al., 2008). These attributes make harira powder a promising candidate for developing functional foods aimed at supporting lactating mothers.

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 24, No.4 (2023)
http://www.veterinaria.org
Article Received: 02-04-2023; Accepted: 10-06-2023

Despite its traditional use, scientific studies evaluating the efficacy of harira powder, particularly in lactogenic recipes, remain limited. Moreover, while the functional benefits of these herbs are well documented, the sensory attributes of foods containing harira powder must also be considered to ensure consumer acceptability. Sensory evaluation is a critical step in food product development as it assesses attributes such as taste, aroma, and texture, which significantly influence a product's success in the market (Lawless and Heymann, 2010).
This research aims to develop and conduct a sensory evaluation of lactogenic recipes prepared using harira powder. The study not only validated the traditional use of harira powder but also explored its potential in modern dietary practices aimed at enhancing lactation. By integrating traditional knowledge with scientific inquiry, this study seeks to contribute to the development of evidence-based lactogenic foods that are both effective and palatable.

METHODOLOGY

For this research, six lactogenic recipes – laddoo, gruel, burfi, chutney, sweet dalia and raab were designed and standardized by using different ingredients and harira powder.

Composition of Harira Powder:

Sr. No.	Ingredients	Quantity (g)
1.	Tamarix Gallica Linn (Jhau)	15
2.	Curcuma Amada Roxb (Mango Ginger)	11
3.	Withania Somnifera Dunal (Ashwagandha)	13
4.	Butea Frondosaekoen (palash)	6
5.	Tribulus Terrestris Linn (Gokshur)	9
6.	Myristica Fragrans Houtt (Nutmeg)	2.2
7.	Myristica Fragrans Houtt (ft.) (Mace)	2.2
8.	Zingiber Officinale Roscoe (Ginger)	9
9.	Carum Copticum (Ajwain)	3.2
10.	Piper Longum Linn (ft.)(Long pepper)	3.2
11.	Piper Longum Linn. (Root) (Long pepper)	3.2
12.	Sangjarahat (Magnecium Salicate)	12
13.	Acorus Calamus Linn (Sweet Flag)	1
14.	Pedalium Murex Linn (Large Caltrops)	4
15.	Elettaria Cardamomum Maton (Green Cardamom)	0.5
16.	Piper Nigrum, Linn (Black Pepper)	2
17.	Curcuma Longa, Linn (Turmeric)	2
18.	Anethum Sowa Kurz (Dill)	1.5

Composition of Recipes:

Following tables 1 to 6 show composition of ingredients and method of preparation of lactogenic recipes.

Table 1: Composition of Ingredients for Laddoo

Sr. No.	Ingredients	Quantity (g)
1	Harira powder	10
2	Almond	10
3	Semolina	15
4	Raisins	10
5	Makhana	10
6	Dried dates	10
7	Turmeric powder	2
8	Omum	2
9	Edible gum	5
10	Fig	5
11	Fenugreek seeds	2
12	Cashew nuts	10
13	Asafoetida	1
14	Jaggery	20

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 24, No.4 (2023)
http://www.veterinaria.org
Article Received: 02-04-2023; Accepted: 10-06-2023

15	Ghee	5	

Table 2: Composition of Ingredients for Gruel

Sr. No.	Ingredients	Quantity (g)	
1	Dried grated coconut	10	
2	Makhana	10	
3	Almond	10	
4	Cashew nut	10	
5	Raisins	10	
6	Crushed jaggery	20	
7	Dried ginger powder	2	
8	Omum	2	
9	Ghee	5	
10	Fig	5	
11	Poppy seeds	5	
12	Turmeric powder	5	
13	Cumin seeds	2	
14	Edible gum	5	

Table 3: Composition of Ingredients for Burfi

Sr. No.	Ingredients	Quantity (g)	
1	Watermelon seeds	40	
2	Grated coconut	15	
3	Green cardamom	5	
4	Harira powder	10	
5	Ghee	5	
6	Jaggery	20	

Table 4: Composition of Ingredients for Chutney

Sr. No.	Ingredients	Quantity (g)	
1	Fresh coconut	15	
2	Garlic	5	
3	Curry leaves	5	
4	Harira powder	10	
5	Salt	1	
6	Cumin seeds	2	
7	Mustard seeds	2	
8	Oil	5	

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 24, No.4 (2023)
http://www.veterinaria.org
Article Received: 02-04-2023; Accepted: 10-06-2023

Table 5: Composition of Ingredients of Sweet Dalia

Sr. No.	Ingredients	Quantity (g)	
1	Broken wheat	30	
2	Almond	10	
3	Cashew	10	
4	Raisins	5	
5	Harira powder	10	
6	Jaggery	20	
7	Ghee	10	
8	Water	150	

Table 6: Composition of Ingredients for Raab

Sr. No.	Ingredients	Quantity (g)	
1	Whole wheat flour	30	
2	Grated Jaggery	30	
3	Omum	2	
4	Dried ginger powder	2	
5	Harira powder	5	
6	Ghee	5	

Sensory Evaluation of Recipes:
All recipes were evaluated for their palatability characteristics. Score cards with the keys were constructed. Sensory evaluation of recipes was carried out by six judges in three trials.

Table 7: Sample Score Card

Trials	Appearance	Colour	Texture/ Consistency	Flavour	Taste	Acceptability
T1						
T2						
T3						

Table 8: Sample Key

Sr. No.	Appearance	Colour	Texture/ Consistency	Flavour	Taste	Acceptance	Scores
1	Very good	Very good	Very good	Very good	Very good	Very good	10
2	Good	Good	Good	Good	Good	Good	8
3	Fair	Fair	Fair	Fair	Fair	Fair	6
4	Poor	Poor	Poor	Poor	Poor	Poor	4

Calculation of Nutritive Value of Recipes:
Nutritive value (energy, macro- and micro-nutrients and fibre content) of all recipes was calculated using standard food composition tables (Nutritive value of Indian Foods, NIN, (ICMR), 2010 and Indian Food Composition Tables, NIN (ICMR), 2017).

RESULTS AND DISCUSSION
Sensory Evaluation:

Table 9: Mean Palatability Scores for Lactogenic Recipes

Sr. No.	Sensory Characteristics	Laddoo	Gruel	Burfi	Chutney	Sweet Dalia	Raab
1.	Appearance	9.88	9.66	10	10	9.88	9.88

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 24, No.4 (2023)
http://www.veterinaria.org
Article Received: 02-04-2023; Accepted: 10-06-2023

2.	Colour	9.88	9.66	9.88	9.88	9.88	9.88
3.	Texture/Consistency	9.88	9.66	9.66	9.88	10	9.88
5.	Flavour	9.88	9.66	9.55	9.77	10	9.88
6.	Taste	9.88	9.77	9.66	9.88	10	9.88
7.	Acceptability	9.88	9.77	9.55	9.88	10	9.77

Laddoo:
The lactogenic laddoo prepared in this study had a golden-brown color, primarily derived from the jaggery, ghee, and turmeric powder. The rich color was visually appealing. The visible specks of almonds, cashew nuts, and dried fruits added visual texture, made the laddoo looked rich and inviting. The aroma of the laddoo was a blend of sweet, nutty, and spicy notes, largely influenced by the ghee used in its preparation. Ghee is known for its rich, buttery aroma, which is highly appealing and plays a significant role in the sensory appeal of traditional Indian sweets (Patel, 2012).

Photo Plate 1: Laddoo

The aromatic spices, including turmeric and asafoetida, added a warm and earthy scent that enhanced the overall aroma profile. Asafoetida, though used in small quantities, imparted a distinct pungent aroma that is characteristic of traditional Indian cuisine and is also known for its digestive benefits (Panda et al., 2009). The taste of the lactogenic laddoo was influenced by the blend of sweet, nutty, and slightly spicy flavors derived from its ingredients. The use of jaggery as a natural sweetener imparted a rich, caramel-like sweetness that was both palatable and healthful, given jaggery's higher mineral content compared to refined sugar (Balgir, 2011). The sweetness was balanced by the warm, slightly pungent flavor of turmeric powder and the subtle spiciness of omum which added depth to the overall taste profile (Hewlings and Kalman, 2017; Burdock and Carabin, 2009). The inclusion of dried fruits such as raisins, dried dates, and figs added layers of natural sweetness and a mild tartness, which enhanced the complexity of the laddoo's flavor. These dried fruits are also rich in iron and fiber, contributing to the nutritional benefits while appealing to the taste buds (Al-Shahib and Marshall, 2003). The nutty flavor of almonds, cashew nuts, and makhana (fox nuts) complemented the sweetness and added a rich, buttery undertone, making the laddoo more indulgent (Martonez et al., 2010). Texture is a crucial aspect of the sensory evaluation, especially for foods intended for postpartum women who may prefer foods that are easy to chew and digest. The lactogenic laddoo offered a pleasing combination of textures—crunchiness from almonds, cashew nuts, and makhana, chewiness from dried fruits like raisins, dried dates, and figs, and a slight softness from the semolina base.

Semolina, used as the primary binding agent, provided a slightly grainy texture that is characteristic of traditional laddoos and is favored by many for its mouthfeel (Chavan and Kadam, 1993). The addition of edible gum further enhanced the chewiness of the laddoo, while also adding a slight stickiness that contributed to the overall texture. Edible gum is traditionally used in postpartum foods for its believed benefits in strengthening bones and joints, making it a functional addition that also impacts the sensory experience (Patel and Kar, 2011). The overall acceptability of the lactogenic laddoo was high, given the favorable balance of taste, texture, aroma, and appearance. The combination of sweet and slightly spicy flavors, the interplay of crunchy and chewy textures, and the rich aroma all contributed to a sensory experience.

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 24, No.4 (2023)
http://www.veterinaria.org
Article Received: 02-04-2023; Accepted: 10-06-2023

Gruel:

Photo Plate 2: Gruel

The gruel had a golden-yellow hue, primarily due to the presence of turmeric powder and jaggery. This color is not only visually pleasing but also associated with traditional and healthy foods, which can be reassuring to consumers (Hewlings and Kalman, 2017). The visible inclusion of nuts, raisins, and figs adds texture and contrast to the appearance, made the gruel looked rich and nutritious. The creamy consistency, punctuated with the occasional crunch of nuts and seeds, added to the visual and textural appeal of the dish. The aroma of the lactogenic gruel was rich and inviting, dominated by the nutty scent of ghee and dry coconut, with underlying notes of spices like cumin, turmeric, and dried ginger. Ghee imparted a characteristic buttery aroma that is highly appealing and contributes to the sensory experience (Patel, 2012). The warm, earthy scent of turmeric and dried ginger added a comforting element to the aroma profile, which is particularly soothing for postpartum women. Cumin seeds, known for their aromatic and digestive properties, contributed a subtle, spicy fragrance that enhanced the overall aroma of the gruel (Burdock and Carabin, 2009). The combination of these aromatic ingredients created a complex and well-balanced scent that was both appetizing and comforting. The taste of the lactogenic gruel was a complex blend of sweet, nutty, and mildly spicy flavors. Jaggery, used as the primary sweetener, provided a deep, caramel-like sweetness that complemented the nutty flavors of almonds, cashew nuts, and dry coconut. Jaggery is not only beneficial for its rich taste but also for its higher mineral content compared to refined sugars, offering additional nutritional benefits for postpartum women (Balgir, 2011). The inclusion of dried ginger and turmeric powder added a warm, slightly pungent flavor that balanced the sweetness and enhanced the overall depth of the gruel. These spices are known for their anti-inflammatory properties, which can be particularly beneficial for postpartum recovery (Hewlings and Kalman, 2017). Omum contributed a slightly bitter and peppery flavor that paired well with the sweetness of jaggery which yielded a well-rounded taste profile (Burdock and Carabin, 2009). Raisins and figs added natural sweetness and a subtle tartness. These dried fruits are also rich in dietary fiber, iron, and antioxidants, making them functional ingredients that support digestive health and energy levels during lactation (Al-Shahib and Marshall, 2003). The texture of the gruel is a key factor in its sensory appeal, especially for postpartum women who may prefer foods that are easy to consume and digest. The gruel's base, made from a mixture of ghee, dry coconut, and edible gum, offered a smooth and creamy consistency that was comforting and satisfying. Ghee, a staple in traditional Indian cooking, is known for its rich, buttery texture and is believed to support digestion and the absorption of fat-soluble vitamins (Patel, 2012). Makhana and poppy seeds added a slight crunch to the gruel, contrasting with the creamy base and added to the overall mouthfeel. Makhana is valued for its high protein content and low glycemic index, making it a suitable ingredient for lactogenic foods (Singh et al., 2010). The chewy texture of raisins and figs further enhanced the textural diversity of the gruel. The overall acceptability of the lactogenic gruel was high due to its balanced sensory attributes. The combination of sweet and mildly spicy flavors, creamy yet varied textures, rich aroma, and appealing appearance made the gruel enjoyable to consume.

Burfi:

Photo Plate 3: Burfi

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 24, No.4 (2023)
http://www.veterinaria.org
Article Received: 02-04-2023; Accepted: 10-06-2023

The burfi had a dark golden-brown hue, primarily due to the jaggery, which gave it a rich, traditional look. The visible specks of green cardamom and the slightly coarse texture from the watermelon seeds and dried coconut added visual interest, making the burfi appear rich and textured. The square or diamond shape, typically used for burfi, contributes to its traditional and aesthetic appeal. This visual appeal is important, as it can influence the consumer's perception of the burfi before even tasting it (Balgir, 2011). The aroma of the lactogenic burfi is another important sensory attribute that contributes to its overall appeal. The dominant aroma came from the green cardamom powder, which provided a sweet, floral, and slightly spicy fragrance that is characteristic of many Indian sweets. This aroma is not only appealing but also has a soothing effect which can be particularly comforting for postpartum women (Burdock and Carabin, 2009). The subtle nutty aroma from the watermelon seeds and dried coconut added depth to the burfi's fragrance. When combined with the rich, molasses-like scent of jaggery, the overall aroma of the burfi became inviting and familiar, which enhanced its acceptability. The taste of the lactogenic burfi was a harmonious blend of sweetness, nuttiness, and a mild spiciness from the cardamom. The jaggery used as a sweetener imparted a deep, rich caramel-like flavor that is more complex than that of refined sugar. This depth of flavor made the burfi particularly appealing as it offers a traditional, comforting sweetness that is often preferred in Indian confectionery (Balgir, 2011). The nuttiness from watermelon seeds and dried coconut complemented the sweetness, creating a balanced flavor profile. Watermelon seeds, known for their slightly earthy and nutty taste, provided a subtle flavor that enhanced the overall richness of the burfi without overpowering it (Tiwari et al., 2016). Dried coconut added a natural sweetness and a creamy, tropical flavor, which contributed to the indulgent taste of the burfi. Green cardamom powder added a refreshing and aromatic spiciness that elevated the burfi's flavor profile. The spice is often associated with luxury in Indian sweets, and its inclusion in the (Burdock and Carabin, 2009). Texture is a critical aspect of burfi, as it directly influences the eating experience. The lactogenic burfi offered a firm yet soft texture that is characteristic of traditional Burfi. The combination of watermelon seeds and dried coconut provided a slight crunch which added an interesting textural contrast to the smooth, dense base created by the jaggery and harira powder. This balance of textures enhanced the sensory experience, making the burfi more enjoyable to eat. Watermelon seeds contributed a slight graininess, which was offset by the creaminess of the dried coconut. This combination resulted in a texture that was both rich and satisfying. The use of harira powder, which contains various herbs and spices, may also add a slight grit, depending on the formulation, but this is generally well-accepted in traditional Indian sweets, where such textures are often valued (Jain et al., 2014). The overall acceptability of the lactogenic burfi was high, given the balance of its sensory attributes. The sweet, nutty flavor, combined with a rich, creamy texture and an inviting aroma, made this burfi an appealing option for postpartum women seeking a nutritious and satisfying treat. The traditional ingredients and preparation methods further enhanced its appeal, aligning with cultural practices and dietary preferences that emphasize nourishing foods during the postpartum period.

Chutney:

Photo Plate 4: Chutney

The chutney had a pale green color. The tempering of mustard seeds and cumin in oil created small dark specks throughout the chutney, which imparted visual interest and indicating the presence of these flavorful components. The presence of curry leaves and their dark green flecks also enhanced the chutney's appearance, making it look fresh and vibrant. The slightly coarse texture from the grated coconut gave the chutney a rustic, homemade look. The aroma of the lactogenic chutney was a complex blend of nutty, spicy, and herbal notes. The dominant aroma came from the tempering of cumin and mustard seeds in oil, which released their essential oils and created a warm, inviting fragrance. This is a common and cherished aroma in Indian cuisine, often associated with home-cooked, comforting meals (Burdock and Carabin, 2009). Garlic added a sharp, pungent aroma that complements the nutty scent of the coconut and the warm notes of the spices. The curry leaves contributed a fresh, herbal fragrance that elevates the overall aroma, making it more appetizing and appealing. Harira powder, with its mix of various herbs and spices, added a subtle complexity to the aroma. The taste of the lactogenic chutney is a vibrant blend of savory, spicy, and slightly tangy flavors. Fresh coconut served as the base, which offered a mild sweetness and a creamy, rich taste that balanced the

stronger flavors of garlic, cumin, and mustard seeds. Coconut is not only flavorful but also rich in medium-chain triglycerides which are easily absorbed fats that provide a quick source of energy, beneficial for postpartum recovery (Kinsella et al., 1990). Garlic contributed a pungent, spicy flavor that added depth to the chutney. It is known for its health benefits, including its role in boosting immunity and promoting heart health, making it a functional ingredient in the chutney (Amagase, 2006). The slight bitterness and warm, earthy flavor of cumin seeds enhanced the overall complexity of the chutney, while mustard seeds provided a sharp, tangy note that contrasted with the richness of the coconut and oil. Curry leaves introduced a fresh, slightly citrusy flavor that lightened the chutney, added a layer of brightness to the taste profile. The salt helped to balance all the flavors, thereby ensuring that no single ingredient overpowers the others. The inclusion of harira powder, which contains a mix of herbs and spices, added subtle complexity and depth, contributed to the overall savory and slightly bitter notes, which are well-balanced by the other ingredients (Jain et al., 2014). The fresh coconut provided a slightly coarse yet creamy texture, which is characteristic of traditional South Indian chutneys. The grinding of the coconut with garlic and spices ensured that the chutney had a smooth consistency, making it easy to spread or mix with other foods. Cumin and mustard seeds, when tempered in oil, added a slight crunch to the chutney and hence, provided a pleasant textural contrast to the smooth coconut base. This combination of creamy and crunchy textures enhanced the mouthfeel. The use of oil not only aided in tempering the spices but also added a silky texture, making the chutney rich and cohesive. This is important for sensory satisfaction, as a well-blended texture can make the chutney more palatable and versatile for use with various foods. The overall acceptability of the lactogenic chutney was high. The chutney offered a balanced taste, combining the richness of coconut with the sharpness of garlic and the warmth of spices, thereby making it both flavorful and nutritious. Its texture, aroma, and appearance further contributed to its appeal, making it a versatile condiment that can be paired with a variety of foods.

Sweet Dalia:

Photo Plate 5: Sweet Dalia

The dalia was of golden-brown color, primarily due to the jaggery and ghee, which gave it a rich, inviting appearance. The broken wheat grains were visible, giving the dish a hearty, rustic look. The addition of almonds and cashew nuts added visual interest and a sense of indulgence, making the dish looked more appealing. The raisins, with their dark color, provided a contrast to the lighter tones of the broken wheat and nuts, adding to the visual appeal of dalia. The herbs in the harira powder imparted subtle flecks of green added to the perception of the dish as being flavorful. The aroma of the lactogenic sweet dalia was a complex blend of sweet, nutty, and herbal notes. The primary aroma came from the ghee and jaggery, which together created a rich, warm, and inviting scent. The almonds and cashew nuts added a subtle nutty fragrance, which enhanced the richness of the dalia's aroma. The harira powder, with its mix of herbs, contributed a mild, earthy, and slightly spicy aroma. This herbal aroma was subtle enough to blend well with the sweetness of the jaggery but noticeable enough to suggest the health benefits associated with the herbs used in the harira powder. The taste of the lactogenic sweet dalia was a harmonious blend of sweetness, nuttiness, and a mild herbal undertone, resulting from the combination of jaggery and herb mix harira powder. The jaggery served as the primary sweetening agent, imparting a rich, caramel-like flavor that was both comforting and deeply satisfying. Jaggery is a traditional sweetener that not only provides sweetness but also adds trace minerals such as iron, which is beneficial for postpartum recovery (Balgir, 2011). The addition of almonds and cashew nuts contributed a nutty, creamy taste that complemented the sweet, earthy flavor of the jaggery. These nuts are also rich in healthy fats, proteins, and micronutrients, enhancing the nutritional profile of the dalia while also adding complexity to its flavor (Mukherjee and Chatterjee, 2016). Raisins introduced a natural, fruity sweetness with a slight tartness, providing a pleasant contrast to the rich, molasses-like sweetness of the jaggery. This combination of flavors created a well-balanced taste profile The herbs in harira powder, such as ashwagandha and turmeric, are known for their health benefits, including anti-inflammatory and immune-boosting properties, which are particularly valuable for postpartum women (Jain et al., 2014). The broken wheat provided a slightly coarse, chewy texture that formed the base of the dish. This texture was

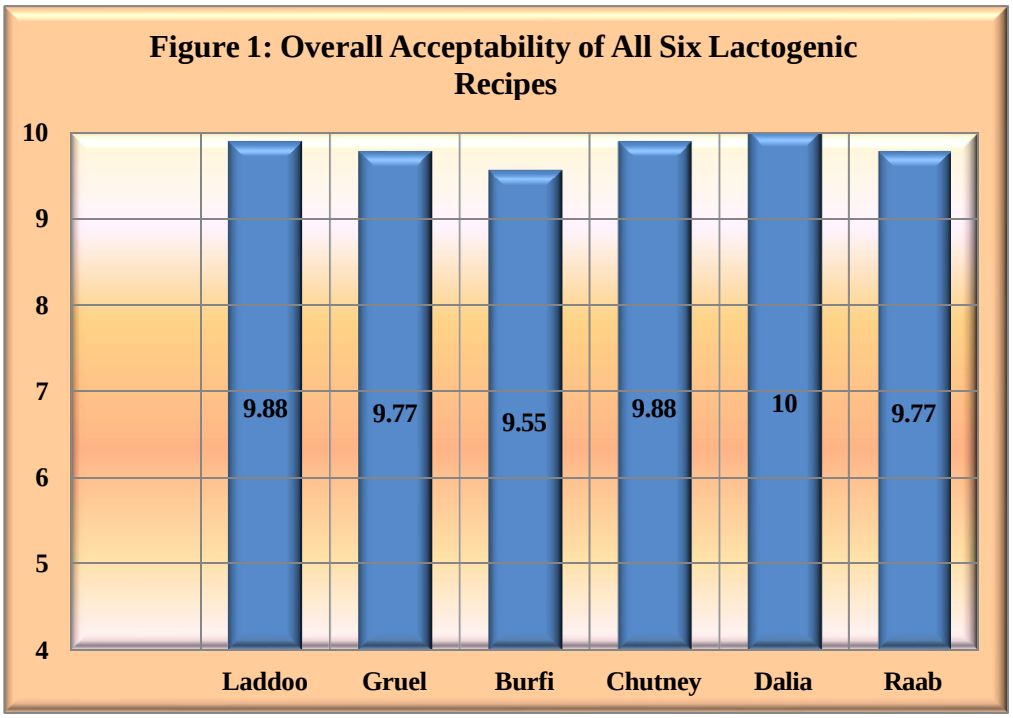
satisfying and filling, making the dalia a hearty and comforting meal option. The use of broken wheat also ensured that the dalia had a substantial mouthfeel, which is important for satiety. The addition of ghee, imparted a rich, creamy texture to the dalia, making it smooth and luxurious. Ghee not only enhanced the mouthfeel but also carried the flavors of the other ingredients, ensuring a cohesive taste experience. Ghee is also valued for its ability to promote digestion and absorption of nutrients, which is beneficial for postpartum recovery (Sethi et al., 2020). The nuts—almonds and cashew nuts—provided a contrasting crunch, adding textural interest to the dalia. This combination of creamy, chewy, and crunchy textures enhanced the overall sensory experience, making the dalia more enjoyable to eat. Raisins, when cooked, became plump and juicy, added bursts of sweetness and a soft, slightly sticky texture that contrasted with the coarser texture of the broken wheat. The overall acceptability of the lactogenic sweet dalia was high.

Raab:
The dish had brown to golden hue, largely due to the combination of bajra flour, jaggery, and ghee. This warm, earthy color was visually appealing and suggested a wholesome, nutritious food. The slightly thick consistency of the raab gave it a rich, hearty appearance.

Photo Plate 6: Raab

Small specks of omum seeds and the occasional visible flecks from the harira powder added visual interest, breaking the monotony of the dish's uniform color. This added to the perception of the raab as a traditional, homemade dish, which is often valued for its authenticity and natural ingredients. The aroma of raab was a warm, inviting blend of nutty, sweet, and spicy notes. The dominant aroma came from the ghee, which when heated, released a rich, buttery fragrance. The dried ginger powder added a warm, spicy aroma that complemented the sweetness of the jaggery. Ginger's aroma is known to have soothing properties, which can be calming and therapeutic, particularly for postpartum women (McGee, 2004). Omum seeds contributed a strong, herbal scent that was slightly pungent and sharp. This aroma was distinct and recognizable, adding depth to the overall fragrance of the raab. The herbal notes from the harira powder further enhanced the aroma. The primary sweet component of raab came from jaggery, which imparted a rich, caramel-like sweetness. Bajra flour contributed a slightly nutty and earthy taste, characteristic of pearl millet. This flavor was complemented by the warmth and spiciness of dried ginger powder, which added a subtle heat to the raab. Ginger is well-known for its digestive and anti-inflammatory properties, making it a valuable addition to postpartum diets (Ali et al., 2008). Omum seeds introduced a distinct, pungent flavor with a slight bitterness that balances the sweetness of the jaggery. This spice is traditionally used to aid digestion and relieve gas, which is particularly beneficial for postpartum women (Srivastava, 2010). The dish had a smooth, slightly thick consistency, which was achieved by cooking bajra flour in ghee and water. The use of bajra flour gave the raab a somewhat grainy texture that provided a satisfying mouthfeel. Ghee contributes to the raab's creamy, rich texture, enhancing its palatability. The smooth texture of ghee-coated bajra flour, combined with the slight grittiness of the millet, created a balanced mouthfeel. The presence of omum seeds added a slight crunch, providing a textural contrast to the otherwise smooth raab. This contrast enhanced the eating experience, making the dish more interesting and satisfying to consume. The overall acceptability of lactogenic raab was high. The dish offered a balanced flavor profile, combining sweetness with mild spiciness and a nutty, earthy base. Its rich, creamy texture and warm, inviting aroma further contributed to its appeal, making it a comforting and nourishing option for postpartum recovery.

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 24, No.4 (2023)
http://www.veterinaria.org
Article Received: 02-04-2023; Accepted: 10-06-2023



From Figure 1, it is clear that dalia got highest acceptability with mean score of perfect '10' whereas burfi received mean score of '9.55' which was lowest among all recipes.

Nutritive Value:

Table 10: Nutritive Value of Lactogenic Recipes (per 100 g)

Sr. No.	Nutrients	Laddoo	Gruel	Burfi	Chutney	Sweet Dalia	Raab
1.	Energy (kcal)	308.11	318.8	516.93	197.6	323.41	276.43
2.	Carbohydrates (g)	47.08	35.16	24	8.43	46.26	56.46
3.	Protein (g)	7.15	7.00	19.90	4.52	7.67	5.26
4.	Fat (g)	13.86	16.62	37.83	28.13	21.92	2.64
5.	Soluble dietary fiber (g)	1.32	1.39	0.33	1.29	1.21	0.97
6.	Insoluble dietary fiber (g)	4.22	4.97	3.3	6.5	3.55	3.98
7.	Total dietary fiber (g)	5.54	6.37	3.70	7.88	4.76	4.96
8.	Potassium (mg)	475.41	549.99	285.7	316.3	394.7	376.48
9.	Sodium (mg)	8.45	12.55	8.77	411.7	7.62	12.0
10.	Magnesium (mg)	100.5	126.75	56.92	67.86	128.11	99.86
11.	Zinc (mg)	1.332	1.52	0.76	0.75	1.65	1.353
12.	Iron (mg)	4.17	5.40	1.62	3.04	3.49	4.56
13	Thiamine (mg)	0.13	0.190	0.88	0.075	0.157	0.10
14.	Riboflavin (mg)	0.05	0.560	0.089	0.15	0.06	0.086
15.	Niacin (mg)	0.96	0.84	2.21	0.43	1.172	0.35
16.	Pyridoxine (mg)	0.18	0.249	30.69	13.77	0.249	0.36
17.	Folate (µg)	15.48	20.18	4.09	37.22	16.72	21.05
18.	Vitamin C (mg)	1.25	3.44	-	2.28	0.170	0.03
19.	Carotene (µg)	62.93	33.26	1.14	877.38	0.92	31.53

Energy and Carbohydrate:

Jaggery is a significant source of carbohydrates, providing quick energy that is crucial for postpartum women, who often experience fatigue due to the physical demands of childbirth and lactation (Patel and Prajapati, 2013). The high energy density of jaggery was complemented by its content of micronutrients like iron, which is essential for replenishing blood loss after delivery.

Broken wheat and bajra flour contributed complex carbohydrates, providing sustained energy release, essential for maintaining blood sugar levels and supporting the physical demands of motherhood (Kaur et al., 2019). Semolina also

added to the carbohydrate content, offering a source of quick energy while being easy to digest, which is important during the postpartum period when digestive issues are common.
All six lactogenic recipes were found to be good in energy ranged from 197.6 to 323 41 kcal/100 g.

Protein:
Almonds, cashew nuts, and makhana are excellent sources of plant-based protein, which is essential for tissue repair and recovery after childbirth. Almonds are particularly high in protein, and are also rich in essential fatty acids that support brain health and hormone production (Mukherjee and Chatterjee, 2016). Fenugreek seeds and edible gum (gondh) also contributed to the protein content. Fenugreek, in particular, has been traditionally used to enhance milk production in lactating mothers due to its phytoestrogen content, which mimics estrogen and promotes milk supply (Khorshidian et al., 2016). The protein content of the burfi was found to be highest (19.90 g/100 g) followed by sweet dalia (7.67 g/100 g), laddoo (7.15 g/100 g), gruel (7.00 g/100 g), raab (5.26 g/100 g) and chutney (4.52 g/100 g).

Fat:
Ghee, almonds, cashew nuts, and coconut are rich in healthy fats, which are crucial for postpartum recovery. Fats are necessary for hormone production, absorption of fat-soluble vitamins (A, D, E, and K), and providing long-lasting energy (Sethi et al., 2020). Ghee, in particular, is revered in traditional medicine for its ability to nourish the body and improve digestion. Raab had lowest fat value per 100 g (2.64 g) whereas chutney had the highest value of fat per 100 g (28.13 g).

Fiber:
Ingredients like figs, raisins, dates, omum and bajra are excellent sources of dietary fiber. Fiber is essential for maintaining digestive health, which is particularly important postpartum when digestive issues like constipation are common (Slavin, 2013). The presence of fiber also helps in the gradual release of energy, keeping blood sugar levels stable. Total dietary fiber content of the lactogenic recipes was found to be good ranged from 3.70 to 7.88 g/100 g. Also, the insoluble and soluble fiber values per 100 g of recipes ranged from 3.3 g to 6.5 g and 0.33 g to 1.39 g, respectively.

Micronutrients:
It is found out that all six lactogenic recipes were found to be good in iron, folate, magnesium, potassium and carotene.
Potassium and magnesium content of the laddoo was found to be good (475.41 mg and 100.5 mg) whereas sodium content was less (8.45 mg). Due to addition of ingredients like dried dates, cashew nuts, almonds and jaggery the iron content of laddoo was found to be good (4.17 mg). It is also seen that thiamine, niacin, total folate & beta-carotene content of the laddoo was found to be fairly good.
The per 100g of gruel contains good amount of potassium and magnesium (549.99 mg and 126.75 mg, respectively) because of use of almonds, cashew nuts, raisins, jaggery, turmeric powder and poppy seeds which are rich in potassium and magnesium whereas sodium content of the gruel was only 12.55 mg. Gruel is a sweet dish & no salt was used. Iron and total folate content of the gruel was more (5.40 mg and 20.18 mg) because of addition of dried ginger, almonds, raisins, jaggery, and turmeric powder.
Potassium and magnesium content of the burfi was more (285.7 mg and 56.92 mg, respectively). Pyridoxine content of burfi was also more (30.69 mg) because of watermelon seeds. Thiamine, riboflavin, niacin, Iron and total folate content was fairly good
The potassium, magnesium, and sodium content of the chutney was good (316.3 mg, 67.86 mg, and 411.7 mg, respectively) because of addition of cumin seeds, fresh coconut and salt. Iron and folate content of the chutney was also more because of the ingredients like curry leaves, cumin seeds, mustard seeds, garlic and fresh coconut as well as the beta-carotene content of the recipe was also high because of addition of curry leaves.
Potassium and magnesium content of the sweet dalia was also very good that is (394.7 mg and 128.11 mg, respectively whereas sodium was less because dalia is a sweet product which was devoid of salt. Iron and folate content of the sweet dalia was good (3.49 mg).
Potassium and magnesium content of the raab was more (376.48 and 99.86 mg/100 g, respectively) because of bajra flour, jaggery and omum. Iron and folate content of the raab was also good (4.56 mg and 21.05 µg, respectively) because of the bajra, jaggery, dried ginger and omum.
It is concluded that the sensory evaluation of these lactogenic recipes highlighted their acceptability, which is crucial for their regular consumption during the postpartum period. The balance of flavors, textures, and aromas contributed by ingredients like almonds**,** cashew nuts**,** jaggery**,** coconut**,** and spices such as turmeric and cumin seeds made these recipes not only nutritious but also palatable. The incorporation of harira powder enhanced the traditional flavors while introducing a subtle complexity that aligns with the cultural expectations of postpartum foods. The positive sensory feedback suggests that these recipes can be effectively integrated into postpartum diets, ensuring that mothers receive the necessary nutrients in a form that is both enjoyable and culturally appropriate. From a nutritional standpoint, these lactogenic recipes provide a rich source of energy, proteins, healthy fats, and a broad spectrum of vitamins and minerals

essential for postpartum recovery. The inclusion of almonds**,** cashew nuts**,** makhana**,** fenugreek seeds, and omum offered substantial protein and fat content, supporting tissue repair, hormone production, and sustained energy levels. The presence of jaggery and broken wheat ensures that the recipes are energy-dense, crucial for combating postpartum fatigue and supporting lactation. Micronutrient-rich ingredients like turmeric, cumin seeds**,** ginger, and figs contributed anti-inflammatory, digestive, and immune-boosting properties, which are vital during the postpartum period when the body undergoes significant recovery processes. The harira powder, with its blend of 15-18 herbs, further enriched these recipes with additional bioactive compounds that promote lactation, enhance digestion, and support overall well-being, making these recipes functional foods with potential long-term benefits.

References:

1. Ali, B. H., Blunden, G., Tanira, M. O., and Nemmar, A. (2008). Some phytochemical, pharmacological and toxicological properties of ginger (Zingiber officinale Roscoe): A review of recent research. *Food and Chemical Toxicology*, 46(2), 409-420.
2. Al-Shahib, W., and Marshall, R. J. (2003). The fruit of the date palm: Its possible use as the best food for the future? *International Journal of Food Sciences and Nutrition*, 54(4), 247-259.
3. Amagase, H. (2006). Clarifying the real bioactive constituents of garlic. *Journal of Nutrition*, 136(3), 716S-725S.
4. Balgir, R. S. (2011). Traditional Indian sweeteners: A review on the potential of jaggery as a rich source of minerals. *Food Research International*, 44(10), 3267-3273.
5. Burdock, G. A., and Carabin, I. G. (2009). Safety assessment of cumin (Cuminum cyminum L.) and related species as spice and herbal components. *Food and Chemical Toxicology*, 47(1), 112-122.
6. Chavan, J. K., and Kadam, S. S. (1993). Nutritional improvement of cereals by fermentation. *Critical Reviews in Food Science & Nutrition*, 28(5), 348-400.
7. Ghosh, D., Das, A., and Mallick, S. (2014). Therapeutic potentials of *Tribulus terrestris* Linn. in health care. *International Journal of Research in Pharmacy and Chemistry*, 4(3), 485-492.
8. Hewlings, S. J., and Kalman, D. S. (2017). Curcumin: A review of its' effects on human health. *Foods*, 6(10), 92.
9. Jain, R., Jain, S. K., and Suhagia, B. N. (2014). Harira powder: a traditional herbal formulation used in postnatal care. *International Journal of Pharmaceutical Sciences Review and Research*, 29(2), 88-92.
10. Kaur, G., Singhal, B. S., and Bhardwaj, R. L. (2019). Nutritional and functional properties of pearl millet (Pennisetum glaucum) seeds: A review. *Current Research in Nutrition and Food Science Journal*, 7(3), 627-639.
11. Khorshidian, N., Yousefi, M., Shadnoush, M., Mortazavian, A. M., and Razavi, S. H. (2016). Fenugreek: potential applications as a functional food and nutraceutical. *Journal of Functional Foods*, 22, 136-151.
12. Kinsella, J. E., Lokesh, B., and Stone, R. A. (1990). Dietary n-3 polyunsaturated fatty acids and amelioration of cardiovascular disease: possible mechanisms. *American Journal of Clinical Nutrition*, 52(1), 1-28.
13. Lawless, H. T., and Heymann, H. (2010). *Sensory Evaluation of Food: Principles and Practices.* Springer.
14. Longvah, T. Ananathan, R. Bhaskarachary, K. & Venkaiah, K. (2017). Indian Food Composition Tables. National Institute of Nutrition (Indian Council of Medical Research), Department of Health Research, Ministry of Health & Family Welfare, Government of India, Hyderabad, Telangana State, India, 1-578.
15. Martínez, R., Torres, A., Meneses, M. A., Figueroa, J. G., Pérez-Álvarez, J. A., and Viuda-Martos, M. (2010). Chemical, technological and in vitro antioxidant properties of almond (Prunus amygdalus) co-products. *Journal of Agricultural and Food Chemistry*, 58(8), 4516-4522.
16. McGee, H. (2004). *On Food and Cooking: The Science and Lore of the Kitchen*. Scribner.
17. Mukherjee, S., and Chatterjee, C. (2016). Almonds and cashew nuts: Nutritional composition and health benefits. *Journal of Food Science and Technology*, 53(10), 3612-3621.
18. Nice, F. J. (2011). Common herbs and foods used as galactogogues. *Infant, Child, & Adolescent Nutrition*, 3 (3): 128-132.
19. Nice, F. J. (2015). Selection and use of galactogogues. *Infant, Child, & Adolescent Nutrition*, 7 (4): 192-194.
20. Panda, H., et al. (2009). *Herbs Cultivation and Medicinal Uses.* Asia Pacific Business Press Inc.
21. Patel, P. M., and Kar, A. (2011). Traditional medicinal uses of natural gum and resins. *International Journal of Research in Ayurveda and Pharmacy*, 2(1), 175-181.
22. Patel, S. (2012). Functional Food Relevance of Khichadi: An ayurvedic prescription for health. *Journal of Ethnic Foods*, 1(1), 46-49.
23. Patel, S., and Prajapati, M. (2013). Food and health applications of exopolysaccharides produced by lactic acid bacteria. *Advances in Dairy Research*, 1(2), 1-7.
24. Peterson, A. L., et al. (2018). The role of lactogenic foods and herbs in supporting breastfeeding: a review. *Journal of Human Lactation*, 34(4), 620-628.
25. Sethi, V., Chakrabarti, S., and Dangwal, R. (2020). Ghee (clarified butter): health benefits, uses, and properties. *Journal of Ethnic Foods*, 7(3), 1-7.
26. Singh, N., Bhalla, M., Jager, P. D., and Gilca, M. (2011). An overview on *ashwagandha*: a rasayana (rejuvenator) of ayurveda. *African Journal of Traditional, Complementary and Alternative Medicines*, 8(5S), 208-213.

27. Singh, S., Das, S. S., and Singh, G. (2010). Makhana (euryale ferox salisb.): a review. *Journal of Food Science and Technology*, 47(5), 499-505.
28. Slavin, J. L. (2013). Fiber and prebiotics: Mechanisms and health benefits. *Nutrients*, 5(4), 1417-1435.
29. Srivastava, K. C. (2010). Extracts from two frequently consumed spices—cumin (Cuminum cyminum) and ajwain (Trachyspermum ammi)—inhibit platelet aggregation and alter eicosanoid biosynthesis in human blood platelets. *Prostaglandins, Leukotrienes, and Essential Fatty Acids*, 30(3), 175-178.
30. Tiwari, R., Verma, S. K., and Chauhan, S. (2016). Watermelon seeds: Implications for health and wellness. *International Journal of Current Microbiology and Applied Sciences*, 5(7), 361-365.
31. Wattanathorn, J., et al. (2008). Enhancing effect of *Piperine* on bioavailability of curcumin in healthy human volunteers. *Phytotherapy Research*, 22(12), 1625-1630.