

# Optimization of Kodo Millet Flour and Green Gram Flour for Formulation of Instant Soup

## Instant Çorba Formülasyonu İçin Kodo Darısı ve Yeşil Gram Unlarının Optimizasyonu

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Geliş Tarihi/Received 01.01.2026  
Revizyon Talebi/Revision  
Requested 25.03.2026  
Son Revizyon/Last Revision 26.03.2026  
Kabul Tarihi/Accepted 31.03.2026  
Yayın Tarihi/Publication  
Date 06.04.2026

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Cite this article: Lamichhane, S., (2026).  
Optimization of Kodo Millet Flour and  
Green Gram Flour for Formulation of  
Instant Soup. *Food Science and  
Engineering Research*, 5(1), 22-28.



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### ABSTRACT

This study aimed to develop and evaluate instant soup formulations using kodo millet and mung bean in varying ratios to produce a nutritionally balanced and convenient plant-based product. Five formulations (A–E) were prepared and analyzed for proximate composition, physicochemical properties, and sensory acceptability. Increasing mung bean content significantly enhanced protein content (7.22–23.02 g/100 g), while kodo millet contributed higher carbohydrate (67.94–84.86 g/100 g) and dietary fiber (3.70–7.80 g/100 g). Physicochemical analysis showed that water absorption capacity (1.95–3.05 g/g) and rehydration ratio (1.71–1.92) increased with higher mung bean incorporation, whereas bulk density (0.54–0.68 g/mL) was higher in kodo millet–dominant formulations. Sensory evaluation using a 9-point hedonic scale revealed that formulation C (37.5% kodo millet and 37.5% mung bean) achieved the highest overall acceptability, indicating that a balanced cereal–legume ratio optimizes color, flavor, aroma, and taste. The results demonstrate that kodo–mung bean instant soup is a protein- and fiber-rich, functionally stable, and sensory-acceptable product, highlighting its potential as a convenient, nutritious, and commercially viable plant-based food.

**Keywords:** Kodo millet, mung bean, instant soup, proximate composition, sensory evaluation, functional food

### ÖZ

Bu çalışma, besinsel açıdan dengeli ve pratik bir bitki bazlı ürün elde etmek amacıyla, farklı oranlarda kodo darısı ve maş fasulyesi kullanılarak instant çorba formülasyonlarının geliştirilmesi ve değerlendirilmesini amaçlamıştır. Beş farklı formülasyon (A–E) hazırlanmış ve proksimat bileşim, fizikokimyasal özellikler ile duyuşal kabul edilebilirlik açısından analiz edilmiştir. Maş fasulyesi oranındaki artışın protein içeriğini önemli düzeyde artırdığı (7.22–23.02 g/100 g), buna karşılık kodo darısının daha yüksek karbonhidrat (67.94–84.86 g/100 g) ve diyet lifi (3.70–7.80 g/100 g) katkısı sağladığı belirlenmiştir. Fizikokimyasal analizler, su tutma kapasitesi (1.95–3.05 g/g) ve rehidrasyon oranının (1.71–1.92) artan maş fasulyesi ilavesiyle yükseldiğini, buna karşın yığın yoğunluğunun (0.54–0.68 g/mL) kodo darısı ağırlıklı formülasyonlarda daha yüksek olduğunu göstermiştir. 9 puanlı hedonik skala kullanılarak gerçekleştirilen duyuşal değerlendirme sonucunda, C formülasyonunun (%37.5 kodo darısı ve %37.5 maş fasulyesi) en yüksek genel kabul edilebilirlik değerine ulaştığı ve dengeli bir tahıl–baklagil oranının renk, lezzet, aroma ve tat açısından optimum sonuç verdiği belirlenmiştir. Elde edilen bulgular, kodo darısı–maş fasulyesi esaslı instant çorbanın protein ve lif açısından zengin, fonksiyonel olarak stabil ve duyuşal açıdan kabul edilebilir bir ürün olduğunu ortaya koymakta; bu ürünün pratik, besleyici ve ticari açıdan uygulanabilir bir bitki bazlı gıda alternatifi olma potansiyelini vurgulamaktadır.

**Anahtar Kelimeler:** Kodo darısı, maş fasulyesi, hazır çorba, proksimat bileşim, duyuşal değerlendirme, fonksiyonel gıda

## Introduction

The twenty-first century is marked by increasing challenges such as climate change, water scarcity, rapid population growth, and rising food prices, which have intensified concerns regarding global food and nutritional security, particularly in arid and semi-arid regions (Kulkarni et al., 2018). Concurrently, changes in lifestyle have increased reliance on convenience foods, many of which are produced using refined flours that are deficient in dietary fiber and essential minerals, thereby limiting their contribution to overall human health (Saxena et al., 2018). In response to these concerns, there is growing interest in the development of nutritionally enriched convenience foods using traditional and climate resilient crops. Millets are recognized for their superior nutritional composition, including high levels of dietary fiber, protein, essential amino acids, vitamins, and minerals, along with health-promoting properties such as reduced risk of diabetes and cardiovascular diseases (Das & Rakshit, 2016). Instant foods are convenient food products that are easy and quick to prepare besides being hygienic, free from microbial contamination (Tamlurkar, 2006). As most of the convenience foods are made up of refined flour which are devoid of many nutrients especially minerals and fiber, they do not contribute to overall wellbeing of human (Saxena et al., 2018). Millets are important nutritional bio sources due to its richness in starch, protein, fiber, niacin, magnesium, phosphorus, manganese, iron, potassium, essential amino acids and vitamin E. In addition to being as a good source of nutrients, millets have various therapeutic benefits such as prevention of heart diseases, diabetes, migraine, cancer and gastro intestinal diseases (Das & Rakshit, 2016).

Green gram (*Vigna radiata* L.) is an important pulse crop widely cultivated in Asia and other tropical regions and is valued for its high protein content, digestibility, and nutritional quality (Niththiya et al., 2014). Instant soup mixes provide a convenient and effective means of delivering balanced nutrition due to their ease of preparation, rapid reconstitution, and extended shelf life without the need for preservatives or refrigeration (Sudarsan et al., 2017). Kodo millet (*Paspalum scrobiculatum* L.) contains approximately 11% protein and is rich in dietary fiber, iron, and antioxidants, which enhances its functional and nutritional potential compared to several other cereals (Deshpande et al., 2015). Instant soup mixes based on millets play an important role in balancing the nutrients required for the people to stay healthy with added convenience (Sudarsan et al., 2017). The advantages of dehydrated foods, particularly, dry soup mixes could act as a protection from enzymatic and oxidative spoilage and flavor stability at room temperature

over a long period of time. Also, they do not need any preservatives or refrigerator to preserve them. It has high nutritive value particularly it is rich in Fiber and Vitamin-C (Sudarsan et al., 2017). Commercial instant soup powders are typically formulated using refined flours and starches, often low in dietary fiber, micronutrients, and bioactive compounds (Anita et al., 2016). Therefore, this study aimed to develop an instant soup mix by incorporating kodo millet flour and green gram flour in different proportions, evaluate its proximate composition, physicochemical properties and sensory acceptability, and identify the optimum formulation.

## Material and Methods

### Raw Material

The materials consisted of kodo millet, green gram, spices (onion powder and garlic powder) and vegetables (carrot, green peas and tomato) were collected from local store of Pokhara.

### Preparation of Kodo Millet and Green Gram Flour

Kodo millet and green gram grains weighing 100 g were soaked separately in fresh water for 12 hours. After soaking, the grains were thoroughly washed under running water to remove any residual dirt, debris, or husk fragments. The cleaned grains were drained and roasted in a preheated pan at 120 °C for 10 minutes with constant stirring. After roasting, the grains were cooled to room temperature, finely ground and stored in an air tight plastic container for further analysis (AOAC, 2005).

### Preparation of Dehydrated Vegetables

Fresh green peas and carrots were cleaned under running water to remove soil, debris, and any surface contaminants. The green peas were shelled, and the carrots were peeled. The vegetables were blanched in boiling water at 100 °C for 3 minutes and immediately cooled in cold water. The cooled vegetables were cut into small, uniform pieces and dried in a tray drier at 50 °C for 24 hours. After drying, the dehydrated vegetables were coarsely ground and stored in an air tight plastic container for further analysis (Ranganna, 2001).

### Preparation of Spice Powder with Tomato

Fresh tomatoes were cleaned under running water to remove any dirt or impurities. The cleaned tomatoes were dried in a tray drier at 50 °C for 24 hours. The dried tomatoes, along with other selected spices, were sorted to remove any foreign matter. The cleaned and dried spices, including the dehydrated tomatoes, were ground into a fine powder using a high-efficiency grinder and sieved to remove any coarse particles (Kulkarni et al., 2018).

### Preparation of Soup

All ingredients including dehydrated vegetables, flours, onion powder, garlic powder, and salt were accurately weighed according to the formulation. The seasonings and dehydrated vegetables were combined, followed by

thorough mixing with the prepared flour to achieve a homogeneous blend. The formulated soup mix was packed in airtight containers to prevent moisture absorption and preserve quality (Anita et al., 2016). The sample formulation is presented in Table 1.

**Table 1.**

*Sample formulation*

S.No	Ingredients (g/100g)	A	B	C	D	E
1	Millet flour	75	56.250	37.5	18.75	0
2	Green gram flour	0	18.75	37.5	56.25	75
3	Salt	5	5	5	5	5
4	Black pepper	1.875	1.875	1.875	1.875	1.875
5	Dried tomato powder	6.25	6.25	6.25	6.25	6.25
6	Dehydrated carrot	3.75	3.75	3.75	3.75	3.75
7	Dehydrated green peas	2.5	2.5	2.5	2.5	2.5
8	Onion powder	3.125	3.125	3.125	3.125	3.125
9	Garlic powder	2.5	2.5	2.5	2.5	2.5

### Proximate analysis

The moisture content, crude fat, crude protein, crude fiber, total ash and carbohydrate was determined as per AOAC (2005).

### Determination of Physical Properties

#### Water absorption capacity

A total of 3 g of sample was added to the centrifuge tube with 25 ml distilled water and the mixture was centrifuged at 5,000 rpm for 25 min with occasional stirring. After centrifugation, the supernatant was discarded and the sediment pellet were kept at 50 °C for 25 min. WHC was calculated as

WHC

$$= \frac{\text{wt. of centrifuge tube plus sediments} - \text{wt of centrifuge tube plus sample}}{\text{weight of sample}} \times 100\%$$

(Howarth et al., 2001).

#### Bulk density

Bulk density was calculated as mass of the sample taken to the volume occupied by the same mass of sample (Karuna et al., 1996).

#### Rehydration ratio

Two grams of the dried samples were rehydrated in 20 ml distilled water. In water bath, at constant temperature, the samples were agitated at constant speed (100 rpm). The samples were taken from the water bath after 10 minutes and were weighted after being blotted with tissue

paper in order to remove the excess water. Rehydration ratio was calculated as

$$\text{Rehydration ratio} = \frac{\text{Final weight of sample (g)}}{\text{Initial weight of sample (g)}} \times 100\%$$

(Singh & Prasad, 2015).

### Sensory analysis

Soups were evaluated by semi-trained panelists including teachers, students and staff of Pokhara Bigyan Tatha Prabidhi Campus, using a 9-point hedonic scale for color, taste, flavor, and overall acceptability (Mehta et al., 2005).

### Statistical Analysis

All the experiments were performed in triplicate. The result was evaluated by using analysis of variance (ANOVA) by using statistical software SPSS version 20 at 5% level of significance (Dahiya et al., 2021).

## Results and Discussion

### Proximate Composition of Kodo Millet Flour and Green Gram Flour

Proximate analysis was conducted to assess the nutritional composition of instant soup formulations prepared using roasted kodo millet and mung bean in varying proportions. Five formulations (A-E) were developed by altering the cereal-legume ratio while keeping other ingredients constant is shown in Table 2. The results revealed significant differences ( $p < .05$ ) among the formulations for all proximate parameters, demonstrating

that the proportion of kodo millet and mung bean had a pronounced effect on the nutritional quality of the instant soup powders. Moisture content ranged from  $4.68 \pm 0.008$  to  $5.86 \pm 0.008$  g/100 g, with all formulations exhibiting low moisture levels, which is desirable for instant soup powders due to improved shelf stability. Similar moisture ranges have been reported in roasted cereal–legume soup mixes by Ijarotimi and Keshinro (2013) and Ojha et al. (2020), supporting the effectiveness of roasting and drying processes in reducing moisture content. The total ash content showed a progressive increase from  $1.21 \pm 0.008$  g/100 g in formulation A to  $3.10 \pm 0.008$  g/100 g in formulation E, indicating enhanced mineral content with increasing mung bean incorporation. This trend is consistent with previous studies on cereal–legume blends, where legume inclusion significantly improved ash content due to higher mineral contribution (Ijarotimi & Keshinro, 2013; Olapade et al., 2015).

Crude fat content ranged from  $0.95 \pm 0.008$  to  $1.98 \pm 0.008$  g/100 g and showed a decreasing trend with increasing mung bean proportion, while all formulations remained within a low-fat range. Similar reductions in fat content with increasing legume incorporation have been reported in instant soup formulations by Ojha et al. (2020). Crude fiber content decreased from  $7.80 \pm 0.013$  g/100 g in formulation A to  $3.70 \pm 0.008$  g/100 g in formulation E, reflecting the influence of formulation composition on dietary fiber levels. Comparable trends were observed by Patil et al. (2021) in millet-based composite food products, where formulations with higher millet content exhibited greater fiber levels. Statistical analysis confirmed significant differences ( $p < .05$ ) among all formulations, demonstrating that fiber and fat content can be effectively modified through formulation design.

A marked improvement in crude protein content was observed with increasing mung bean incorporation, ranging from  $7.22 \pm 0.013$  g/100 g in formulation A to  $23.02 \pm 0.008$  g/100 g in formulation E. This progressive increase highlights the effectiveness of cereal–legume blending in enhancing protein content of instant soups, a finding that aligns with reports by Dahiya et al. (2021) and Ijarotimi and Keshinro (2013) on legume-fortified food products. Conversely, total carbohydrate content decreased from  $84.86 \pm 0.013$  g/100 g to  $67.94 \pm 0.010$  g/100 g as mung bean proportion increased, reflecting the inverse relationship between protein and carbohydrate levels

commonly reported in composite food formulations (Ojha et al., 2020). Overall, the results demonstrate that adjusting the kodo millet–mung bean ratio enables the development of nutritionally balanced, plant-based instant soups with improved protein and mineral content while maintaining desirable fiber and carbohydrate levels, consistent with findings reported in similar cereal–legume-based soup products.

### Physical Analysis

Physicochemical analysis of the instant soup formulations prepared from roasted kodo millet and mung bean revealed significant differences ( $p < .05$ ) in water absorption capacity (WAC), bulk density, and rehydration ratio among formulations A–E is shown in Table 3. Water absorption capacity ranged from  $1.95 \pm 0.01$  to  $3.05 \pm 0.01$  g/g, with the highest value observed in mung bean–dominant formulation E. This increase can be attributed to the higher protein and soluble dietary fiber content of mung bean, which enhances water binding and retention during rehydration. Similar WAC values (2.8–3.2 g/g) for legume-rich flours were reported by Mehta et al. (2005), while Howarth et al. (2001) also noted improved hydration properties with increased fiber incorporation. In contrast, kodo millet–rich formulations showed comparatively lower WAC, consistent with findings by Patil et al. (2021) and Dahiya et al. (2021), who reported lower water absorption in cereal-dominant products due to reduced protein and soluble fiber content.

Bulk density values varied from  $0.54 \pm 0.01$  to  $0.68 \pm 0.01$  g/ml, with higher densities observed in kodo millet–dominant formulations and lower densities in mung bean–rich formulations. The reduced bulk density of formulation E suggests a more porous structure, which is advantageous for instant food products as it facilitates faster rehydration. This observation agrees with Karuna et al. (1996), who reported that bulk density is influenced by particle size, packing behavior, and flour composition, with legume flours generally producing more porous structures. Rehydration ratio followed a similar trend, increasing from  $1.71 \pm 0.01$  in formulation A to  $1.92 \pm 0.01$  in formulation E, reflecting improved water uptake and swelling capacity with higher mung bean incorporation. These values fall within the range reported for cereal–legume instant foods by Singh et al. (2015) and Adegunwa et al. (2012), confirming the reliability of the results.

**Table 2.**

*Proximate analysis of instant soup formulations prepared from roasted kodo millet and mung bean (A–E) (g/100g).*

Parameters	A	B	C	D	E
Moisture	4.75±0.008	5.86±0.008	4.94±0.005	4.68±0.008	4.98±0.008
Total ash	1.21±0.008	1.62±0.008	2.13±0.008	2.55±0.008	3.1±0.008
Crude fat	1.98±0.008	1.70±0.008	1.42±0.008	1.13±0.008	0.95±0.008
Crude fiber	7.80±0.013	6.10±0.008	5.75±0.008	5.14±0.008	3.7±0.008
Crude protein	7.22±0.013	11.11±0.008	15.36±0.008	19.69±0.008	23.02±0.008
Carbohydrate	84.86±0.013	79.72±0.017	76.15±0.008	71.9±0.005	67.94±0.01

\*values are the means of triplicates and ± figures in the standard deviation of the triplicates. Means using the different superscript in the same row are significantly different ( $p < .05$ ) and row having same superscript are significantly same ( $p > .05$ ).

**Table 3.**

*Physicochemical analysis of instant soup formulations prepared from roasted kodo millet and mung bean (A–E) (g/100g). (values expressed on dry basis except moisture content)*

Parameters (%)	A	B	C	D	E
Water absorption capacity	2.55±0.01	1.95±0.01	2.55±0.01	2.15±0.01	3.05±0.01
Bulk density	0.63±0.01	0.68±0.01	0.59±0.01	0.65±0.01	0.54±0.01
Rehydration ratio	1.71±0.01	1.74±0.01	1.82±0.01	1.89±0.01	1.92±0.01

### Sensory Analysis

Sensory evaluation of the five kodo–mung bean instant soup formulations (A–E) was carried out using a 9-point hedonic scale to assess color, flavor, aroma, taste, and overall acceptability is shown in Figure 1. For preparation, 200 ml of water was boiled for 5 minutes, and 20 g of each soup powder was added and cooked to serve freshly prepared soup to the panelists. Water was provided for rinsing the mouth between samples to prevent carryover effects. The evaluation was conducted by ten semi-trained panelists under controlled preparation and serving conditions to ensure uniformity and minimize bias. Statistical analysis revealed significant differences ( $p < .05$ ) among the formulations for all sensory attributes, indicating that variation in the kodo millet–mung bean ratio significantly influenced sensory perception.

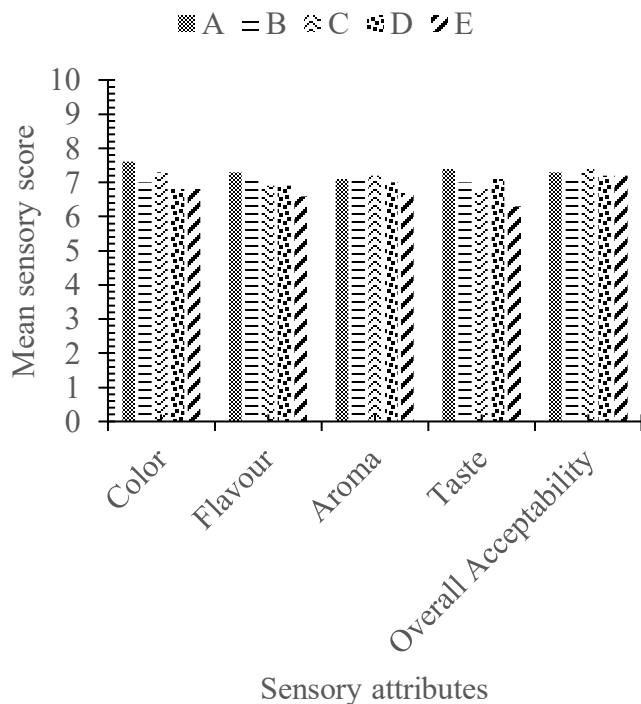
Color scores ranged from 6.8 to 7.6, with formulation A (75% kodo millet) receiving the highest score, suggesting that higher kodo millet content contributed to a more visually appealing product. Flavor scores varied from 6.6 to 7.3, with kodo-dominant formulations receiving higher ratings, while increasing mung bean incorporation resulted in slightly lower flavor acceptability. Aroma scores ranged from 6.7 to 7.2, with formulation C (37.5% kodo millet and 37.5% mung bean) recording the highest score, indicating that a balanced cereal–legume ratio produced a more acceptable aromatic profile. Taste scores ranged from 6.3 to 7.4, with formulation A receiving the highest rating, whereas mung bean-dominant formulation E showed comparatively lower acceptability.

Overall acceptability scores ranged from 7.2 to 7.4, with formulation C achieving the highest mean score, demonstrating that a balanced proportion of kodo millet

and mung bean provided the most favorable combination of sensory attributes. Although kodo-dominant formulations scored higher for individual attributes such as color and taste, the balanced formulation offered better overall sensory harmony. These results indicate that optimization of the kodo millet–mung bean ratio is essential for developing instant soup formulations with improved sensory quality and consumer acceptability.

**Figure 1.**

Mean sensory score for color, flavor, texture, texture and overall acceptability



## Conclusion

The present study evaluated the nutritional, functional, and sensory characteristics of instant soup formulations developed from varying proportions of kodo millet and mung bean. Proximate analysis revealed that increasing mung bean content significantly enhanced protein levels, while kodo millet contributed higher carbohydrate and fiber content, allowing the development of nutritionally balanced formulations. Physicochemical evaluation showed that water absorption capacity and rehydration ratio increased with higher mung bean content, whereas bulk density was higher in kodo millet–dominant formulations, indicating that ingredient composition strongly influences functional properties. Sensory analysis demonstrated that formulation C (37.5% kodo millet and

37.5% mung bean) achieved the highest overall acceptability, suggesting that a balanced cereal–legume ratio provides the optimal combination of color, flavor, aroma, and taste. Overall, the study concludes that kodo–mung bean instant soup is a protein- and fiber-rich, nutritionally balanced, and functionally stable product with favorable sensory qualities. These findings highlight the potential of cereal–legume blending to develop convenient, plant-based instant soups suitable for consumer consumption and commercialization.

**Hakem Değerlendirmesi:** Dış bağımsız.

**Yazar Katkıları:** Fikir- S.L; Tasarım- S.L.; Denetleme- S.L.; Kaynaklar- S.L.; Veri Toplanması ve/veya İşlemesi- S.L.; Analiz ve/ veya Yorum- S.L.; Literatür Taraması- S.L.; Yazıyı Yazan-B.K.; Eleştirel İnceleme- S.L.

**Çıkar Beyanması:** Yazar herhangi bir çıkar çatışması veya çıkar çatışması belirtmez.

**Finansal Destek:** Bu araştırma lisans tezinin bir parçası olarak yapılmış ve herhangi bir dış maddi destek görmemiştir.

**Yapay Zeka Kullanımı:** Yapay zeka araçları (ChatGpt) yalnızca dil düzenleme ve dilbilgisi geliştirme için kullanıldı. Yazar, el yazmasının içeriği, özgünlüğü ve bütünlüğünden tam sorumluluğu üstlenir.

**Peer-review:** Externally peer-reviewed.

**Ethics Committee Approval:** Formal ethics committee approval was not obtained. However, the study involved minimal risk, and all procedures were conducted in accordance with ethical research principles.

**Informed Consent:** Informed consent was obtained from all participants prior to their participation in the study.

**Author Contributions:** Concept – S.L; Design – S.L; Supervision – S.L; Resources – S.L; Materials – S.L; Data Collection and/or Processing – S.L; Analysis and/or Interpretation – S.L; Literature Search – S.L; Writing Manuscript – S.L; Critical Review – S.L; Other – S.L

**Declaration of Interests:** The author declares no conflict or interest.

**Funding:** This research was conducted as a part of a bachelore's thesis and did not receive any external financial support.

**Use of Artificial Intelligence:** Artificial intelligence tools (ChatGpt) were used solely for language editing and grammar improvement. The author takes full responsibility for the content, originality and integrity of manuscript.

## References

- AOAC. (2005). *Official methods of analysis of AOAC International* (18th ed.). AOAC International.
- Anita, S., Sameshwari, T., & Kalpana, B. (2016). Formulation and evaluation of instant soup powder using millets. *International Journal of Current Research*, 8(8), 35668–35673.
- Dahiya, P., Linnemann, A., Nout, M. J. R., & Van Boekel, M. A. J. S. (2021). Nutritional, phytochemical and antioxidant properties of 24 mung bean genotypes. *Food Production, Processing and Nutrition*, 3(21), 1–12.
- Das, I. K., & Rakshit, S. (2016). Millets, their importance, and production constraints. In *Biotic Stress Resistance in Millets* (pp. 3–19).

- Deshpande, S. S., Mohapatra, D., Tripathi, M. K., & Sadvatha, R. H. (2015). Kodo millet nutritional value and utilization in Indian foods. *Journal of Grain Processing and Storage*, 2(2), 16–23.
- Howarth, G. S., Wallace, J. M., & Elliott, R. (2001). Influence of fiber-rich ingredients on water-holding capacity and functional properties of food products. *Journal of Food Science*, 66(3), 340–344.
- Karuna, S., Reddy, K. S., & Rao, P. V. (1996). Functional properties of cereal and legume flours: Bulk density and its implications for processing. *Journal of Food Science and Technology*, 33(4), 271–275.
- Kulkarni, D. B., Sakhale, B. K., & Giri, N. A. (2018). A potential review on millet grain processing. *International Journal of Nutritional Sciences*, 3(1), 1–8.
- Mehta, M., Sathe, S. K., & Salunkhe, D. K. (2005). Functional properties of legume flours and protein concentrates. *Critical Reviews in Food Science and Nutrition*, 45(5), 375–387.
- Niththiya, N., Vasantharuba, S., Subajini, M., & Srivijeindran, S. (2014). *Formulation of instant soup mix powder using uncooked palmyrah (Borassus flabellifer) tuber flour and locally available vegetables*. In Proceedings of the International Research Conference.
- Olapade, A. A., Babalola, K. A., & Aworh, O. C. (2015). Evaluation of plantain and cowpea blends for complementary foods. *Journal of International Scientific Publications: Agriculture and Food*, 3, 274–288.
- Patil, A. V., Bharati, P., & Math, K. K. (2021). Processing kodo millet (*Paspalum scrobiculatum*) to obtain low fibre flour. *The Pharma Innovation Journal*, 10(12), 729–735.
- Ranganna, S. (2001). *Handbook of analysis and quality control for fruits and vegetable products* (2nd ed.). Tata McGraw-Hill Publishing.
- Saxena, D. M., Pathak, A., Mahor, G. R., Mahor, R., & Agarwal, A. (2018). Effectiveness of nutritional interventions on children with severe acute malnutrition admitted in nutrition rehabilitation centers of Bhopal, Madhya Pradesh. *International Journal of Community Medicine and Public Health*, 5(6), 2590–2595.
- Singh, Y., & Prasad, K. (2015). Sorption isotherms modeling approach of rice-based instant soup mix stored under controlled temperature and humidity. *Cogent Food and Agriculture*, 1(1), 1103683.
- Sudarsan, M., Santhanam, S. G., & Visalachi, V. (2017). Development and formulation of instant soup mix from sprouted horse gram and radish leaves. *International Journal of Home Science*, 3(1), 346–349.
- Tamlurkar, V. (2006). *Role of instant foods in the catering industry*. *Marketing Mastermind Magazine*. [https://www.iupindia.in/1206/MM\\_Role\\_of\\_Instant\\_Food\\_in\\_Catering\\_industry\\_33.html](https://www.iupindia.in/1206/MM_Role_of_Instant_Food_in_Catering_industry_33.html)