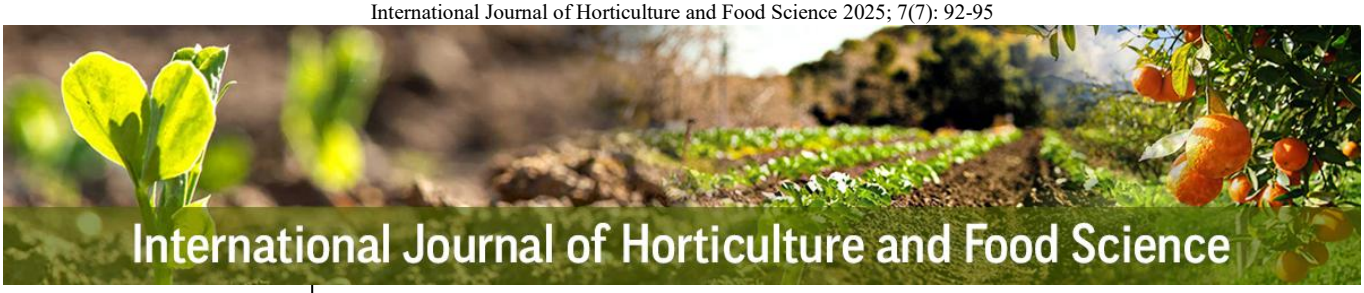


E-ISSN: 2663-1067
P-ISSN: 2663-1075
NAAS Rating (2025): 4.74
www.hortijournal.com
IJHFS 2025; 7(7): 92-95
Received: 11-05-2025
Accepted: 14-06-2025

Nitin Nivrutti Talpade
Professor, Department of Food Chemistry & Nutrition, K.K. Wagh College of Food Technology, MPKV Rahuri, Nashik, Maharashtra, India

Saurabh Sanjay Bankar
Professor, Department of Food Plant Operation, K.K. Wagh College of Food Technology, MPKV Rahuri, Nashik, Maharashtra, India

Nitin G Devshete
Department of Food Process Technology, K.K. Wagh College of Food Technology, MPKV Rahuri, Nashik, Maharashtra, India

Arpita B Apsunde
Professor, Department of Food Chemistry & Nutrition, K.K. Wagh College of Food Technology, MPKV Rahuri, Nashik, Maharashtra, India

Corresponding Author:
Nitin Nivrutti Talpade
Professor, Department of Food Chemistry & Nutrition, K.K. Wagh College of Food Technology, MPKV Rahuri, Nashik, Maharashtra, India

Development and standardization of composite flour pasta incorporated with quinoa (*Chenopodium quinoa*) and garden cress seed (*Lepidium Sativum* L.)

Nitin Nivrutti Talpade, Saurabh Sanjay Bankar, Nitin G Devshete and Arpita B Apsunde

DOI: https://www.doi.org/10.33545/26631067.2025.v7.i7b.340

Abstract
The present study focuses on developing and standardizing a health-oriented composite flour pasta enriched with quinoa (*Chenopodium quinoa*) and garden cress seeds (*Lepidium sativum* L.), alongside wheat flour and green gram. Designed for health-conscious individuals seeking nutrient-rich, convenient food options, this innovative pasta aims to provide balanced nutrition. Four formulations (T_0, T_1, T_2, T_3) were prepared with varying ratios of quinoa flour, wheat flour, green gram flour, and garden cress seed powder: 00:76:24:00, 40:35:24:01, 35:40:24:01, and 30:45:24:01, respectively. Sensory evaluation identified T_1 (40:35:24:01) as the most preferred formulation. Proximate analysis of T_1 revealed a nutrient profile of 10.9% moisture, 3.49% fat, 7.88% protein, 75.8% carbohydrates, 1.6% fiber, and 1.05% ash per 100g. With excellent sensory and textural properties, T_1 demonstrates promising potential as a nutritious, quick-preparation food choice for health-conscious consumers.

Keywords: Quinoa, garden cress seeds, whole wheat flour, green gram, pasta

Introduction
Pasta is one of the most common and popular staple foods because of its sensory and nutritional value, convenience, and versatility. According to Italian law, “dried pasta” must be produced with water and durum wheat. Although in the rest of the world (except for France and Greece) common wheat (*Triticum aestivum* L.) can be used for pasta production, it is well-known that only durum semolina can assure the best product quality, in terms of dough rheological properties, cooking quality and consumer acceptance. One of the main reasons for the success of pasta is its nutritional profile. Indeed, pasta generally is very nutritious, due to its low amount of fats and readily digestible carbohydrates. The low cost and long shelf life of pasta make it popular with many diverse groups of consumers (Bresciani *et. al.,* 2022) [1]. Production and origin: 165 million tons of pasta was produced in the world in 2020. The highest production of pasta is in European countries. Pasta is an ancient ready to eat product made from durum wheat, water by using a high-capacity cold extruder with different types of dyes to ensure different shapes of product (Kumar *et. al.,* 2021) [3].

Quinoa (*Chenopodium quinoa*) is pseudo cereal native to the Andean regions South America is receiving increasing attention because of the nutritional value of its protein. Quinoa is important subsidiary grain crop for human and animal foodstuff due to high-protein and a balanced amino-acid spectrum with high lysine (5.1-6.4%) and methionine (0.4-1.0%) contents. Quinoa has been an important food grain source in Andean region of South America since 3000 B.C. and occupied a place of prominence in the Inca Empire only next to the maize. The seed protein content is high (about 15%), and its essential amino acid balance is excellent because of a wider amino acid spectrum than cereals and legumes, with higher lysine (5.1-6.4%) and methionine (0.4-1.0%) contents (1-3) and minerals but also as source of antioxidants. It has highest content of bioactive compounds compared to other cereals and pseudocereals (Abugoch *et al*., 2008) [11]. Minerals in quinoa are found in outer bran layers at concentrations greater than that reported for most grain crops. Iron (81 mg/kg), calcium (874 mg/kg) and phosphorus levels are higher in quinoa than those of maize and barley (Tanvar et. al., 2015) [4].

There are different phytochemicals are found in quinoa seed such as phenolic compound as tannins with values varying from 0 to 500 mg/100 g, flavonoids, 0.1-1.0% phytic acid and saponins between 0.03 and 2.05% of bitter tasting saponins and the saponification process can remove 72% of saponins content in seeds.

Garden cress seeds (*Lepidium sativum* L.) are loaded with nutrition. It is an important source of iron, folic acid, calcium, vitamins C, E and A. It is a rich source of iron 'containing 100 mg iron/100g. They are high in calories. It has about 454 kcal and 33 gram of carbohydrate per 100 gram with a protein content of 25.3grams. It is often given postpartum to lactating mothers. It has low fat of 24.5 g, when compared with other nuts and oilseeds. It contains minerals like calcium, phosphorus (Talpade *et al*., 2018) [10].

Wheat (*Triticum aestivum* L.) is the most extensively grown cereal crop in the world, covering about 237 million hectares annually, and accounting for a total of 420 million tonnes and for at least one-fifth of man's calorie intake. It contains carbohydrate 78.10%, protein 14.70%, fat 2.10%, minerals 2.10% and considerable proportions of vitamins (thiamine and vitamin-B) and minerals (zinc, iron). Wheat is also a good source of traces minerals like selenium and magnesium, nutrients essential to good health. (Gollen *et. al.,* 2011) [7].

Green gram (*Vigna radiata* L.) is one of the major legumes and is frequently used in Asian countries. It is widely used in making dhals (decorticated split halves), infant foods, snacks, etc. (Veena and Bhattacharya, 2011) [8]. It is an excellent source of digestible protein, with a higher lysine content than any other legume, and is free from factors that cause flatulence (Bhosale *et al.,* 2021) [9]. In Southeast Asian countries, many traditional foods are also made from green gram after blending with cereals though it is popularly consumed as cooked thick gruel which is part of major meals (Veena and Bhattacharya, 2011) [8]. Mung bean flour is starchy gluten free fine grain flour that has many uses in the Asian countries such as China, India, Pakistan, Japan, etc. This fine gluten-free flour is used in combination with other flours or on its own, depending on the end product. Because of its starch content, it holds the foods well (Chandra and Samsher, 2013) [2]. Mung bean contains 26.4g protein, 0.72g non-protein nitrogen, 4.5g ash, 1.75g fat, 6.15 crude fiber, and 61.2g carbohydrates in 1005 on dry weight basis. The green gram is a source of protein, carbohydrates, amino acids and minerals. Green gram-based products are used for diabetic patients, children, aged people because it is easy for digestion (Bhosale *et al.,* 2021) [9].

Materials and Methods

This study was conducted in the Department of Food Chemistry and Nutrition at K.K. Wagh College of Food Technology, affiliated with Mahatma Phule Krishi Vidyapeeth, Nashik, Maharashtra. The research focused on developing a novel product using a composite flour blend comprising quinoa, garden cress seeds, whole wheat, and green gram. The raw materials, including quinoa, garden cress seeds, whole wheat, green gram, oil, and salt, were sourced from local markets and confectionery outlets in Nashik.

Methodology

Standardization and formula for preparation of High Protein Biscuit: For standardization of formula, various combination composite flour pasta was used and acceptable product was selected for further utilization. Composite flour (Quinoa, Garden cress seeds, Whole Wheat, Green gram) was extruded with water and oil and salt for taste and dough was prepared. The other ingredients were kept constant throughout the treatments.

Table 1: Standardization of Formula (ingredients g/100 gm) for preparation of pasta

Ingredients	Treatments			
	T_0	T_1	T_2	T_3
Wheat Flour	76	35	40	45
Green Gram Flour	24	24	24	24
Quinoa Flour	-	40	35	30
Gardencress Seed Powder	-	1	1	1

Organoleptic evaluation of Pasta

Ten semi-trained panelists carried out a sensory evaluation of composite flour pasta and compared with the control samples. At the start the subjects described two very different pasta (Control and Composite flour pasta) and mainly focused on the texture change. Then, the most frequently cited attributes were selected, and their definitions and the protocols scoring them were developed. Next, the panelists were given a score sheet to evaluate sensory attributes, namely, color, taste, texture, flavor, and overall acceptability, and asked to score samples on 9 point hedonic scale to rate the quality of Composite flour pasta respectively (Talpade, *et al*., 2018) [10].

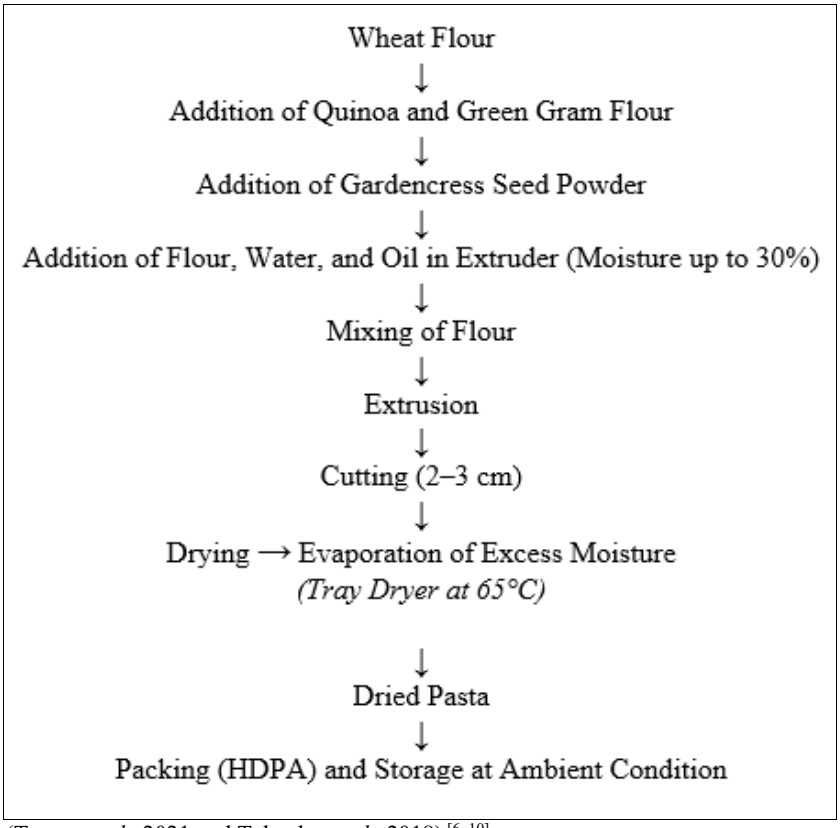
Preparation of Pasta

The process for preparation of composite flour pasta incorporated with quinoa and garden cress seed was followed by (Torres *et al.,* 2021) [6]. For preparation of pasta, the saponification process was carried out due to saponin compounds located in the pericarp seed. The saponification process of the quinoa seeds prior to elaborating the flour was carried out by applying a moist method, which consisted in manually washing with cold water and water at boiling temperature for 60 min. Thereafter, the seeds were placed in aluminum trays at 50° C in a tray dryer for 24 h. After the heat treatment, the seeds were ground in a knife mill (GRINDOMIX GM 200, Retsch) with a 0.5 mm stainless steel sieve to obtain the flour.

Finally, the dry flour was kept in a sealed polyethylene bag and stored at room temperature (25° C) (Torres *et al.,* 2021) [6]. Garden cress were roasted at 120°C for 5 mins and then then grinded into fine powder (Talpade, *et al*., 2018) [10]. The green gram and whole wheat are ground into flour. Three formulations were prepared in the following proportions T_1, T_2, T_3 respectively and T_0 for control sample as shown in Table 1.

Pasta elaboration

All pasta samples were prepared according to (Torres *et al.,* 2021 Kumar *et al.,* 2021) [6, 3] with modifications. For each trial the dry ingredients were combined into a homogenous mixture. 250gm of composite flour, salt and water are mixed for 15 min. The dough was shaped through the die to obtain pasta in a home pasta extruder. Pasta was then dried at 60-65°C temperature for 8 hours.



(Torres *et al.,* 2021 and Talpade, *et al*., 2018) [6, 10]

Flow Chart 1: Processing technology for preparation of Pasta

Results and Discussion

Sensory evaluation of Biscuits

The sensory evaluation were carried out of pasta data with respect to color, appearance, taste, flavor, texture and overall acceptability are depicted in Table No. 2 It can be revealed from the above Table 2 that the sensory evaluation scores given by the semi trained panelist showed that the textural scores were significantly decreasing from control sample to sample T_3. Appearance of control sample and sample T_1 was having similar score for appearance. When the data analyzed statistically it was found that control sample and sample T_1 was significantly superior to the rest of the samples.

Parameter for 9-point Hedonic scale

Dislike extremely	Dislike very much	Dislike moderately	Dislike Slightly	Neither like nor dislike	Like slightly	Like Moderately	Like very much	Like extremely

Table 2: Mean sensory values for the Pasta

Sample	Color	Taste	Flavor	Texture	Appearance	Acceptability
T_0	8	7.5	8	9	8.1	8.1
T_1	8.1	8	8.5	7	7.9	7.9
T_2	7	6.9	7	8	7.2	7.2
T_3	6	7	6.8	7	6.8	6.7

*Each value an average of three determinations

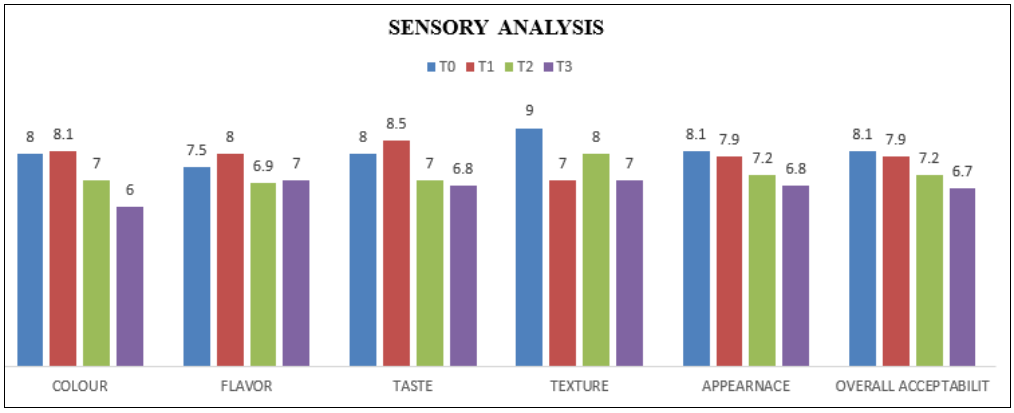


Fig 1: Graphical Representation of Sensory evaluation chart

References

1. Bresciani MA, Pagani A, Marti. Pasta-making process: A narrative review on the relation between process variables and pasta quality. Food Sci Technol. 2022;11:256.
2. Chandra S, Samsher L. Assessment of functional properties of different flours. Afr J Agric Res. 2013;8:4849-4852.
3. Kumar GS, Arunima SH, Krishnan R, Mohammed T. Pasta: raw materials, processing and quality improvement. Pharma Innov J. 2021;10(5):185-197.
4. Arneja I, Tanwar B, Chauhan A. Tritional composition and health benefits of golden grain of 21st century, Quinoa (*Chenopodium quinoa*). Pak J Nutr. 2015;14(12):1034-1040.
5. Vignola MB, Bustos MC, Pérez GT. Comparison of quality attributes of refined and whole wheat extruded pasta. LWT - Food Sci Technol. 2017;89:329-335.
6. Torres OL, Lema M, Galeano YV. Effect of using quinoa flour (*Chenopodium quinoa* Willd.) on the physicochemical characteristics of an extruded pasta. Int J Food Sci. 2021;2021:8.
7. Kumar P, Yadava RK, Gollen B, Kumar S, Verma RK, Yadav S. Nutritional contents and medicinal properties of wheat: A review. Life Sci Med Res. 2011.
8. Veena R, Bhattacharya S. Rheological characterization of raw and roasted green gram pastes. LWT - Food Sci Technol. 2011;46:260-266.
9. Bhosale SS, Agarkar BS, Kshirsagar RB, Patil BM. Studies on physicochemical properties of cereals (Rice, sorghum, finger millet, amaranth) and Pulses (Green gram, black gram and chickpea). Pharma Innov J. 2021;10(4):110-114.
10. Talpade NN, Pawar VS, Sontakke MD, Syed HM, Farooqui AS. Formulation and organoleptic evaluation of papad prepared with incorporation of gardencress seed powder (*Lepidium sativum* L.). J Pharmacogn Phytochem. 2018;7(2):2989-2992.
11. Abugoch LE, Romero N, Tapia CA, Silva J, Rivera M. Study of some physicochemical and functional properties of quinoa (*Chenopodium Quinoa* Willd) protein isolates. J Agric Food Chem. 2008.