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REVIEW PAPER

Comprehensive Review on Various Soup Premixes and its Functional Properties Related to Human Health

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ABSTRACT

Vegetable soups have become increasingly popular among consumers worldwide due to the wide range of raw materials (vegetable fruits, tubers, bulbs, leafy vegetables, and legumes) that can be used in their formulation, These soups are known to be a healthy source of nutrients, primarily proteins, dietary fiber, other carbohydrates, vitamins, and minerals, as well as bioactive compounds that may help maintain the body's health and wellness. Additionally, they are inexpensive, simple to prepare and preserve at home, and ready to eat. As a result, they are very helpful in modern life rhythms that alter current consumption habits and reclaim foods elaborated with natural ingredients, ecological, vegan, less invasive production processes, agroindustry co-products, and exploring new flavours and textures.

Keywords: Vegetable soups, consumers, nutrients, modern life, flavours, textures

Soup is a dish made by cooking meat or vegetables in stock to extract a flavourful liquid. It is frequently eaten as a snack or even suggested as a treatment when the patient is told to limit their intake to liquids (Divekar *et al.* 2025).

Food preparation, processing, and presentation are just a few of the fast-paced, practical parts of the modern lifestyle that many Indians lead, particularly those who live in large cities. It fosters a culture that values ready-to-eat and ready-to-cook food items. Functional soup is one product that could be converted into an instant food. Dried soups are essential for meeting consumer social needs. Food that has been dehydrated, particularly dry soup mixes, has several benefits, including protection from oxidative and enzymatic deterioration and the capacity to maintain flavour for up to a year at ambient temperature. They have a longer shelf-life without refrigeration, are high in protein, and have considerable nutritional value. Because they weigh less, they can be easily sent and are always available. Functional soup has the potential to become a breakfast substitute due to its ability to provide the body with the necessary energy and nutrients, ease of preparation, and quick serving time. For dried soups to be of high quality, supplemental additions, their useful characteristics, and their ratio are important considerations. For maintaining nutritive value whole, legumes and vegetables are added in it. Due to these needed carbohydrate, proteins, fiber and amino acids are provided Soup powders and its functional attributes provide health benefits. Due to limitation

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of plant proteins as deficiency of amino acids, can be maintained or fulfilled by mixing legume and vegetable flours together (Upadhyay *et al.* 2017).

In addition to cost, health, sensory appeal, and other associated considerations, convenience is a complex idea that is frequently cited as the primary determinant of the food of choice (Grunert, 2005). Nowadays, a lot of food producers use scientific methods to create the greatest product compositions. Additionally, convenience plays a bigger role in determining what, when, where, and how to eat. Because of this, there has been a noticeable rise in demand in recent years for minimally processed ready-to-eat or ready-to-cook items (Brunner *et al.* 2010).

HISTORY

The word soup originated from" sop", which traditionally consisted of a soup or thick stew that was soaked up with bits of bread, is where the word "soup" originated. One of the earliest soup varieties dates to around 6000 BC. In order to make soup, things like meat and vegetables are combined with stock or boiling water until the flavour is removed, creating a broth. Hippo soup was the earliest soup ever documented. Clear soups and thick soups are the two main categories into which soups are traditionally divided. Bouillon and consommé are the two recognized French categories for transparent soups. Cream soups are thickened with béchamel sauce; veloutés are thickened with eggs, butter, and cream; purées are vegetable soups thickened with starch; and bisques are produced from puréed shellfish thickened with cream. Grain, rice, and flour are other frequent ingredients used to thicken soups and broths. There are five primary types of soup: canned, frozen, chilled, dried, and UHT (Smith *et al.* 2012).

Dry soup mixes are suitable for both military rations and institutional use because of their low unit volume and extended storage life at room temperature. Soup powder refers to products made by mechanically dehydrating fresh vegetables, fruits, pulp, or puree of sound vegetables, fruits, and/or earlier concentrate, dehydrated, frozen, or processed fruits and vegetables, either alone or in combination by blending with salt, nutritive sweeteners, spices, condiments, and any other ingredients appropriate to the product, as well as packing them appropriately to prevent spoiling. Typically, the product has a moisture content (m/m) of no more than 5.0% and a total soluble solids content (m/m) of no less than 5.0% when diluted on a ready-to-serve basis (Chavan *et al.* 2024).

One of the first cooked dishes in human history is thought to be soup. Food historians (Karel *et al.* 1975) claim that soup originated when people first discovered how to cook food using water, heated stones, and crude vessels such clay pots and animal pelts. The primary purpose of early soups was to increase digestibility and nutrient availability. They were straightforward concoctions of water with roots, grains, leaves, or meat herbs and vegetables. Due to its affordability, ease of preparation, and capacity to feed huge populations, soup became an essential component of daily diets across nations as civilizations evolved. All social strata frequently ate soups and broths in ancient societies like China, Mesopotamia, Greece, and Rome. Soups were utilized for both nutritional and therapeutic purposes, frequently for the sick, the aged, and laborers. With the addition of cereals, beans, vegetables, and herbs during the Middle Ages, soups continued to develop.

While transparent broths became popular in Asian cuisines, thick soups and pottages were popular in Europe. Soups got more varied and regionally specific as farming and cooking methods improved. Due to urbanization and industrialization, the shift toward soup premixes started considerably later. According to Smith, the Industrial Revolution profoundly altered how food was prepared. Foods that required less time, fuel, and effort were in greater demand as people relocated to cities and led faster-paced lives. As a result, concentrated and preserved foods, such as dried soups, were created. By the 18th and 19th centuries, portable and durable soup bases could be produced because to developments in drying, dehydration, and food preservation technology.

Soup tablets, powders, and concentrates are examples of compact soup forms that have been developed due to military requirements, space limitations, and economic reasons. The basis for contemporary quick soup premixes was established by these early iterations. As the food processing industries grew in the 20th century, soup premixes became widely sold. According to Smith, the development of dehydration methods like freeze drying and spray drying allowed producers to preserve nutritional value and flavour while greatly increasing shelf-life. As a result, soup premixes become a practical substitute for conventional soups, preserving the traditional essence of soup while meeting contemporary consumer demands (Smith *et al.* 2012)

HEALTH BENEFITS AND NUTRITIONAL VALUE

Although they have a different nutrient value, soup premixes made from vegetables, legumes, grains, and pulses offer vital elements.

Disease Prevention and Metabolic Health

It has been shown that functional soup premixes can aid in the management of non-communicable disorders. Certain formulations, such those with chickpeas, barley, or buckwheat, may help reduce hyperglycemia (high blood sugar) and hyperlipidemia (high blood fats), according to research (Mohamed *et al.* 2020).

Heart Health: Omega-3 fatty acids (EPA and DHA), which are known to lower cholesterol and lower the risk of cardiovascular disease, are provided by premixes enhanced with ingredients such flaxseed or tilapia waste (Monteiro *et al.* 2014). Antioxidant Support: A lot of soup mixes contain bioactive substances like carotenoids and phenolic acids, which have strong antioxidant activity and guard against oxidative stress and cellular damage (Sinchaipanit *et al.* 2023).

Weight control and digestive health

Diets that encourage satiety and help with weight loss often include soup.

Satiety: By producing gastric distension and delaying the emptying of the stomach, eating soup can make you feel fuller and consume less energy overall (Martínez-Tomé *et al.* 2015).

Digestive Health: Formulations high in dietary fiber, like those derived from millets, beans, or green bananas, prevent constipation, promote regular bowel movements, and preserve a healthy gut microbiota (Garg *et al.* 2023).

Nutritional Supplements and Geriatric Care:

Nutritional Supplements and Geriatric Care Density of Nutrients: Proteins, minerals (calcium, iron, zinc), and vitamins (A, B12, D) can be added to prepared mixtures to prevent malnutrition (Mohamed *et al.* 2020).

SOURCES

Table 1: Nutritional Significant formulations Based on various materials their material

Sl. No	Research Topic	Based Material	Major Nutrient Content	Key Nutritional Significance	Reference
1	Formulation of an Instant Vegetable Soup and Evaluation of Shelf-life Improves	Tomato, carrot, onion, potato	Carbohydrates, dietary fiber, vitamin A & C	micronutrient intake and antioxidant activity	Ganga *et al.* (2001–02).
2	Development and Evaluation of Red Rice–Vegetable Soup Premix as a Functional Food	Red rice, vegetables Complex	Carbohydrates, iron, dietary fiber	Suitable for recovery nutrition and gut health	Riswin *et al.* (2025)

3	Production and Evaluation of Instant Herbal Mix Soup	Herbal extracts, vegetables	Polyphenol, minerals, antioxidant	Boost immunity and therapeutic value	Upadhyay *et al.* (2017)
4	Acceptability Profile of Tomato Soup Using Flavour Potentiators	Tomato, spices	Lycopene, vitamin C	Antioxidant-rich and consumer acceptable	Prabhavathi *et al.* (2017)
5	Improvement of Quality of Solid Ingredients of Instant Soups: A Review	Cereals, starches, vegetables	Carbohydrates, protein, fiber	Improves texture, stability, and nutrition	Chen *et al.* (2023)
6	Ready-to-Eat Soup for the Elderly: Nutritional Composition and Storage Stability	Vegetables, cereals, legumes	Protein, fiber, vitamins, minerals	Easy digestibility and balanced nutrition for elderly	Sinchaipanit *et al.* (2023)
7	Production of Gluten- and MSG-Free Tomato Soup Powder	Tomato, corn starch	Carbohydrates, vitamin C, lycopene	Suitable for gluten-sensitive consumers	Chavan *et al.* (2024)
8	Dried Vegetarian Soup Supplemented with Legumes	Vegetables + lentil, chickpea	Protein, dietary fiber, minerals	Enhanced nutritional quality and satiety	Haleem *et al.* (2014)

PRODUCTION

The value of processed fruit and vegetables was €47 billion, or 6.7% of the total value of the EU food industry's production, according to statistics from a statistical overview of Eurostat. Processing is concentrated in five nations. Fruits and vegetables are processed into a variety of food products, which can be divided into frozen and preserved fruits and vegetables, in addition to being directly consumed and traded as raw commodities.

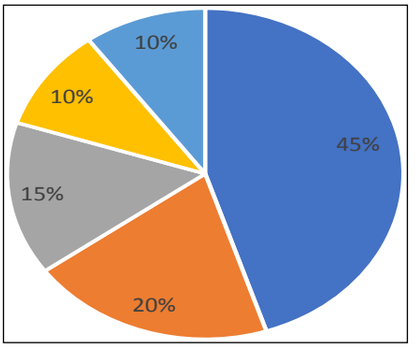

Fig. 1: Production share of Soup premixes by source

Despite being the world's biggest producer of fruits and vegetables, less than 2% of them are processed in India. Despite accounting for 12% of global production, the per capita India is the world's largest producer of fruits and vegetables, but less than 2 per cent of fruits and vegetables are processed in the country Although there is 12 % of the world's production, the per capita vegetable consumption in India is only 135g / day as against the ICMR recommendation of 250g/day.

Value addition and exploration of nutritionally high and superior vegetables are essential to bridge this gap between production and consumption (Gandhi *et al.* 2017).

The Fig. 1 shows that the Vegetable-based soup premixes contribute the highest share (~45%), due to consumer preference, availability, and health perception.

1. Legume-based premixes account for about 20%, mainly for protein enrichment.
2. Cereal-based soups contribute around 15%, commonly used for energy-dense formulations.
3. Pulse-based and non-vegetarian soup premixes contribute approximately 10% each, used for specialized or premium products.

ESTIMATED DEMAND

With a 4.7% compound annual growth rate, the worldwide soup market is expected to reach USD 26.21 billion by 2030. With a compound annual growth rate (CAGR) of 4.8%, the Indian soup market is projected to reach USD 2,008.5 million by 2033.Due to growing consumer acceptance and the desire for animal substitutes, vegetarian soup mixes are in great

demand. Soup mix brands have a lot of room to grow in emerging regions, especially in Asia and Africa. Successful product innovation, efficient marketing, and regional development are some of the variables that impact market growth.

Globally, the instant food market is expanding at a rate of about 12–15%. One category of dry foods is instant soups. These are crucial to nutrition because they meet the needs of current and future social consumers (Gandhi *et al.* 2017).

MARKET STUDY

Using Google Forms, a market survey was conducted to learn about consumers' opinions of the soup premixes currently on the market. People between the ages of 15 and 60 were given the form to complete in order to reflect on their preferences for soup premixes. This survey led to the conclusion that, in comparison to the nutritional value they offer, well-known soup premix giants on the market have significant levels of sugar and other additives in their premixes. This aided in creating a premix that met consumer demands by incorporating the advantages of legumes without additional sugar or other additives (Divekar *et al.* 2025).

TYPES OF SOUP PREMIXES

Fig. 2 shows the types of premixes i.e. dehydrated soups, canned soups, and frozen soups Etc.

The main steps involved in instant dry soup manufacturing are preparation of soup according to developed formula, blending into a puree, drying into powder form by a drum drier. Hence, the heat sensitive vitamin like vitamin B and C that present in freshly prepared soups are destroyed during the drying process fortification is essential. The product is also rich in other vitamins, proteins, carbohydrates, fats, minerals and fibres. The moisture content of dehydrated soups is in the range 2-3% and it should not exceed 7% during the shelf-life. Water activity should below 0.6 to avoid microbial deterioration. Studies of the estimation of shelf-life of such dehydrated products was based on physical changes which are caused mainly due to the moisture content of the product. The packages, which are resistant to moisture and light can be used as protective coverage for these products and thereby extent the shelf-life of the product (Ganga *et al.* 2001–2002). Fig. 3 shows the various types of soup mixes.

1. Dehydrated soups

(a) Dehydrated soup premix is a dry powdered or granular mixture prepared by removing moisture from ingredients to extend shelf-life. It is reconstituted with hot water before consumption.

2. Canned soups

(b) Canned soup premix is a ready-to-eat or ready-to-heat soup formulation preserved by thermal sterilization and packed in hermetically sealed cans.

3. Frozen soups

(c) Frozen soup premix consists of pre-cooked or partially cooked soup ingredients that are preserved by freezing at −18 °C or below. The consumer reheats the product before consumption.

Fig. 2: Types of soup premixes

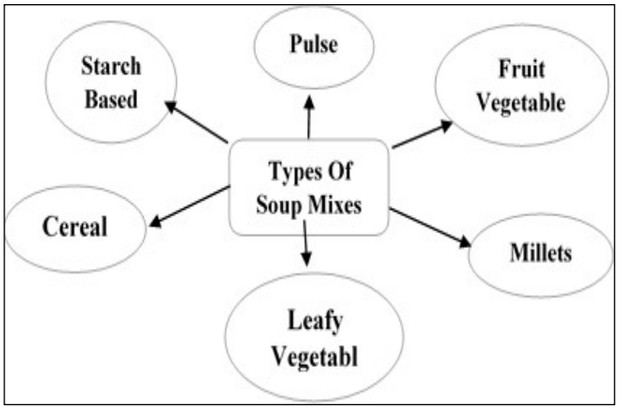

Fig. 3: Various Types of soup mixes

Pulse Based Soup Mixes

1. Value addition through malting: Development of legume-based soup premix

The study demonstrated that the produced product completely eliminates artificial additives and sugar, making it a better option for persons with diabetes or even for kids. Because of its higher bioavailability from the malting process, this soup is a good source of protein. Legumes were subjected to unit procedures such as steeping and malting, which increased their micronutrient content and ensured microbiological safety in fully sanitary settings. Consumers look for healthier substitutes for commercially available products, according to sensory evaluation of legumes. The panelists were satisfied with the finished items in terms of colour, flavour, appearance, and general acceptance. Chemical analysis demonstrated the efficacy of the soup preparation method by illuminating the rise in nutritious content. Protein concentration was calculated to be 15–20%, ash content was found to be 11–13%, and moisture content was 5.8–6%, guaranteeing low susceptibility for a microbial infection. Therefore, in the near future, goods like soup premix with strong market viability, an extended shelf-life, an improved nutritional profile, and a better snacking strategy may result from the current study on the value addition of malting beans (Divekar *et al.* 2025).

2. Efficiency of newly formulated functional instant soup mixtures as dietary supplements for elderly

The Mohamad was Formulated the two soup premixes by Lyophilized chickpeas, specific vegetables, and some by-products were added to soup combinations at 5% and 10% concentrations. A geriatric animal model was used to assess their biological performance. Even after being stored for four months, both soup combinations demonstrated good sensory acceptability. According to the proximate analysis, mixture II had 16.89% protein, 6.30% fat, 6.30% crude fiber, and 54.16% carbs, whereas mixture I had 16.62% protein, 6.20% fat, 6.60% crude fiber, and 65.89% carbohydrates. In comparison to mixture I, mixture II showed a greater flavonoid concentration and more potent free-radical scavenging action. Both soup combinations did not negatively impact liver and renal functioning, according to feeding trials conducted on elderly rats. Furthermore, the findings indicated that these functional soups may be useful as dietary supplements for the elderly since they may help regulate elevated blood glucose and cholesterol levels as well as promote bone health (Mohamad *et al.* 2020).

Millet Based Soup Mixes

1. Formulation of prebiotic, low glycemic index millet soups using foxtail, barnyard and kodo millet

Foxtail, barnyard, and kodo millet were used to create the millet soups. To optimize the millet grain ratio and identify the proper blend of foxtail, barnyard, and kodo millet, a simplex centroid mixture design was used. The desired responses were 2.14:5.76:7.11 gm, respectively. The addition of millets considerably raised the optimized millet soups' sensory scores. Additionally, this increased its overall dietary fiber content, which in turn increased its prebiotic activity. Its low glycemic index value of 41.85 was discovered. Given this conclusion, evaluating the aforementioned characteristics in the millet soup mix at various storage times would have improved the outcomes. The optimized millet soup can be classified as low glycemic soup (GI<55) with good prebiotic activity

based on the results. Therefore, it might be suitable for people with lifestyle issues including diabetes and obesity (Peerkhan *et al.* 2024).

2. Nutritional and functional characterization of barley–flaxseed based functional dry soup mix

Functional dry soup mix based on barley flaxseed (BFSM) has a respectable calorific value and is nutrient-dense. There is no antinutritional danger. Low BFSM addition glycemic index Ally encourages diabetics to use it. BFSM can be referred to be "health food" since it contains 0.9418 g β-glucans per serving of 250 ml (8.64 g/100 ml). The components of BFSM, which include ω-3 fatty acid and phenolics with sufficient antioxidant activity, strongly support its usage as a functional soup (Kaur *et al.* 2015).

3. Development of finger and barnyard millet-based probiotic soup mix incorporated with bioactive flower waste of Himalayan region

(Dev *et al.* 2025) investigated the development and characterization of millet-based soup premixes using soaked and malted millet flour combined with probiotic-coated sorghum millet flakes and natural bioactive flower waste powder, demonstrating their potential as functional meals. The rheological investigation verified that millet content affects texture and viscosity, which in turn affects consumer acceptability. The addition of probiotic sorghum flakes at different concentrations (3%, 6%, and 9%) led to significant changes in the viscosity of FMRS and BMMS soups. Among the three formulations, it was determined that the R2 and B2 soups, with a malted-to-raw millet flour ratio of 60:40, were the most optimal at a 6% incorporation of probiotic millet flakes. This probiotic sorghum flake concentration produced the best physicochemical and sensory characteristics while maintaining cell viability for up to 90 days of storage.

4. Development and evaluation of multigrain soup sticks based on Box–Behnken design

For the creation of multigrain soup sticks, the Box-Behnken design seemed ideal. WWF (30.11 g), FF (23.01 g), and Great millet (Jowar) flour (23.71 g) were the ingredient compositions that were improved using RSM. Multigrain Soup Sticks include 15.30 ± 0.62% protein, 12.14 ± 0.01% fat, 3.27 ± 0.12% fiber, 63.79 ± 0.50% carbohydrate, and 425.65 ± 0.29 kcal energy. The prepared Multigrain Soup Sticks had a crunchy texture, according to the texture studies. The Multigrain Soup sticks were found to have a 60-day shelf-life at room temperature. According to this study, giant millet (jowar) and foxtail millet have good potential for use in the creation of baked goods with the aim of improving nutritional quality. When consumers are eating, these soup sticks could be quite helpful for delivering particular spices or minerals (Wadikar *et al.* 2022).

Cereal Based Soup Mixes

1. Development and evaluation of a red rice–vegetable soup premix as a functional food for tuberculosis recovery

Premix for baby corn soup The purpose of the project was to create a soup mix using baby corn byproducts. Cut bits of baby corn were dried and ground to create baby corn powder. By varying the amounts of baby corn powder (10–40%), corn flour, salt, mango, onion, garlic, cumin, black pepper, coriander, and sugar powders, various soup mix compositions were created. A red rice-vegetable soup premix designed to aid in tuberculosis recovery was created and assessed in this study. To improve immune function, red rice, which is high in anthocyanins and antioxidants, was mixed with powdered vegetables (carrot, beans, onion, and garlic) (Muth *et al.* 2025).

Leafy Vegetable Based Soup Mixes

1. Study on development cum standardization of instant soup mix using Malabar spinach (*Basella alba*) leaves powder

The objective of this research was to develop an instant soup mix utilizing powdered dried Malabar spinach leaves. Malabar spinach powder, moong dal (green gram), tomato powder, onion powder, garlic powder, and ginger are all present in different

amounts in these five treatments of the Malabar spinach instant soup mix, salt, black pepper, and powder. The instant soup mix's sensory quality and nutritional attributes, such as its proximate composition and mineral content, were examined. In terms of overall acceptance, the Malabar spinach instant soup mix made with 4 g of powdered Malabar spinach leaves, 20 g of moong dal powder, and 11 g of tomato powder, among other ingredients, was deemed to be the most acceptable score of 8.0, whereas the control group scored 8.20. The results showed that adding Malabar spinach leaf powder greatly improved the created items' nutritious value. The best instant soup mix treatment (code T4) has a high protein content (6.13-7.65%), ash content (5.04- 7.02%), fiber (3.37-5.89%), fat (1.39-2.41%), and carbs (80.02-71.34%). Customers can address their nutritional deficiencies with this healthy option (Singh *et al.* 2024).

2. Dehydration studies of Amaranthus (*Amaranthus cruentus*) leaves for making RTS soup mix

1. The optimum method for drying amaranthus leaves with 3.60% (d.b.) moisture content, 3.21% fat,19.75% protein,19.04% ash,1.77 mg/100 gm ascorbic acid, 14.01% fiber, and 43.85% was microwave vacuum drying for 60 seconds on and off. carbs, etc.

2. It took five hours of microwave vacuum drying for 60 seconds on and off to lower the moisture content from 771.10% (d.b.) to 3.74% (d.b.).

3. When it comes to protein content (14.43%), carbohydrate content (61.09%), lipid content (1.29%), fiber content (7.54%), and ash content, the soup mix powder of T3 (15:45 = amaranthus leaves powder: arrowroot starch powder) yields the greatest results. (4.104%) at energy (314 Kcal/100g) and moisture content(d.b.)(5.82%). 4. Of all the treatments, the RTS soup mix powder with T1 (i.e., powdered amaranthus leaves: arrowroot starch in a 5:55 ratio) received the highest sensory scores for colour (7.7), texture (7.7), flavour (7.65), mouthfeel (7.7), and overall acceptability (7.6) (Peje *et al.* 2019).

Fruit Vegetable Based Soup Mixes

1. Studies on utilization of partially hydrolysed guar gum in tomato soup powder

Using partially hydrolysed guar gum in tomato soup powder helps increase the consistency and acceptability of tomato soup while simultaneously providing soluble dietary fiber. Tomato powder is a good source of β-carotene, lycopene, and vitamin C—natural antioxidants (Bhargavnandha *et al.* 2021).

2. Development and formulation of instant soup mix from sprouted horse gram and radish leaves.

An quick soup mixture made from radish leaves and sprouted horse gram (Parbhani, Maharashtra, India). The sprouting horse gram and radish leaves in the Instant Soup Premix provide numerous health advantages. Constipation, diabetes, weight loss, and fever and cold. (Mathangi *et al.* 2016) Research that this quick soup mixture made Sprouted horse gram, radish leaf powder, onion powder, garlic powder, coriander powder, curry leaf powder, pepper powder, and salt are simple to make and don't require any special preservation methods because, when kept at room temperature or in the refrigerator, there is no bacterial colony growth even after 30 days. It can be kept in an airtight container. The components are useful in managing diabetes.

3. Development and evaluation of instant soup premix using oyster mushroom powder

Using powdered dried oyster mushrooms, make a quick soup. Oyster mushroom powder, corn flour, milk powder, salt, and different amounts of mushroom powder (10–40%) were dry mixed to create four different formulations of mushroom soup mix, oregano, sugar, and black pepper. To make this mushroom soup, combine 50 grams of soup mix with 750 milli liters of water fifteen times, then boil for two minutes (Srivastava *et al.* 2019).

4. Development of instant moringa soup mix using factorial design and its physico-chemical evaluation

The current study was to create a quick soup mixture

using powdered *Moringa oleifera* leaves. The study demonstrated *Moringa oleifera's* great potential as a useful component to improve the nutritional value of easy food items and provide healthier alternatives that satisfy customer demands while addressing nutritional deficits (Moulya *et al.* 2025).

Starch Based soup mixes

1. A cost-effective technology for isolation of potato starch and its utilization in formulation of ready-to-cook, non-cereal, and non-glutinous soup mix.

Based on functional, rheological, pasting, and sensory aspects, the formulation with 40% potato starch was determined to be the most appropriate. According to storage studies, a soup mix containing 40% potato starch can be kept safely for four months (Singh *et al.* 2021).

2. Formulation of Vegetable Soup Mixture Using Physically Modified Sweet Potato Starch as a Thickener

The use of physically altered sweet potato starch as a thickening for a food composition that exhibits better quality than maize starch. Dry soup powder has a six-month shelf-life and works well as a dietary substitute for corn starch ingredient to increase viscosity (Senanayake *et al.* 2014).

3. Development of instant vegetable soup mixes using extrusion technology

The goal of the current study was to determine whether extrusion technology might be used to create instant vegetable soup mixes. A co-rotating twin screw extruder was used to process corn and potato starches under various processing conditions. Starch is used in a variety of food and other industries. As a meal component, it can serve as a gelling agent, water absorber, thickening agent, dusting agent, and nutrient since it can supply up to 80% of the daily calories that humans ingest (Gandhi *et al.* 2017).

4. Study of soup mix incorporated with starch extract from mango (*Mangifera indica*) seed kernels

Mango seed kernels that are produced as waste can be efficiently processed as a byproduct in order to extract starch. This mango seed kernel starch extract was shown to be suitable up to a 50% inclusion level when used in place of corn starch in soup mixes, and it has a two-month shelf-life. (Yatnatti *et al.* 2018) suggest that additional techniques for extracting starch from mango kernels can be investigated in order to enhance its recovery. Additionally, molecular analysis of the starch granule provides opportunities to comprehend the different characteristics of mango kernel starch, which can help expand its use in food processing and investigate its health implications.

5. Jackfruit (*Artocarpus heterophyllus*) by-products: A novel source of pectin—Studies on physicochemical characterization and its application in soup formulation as a thickener

The current study offers valuable information regarding the extraction of pectin from jackfruit by-products and the possible applications of the extracted pectin. This result validates the use of jackfruit waste pectin as a novel thickening to create vegetable soups with desired sensory qualities. A stronger thickening material is formed by pectin with a reduced molecular weight, ash content, and esterification degree. The physicochemical, structural, and sensory characteristics of jackfruit waste pectin are closely related to its thickening ability. Furthermore, the extraction conditions had a significant impact on the thickening capabilities of the pectin that was recovered from jackfruit by-products. The thickening capabilities of soups including commercial and analytical pectin are clearly affected by changing the parameters of the thickening circumstances, pectin, and starch concentration (Islam *et al.* 2023).

Non-Vegetarian Soup Mixes

1. The Effect of Taxifolin and Arabinogalactan Premixed with *Dihydro quercetin* on the Storage Quality of Fish Soup Prepared from Brook Trout

This study examines how varying concentrations of taxifolin and arabinogalactan premixed with dihydro quercetin (Lavitol V) affect the quality variations of trout soup at 4 ± 1°C for 31 days. Physiochemical,

sensory, and microbiological quality metrics were used in shelf-life research. With taxifolin and Lavitol V, the fish soups' shelf lives were prolonged by 2–4and 7–10 days, respectively, with significant differences ($p < 0.05$), with Lavitol V having the longest shelf-life (31 days). The control group had the greatest TBA and TVB-N, measuring 3.72 mg MA/kg and 11.21 mg/100 g, respectively. Lavitol V therefore has a significant chance of being used in seafood preservation in the future (Kose *et al.* 2025).

2. Production of a Nutritious Canned Salmon Soup Suitable for Human Consumption from Filleting By-products Using Plant Processing Conditions

(Tufan *et al.* 2021) study evaluates the nutritional value and consumer acceptability of using salmon fillet by-products as canned soup under plant-scale conditions. The evaluated finished product showed a high level of consumer acceptability and was found to be microbiologically sterile. The findings also imply that salmon fillet waste is a good source of fat, protein, and amino acids, especially important amino acids, vitamins, and minerals. This creative study suggests that using leftover salmon filleting material in canned fish soup can increase the product's market value. Additionally, by preventing their disposal in the environment, such uses would aid in environmental protection.

METHODS OF MAKING SOUP

1. **Quik cooking soups:** Quick cooking soups require minimal preparation and short cooking time. These soups are usually made from finely cut or powdered ingredients that hydrate and cook rapidly. It is commonly used in soup premix (Chen *et al.* 2023).

2. **Instant cooking soup:** Instant soups are ready-to-prepare products that require only the addition of hot water. These soups are manufactured using dehydration or spray drying techniques (Fellows *et al.* 2017).

3. **Slow cooking soups:** Instant soups are ready-to-prepare products that require only the addition of hot water. These soups are manufactured using dehydration or spray drying techniques (Rahman *et al.* 2020).

PROCESSING TECHNOLOGY

Convective drying

Heated air is passed through the product's layers during convective drying. It can be carried out using tray or cabinet dryers, where thin layers of materials are held in perforated trays. The tray drier is made up of an insulated tray with an air circulating fan that circulates air through a heater and then through baffles that may be adjusted to distribute air between the food trays. For the first four hours of drying, the temperature is kept at 68 °C. After that, it is lowered to 55 °C until the materials have completely dried. The use of herbs, chickpeas, finger millet, and soybeans is the work's high point (Upadhyay *et al.* 2017).

Using a spray dryer

The most popular industrial method for removing solvent that involves particle production and drying is spray drying. Short dry periods with little thermal deterioration are the outcome of rapid mass transfer rates caused by the high specific surface of the tiny drops created during the atomization of either solutions or slurries. Because of this, spray drying is an excellent method for continuously producing dry solids from liquid feedstock as solutions, emulsions, and pumpable suspensions in powder, granulate, or agglomerate form. The key to producing high-nutritive, high-quality powders with particular qualities is the choice of operating parameters (Fernández-Pérez *et al.* 2004).

Applying a spray dryer

Spray drying is the most widely used industrial technique for solvent removal that includes particle creation and drying. Rapid mass transfer rates brought on by the high specific surface of the tiny drops formed during the atomization of either solutions or slurries result in brief dry periods with minimal thermal degradation. For this reason, spray drying is a great way to continually produce dry solids from

liquid feedstock in the form of solutions, emulsions, and pumpable suspensions in the form of powder, granules, or agglomerates. The selection of operating conditions is crucial for creating high-nutritive, high-quality powders with specific attributes (Fernández-Pérez *et al.* 2004).

Freeze-drying

Freeze drying preserves increased nutritional content, flavour, and colour while allowing materials to be dehydrated by sublimation at low temperatures and sub-atmospheric pressure. It also gives dried items a porous structure, all of which are desirable qualities. Additionally, the freeze-dried products offer superior dissolving and rehydration qualities. Freeze drying is a very time-consuming and energy-intensive process since it requires deep freezing and low operating pressure (Liu *et al.* 2020).

Using a microwave to freeze-dry

Microwave freeze-drying is expected to reduce costs without compromising quality. Agglomeration, oxidation, and microbial suppression improve the stability and safety of solid-form soup during storage. Our objective is to provide useful information for preparing flavorful, healthful, and safe solid ingredients for instant soup (Chen *et al.* 2023)

Cabinet solar dryer

It is direct natural convection type pyramid shaped solar dryer. It is pyramid shaped dryer. The cabinet solar dryer consists mainly of two parts such as cabinet and chimney. Chimney is attached to the top of cabinet. The front side of cabinet were removable. The temperature of chimney was more than the temperature of cabinet and the temperature of the cabinet was more than the surrounding and hence the natural convection is set up in the dryer. Drying temperature is from 45°C to 60°C (Peje *et al.* 2019).

Vacuum dryer

The vacuum drying process is a batch operation performed at reduced pressures compared to ambient pressure, enabling faster drying. The dryer door is tightly shut and steam is passed through the space between trays and jacket so that the heat transfer occurs by conduction. Water vapour from the feed are sent into the condenser and after drying vacuum pump was disconnected and the dried product is collected from the trays. The pressure maintained in vacuum drying is generally 300 mmHg - 550 mmHg. Fresh amaranthus leaves were spread over tray in thin layer as shown in Plate 3.8 and drying at 3 different temperatures i.e. 30°C, 40°C and 50°C (Peje *et al.* 2019).

FLAVOUR ENHANCERS

In many different cuisines, flavour enhancers are frequently employed to improve a food system's natural flavour or taste. In Asian cooking, glutamate-related substances such monosodium glutamate (MSG), monopotassium glutamate, and compounds based on ribonucleotides are the most often utilized flavour enhancers. The goal of the current study was to assess how monosodium glutamate enhanced the flavour of tomato soup. Using three different amounts of MSG (50, 100, or 150 mg/100g), five soup formulations were made using spice powders (*Capsicum annum* L., *Capsicum fructescens* L., *Syzygium aromaticum* L., *Cinnamomum verum*, C. and *Piper nigrum* L.). MSG-free products were used as a control. Ten trained panelists assessed the products using a score card with a maximum score of 20. The findings showed that the scores were gradually rising as the degree of MSG incorporation increased. The designed products' flavour, mouthfeel, and scent quality differed significantly, according to statistical analysis. According to (Prabhavathi *et al.* 2017), this suggests that MSG and spices would typically have a synergistic effect that contributes to the increased enjoyment of the product.

FUNCTIONAL ADDITIVES

Table 2 shows the various thickening and texturing agents used in soup mixes i.e. Modified starch, corn starch, maltodextrine, guar gum, xanthan gum, carboxymethyl cellulose (CMC) etc.

Table 2: Thickening & Texturizing Agents (Improve body, mouthfeel, and consistency)

Sl. No.	Additives	Functions	References
1	Modified starch	Thickening, freeze–thaw stability	Singh *et al.* 2007
2	Corn starch	Viscosity development	Bemiller *et al.* 2011
3	Maltodextrin	Bulking, improves flowability	Chronakis *et al.* 1998
4	Guar gum	Increases viscosity at low concentration	Mudgil *et al.* 2014
5	Xanthan gum	Stability during storage and reheating	Garcia-ochoa *et al.* 2000
6	Carboxymethyl cellulose (CMC)	Carboxymethyl cellulose (CMC)	Saha *et al.* 2010

Table 3: Nutritional Fortifying Agents used to improve health value (functional soups)

Sl. No.	Additives	Additives	References
1	Protein isolates (soy, pea, whey)	Protein isolates (soy, pea, whey)	Stone *et al.* 2015
2	Dietary fiber (inulin, psyllium)	Protein enrichment	Roberfroid *et al.* 2007
3	Vitamin premix (A, B-complex, C, D)	Micronutrient fortification	Allen *et al.* 2006
4	Mineral salts (Ca, Fe, Zn)	Bone and immunity support	Gupta *et al.* 2015
5	Plant bioactives (moringa, spinach powder)	Antioxidant activity	Sreelantha *et al.* 2009

NUTRITIONAL FORTIFYING AGENTS

Table 3 shows the additives for nutritional fortifying agents used to improve the health these are Protein isolates (soy, pea, whey), Dietary fiber (inulin, psyllium), Vitamin premix (A, B-complex, C, D), Mineral salts (Ca, Fe, Zn), Plant bioactives (moringa, spinach powder) etc.

PRESERVATIVES & SHELF-LIFE ENHANCER

Table 4 shows the various preservatives used in soup premix i.e. Sodium benzoate, Potassium sorbate, Citric acid, Ascorbic acid.

Table 4: Preservatives used in soup premix

Sl. No.	Additive	Function	Reference
1	Sodium benzote	Antimicrobial	Chipley *et al.* 2005
2	Potassium sorbate	Mold inhibition	Sofos *et al.* 2000
3	Citric acid	pH control	Papagianni *et al.* 2007
4	Ascorbic acid	Antioxidant	Lee *et al.* 2000

PACKAGING MATERIAL

The premix is usually packed in moisture- and oxygen-barrier packaging such as laminated aluminium foil pouches, HDPE, or PET containers. Vacuum sealing or nitrogen flushing helps reduce oxidation and preserves aroma and nutrients. Storage at ambient temperature (20–25 °C), away from direct sunlight and heat, ensures better stability. Studies of the estimation of shelf-life of such dehydrated products was based on physical changes which are caused mainly due to the moisture content of the product. The packages, which are resistant to moisture and light can be used as protective coverage for these products and thereby extent the shelf-life of the product. It has been found that Aluminium foil laminated packs are the most suitable package for dehydrated soups. In this study metalized polyethene, which can not act as a complete barrier to oxygen and light was used as the package **(**Ganga *et al.* 2002).

The packages, which are resistant to moisture and light can be used as protective coverage for these products and thereby extent the shelf-life of the product. It has been found that Aluminium foil laminated packs are the most suitable package for dehydrated soups. In this study metalized polyethene, which can not act as

a complete barrier to oxygen and light was used as the package. Storage-life of dehydrated soup at ambient temperature is longer than canned and frozen soups.

Instant vegetable soup mixes were packed in LDPE and Aluminium Laminate bags. Samples were stored at ambient temperature conditions for shelf-life estimation over a period of6 months and the product was evaluated for moisture content, water activity (aw), free fatty acids, colour, and overall acceptability, at an interval of one month, during the storage period (Gandhi *et al.* 2017).

During the 90 days storage period the instant soup mix in alluminium foil was found to be best in context of overall acceptability with the intervals of 0 days 8.06, 30 days 8.06, 60 days 8.06 and 90 days 7.94 scores respectively (Anasari *et al.* 2021).

STORAGE STUDY

Storage studies suggested that the content of β-carotene and antioxidant activity of both (ready-to-eat and instant powder) types of soup decreased with increasing storage time, while a slight increase in yeast and mold count (<50 cfu/g) was noted. Most importantly, no pathogenic bacteria were detected in ready-to-eat and instant soup during the storage study of 6 weeks at 5 °C and 6 months at 25 °C, respectively. In terms of the high nutritional composition and functional value of the product, 4 weeks of storage at 5 °C and 4 months of storage at room temperature were suggested for ready-to-eat and instant powder soup product, respectively (Sinchaipanit *et al.* 2023).

Storage slightly affected the overall acceptability of instant soup mixes. During the entire 6 months of storage, overall acceptability of instant vegetable soup mixes was within acceptable range. Similarly, observed that sensory properties were almost same throughout six months storage and there was a non-significant difference in various treatments. Mushroom soup mix prepared using potato starch scored less flavour score than others. The overall acceptability scores of tomato soup mixes from corn starch was awarded maximum scores. During the first month of storage tomato soup mix prepared from corn starch have overall acceptability of 8.3 which decreased to 7.8 at the end of 6 months storage (Butt *et al.* 2004).

Storage-life of dehydrated soup at ambient temperature is longer than canned and frozen soups. Therefore there is an increasing demand for them in foreign market. Higher consumer acceptability of soup, nutritive value and low cost are the major reasons that the popularity among majority of people. During the study it was found that there was no post fecal contamination in the product and rancidity after four months in storage life (Ganga *et al.* 2002).

Storage study of tomato soup powder was carried out at ambient temperature (37ºC) and refrigerated condition (4ºC). Tomato soup powder was taken at specific interval for 30 days and upto 3 months to evaluate solubility, pH, titratable acidity, moisture content, TSS (total soluble solids) and over acceptability based on its colour, flavour, taste, consistency were evaluated at regular intervals of time (Bhargavnandha *et al.* 2021).

Storage of soup mix showed minor changes towards sensory attributes, increase in viscosity, decline in antioxidant activity and pH but the product remained acceptable till the stored period of 5 months. Hence the by-products of baby corn processing industry could be effectively utilized in the production of baby corn soup mix (Singh *et al.* 2020).

REFERENCES

Allen, L., de Benoist, B., Dary, O. and Hurrell, R. 2006. Guidelines on food fortification with micronutrients. World Health Organization & FAO.

Ansari, F., Singh, A., Baidya, K., Rana, G.K. and Bharti, A. 2020. Formulation and development of instant soup mix using *Moringa oleifera* leaf powder. *Journal of Pharmacognosy and Phytochemistry*, SP (6): 429–432.

Be Miller, J.N. 2011. Pasting, paste, and gel properties of starch–hydrocolloid combinations. *Carbohydrate Polymers*, **86**(2), 386–423.

Bhargavnandha. 2021. Studies on utilization of partially hydrolysed guar gum in tomato soup powder (Master's thesis, Department of Food Engineering, College of Food Technology, Vasantrao Naik Marathwada Krishi Vidyapeeth,

Brunner, T., Van der, H.K. and Siergrist, M. 2010. Convenience food products, drivers for consumption. *Appetite*, **55**: 498-506.

Butt, M.S., Nasir, M., Akhtar, S. and Sharif, K. 2004. Effect of moisture and packaging on the shelf-life of wheat flour. *Int. J. Food Saf.*, **4**: 1–6 8.

Chavan, R.S. 2024. Manufacturing of gluten- and MSG-free tomato soup powder. Archers & Elevators Publishing House.

Chen, C., Zhang, M., Xu, B. and Chen, J. 2023. Improvement of the quality of solid ingredients of instant soups: A review. *Food Reviews International*, **39**(3): 1333–1358.

Chipley, J.R. 2005. Sodium benzoate and benzoic acid. *In:* Antimicrobials in Food (3rd ed.), CRC Press, Boca Raton, pp. 11–48.

Chronakis, I.S. 1998. Maltodextrins as food ingredients. *Critical Reviews in Food Science and Nutrition*, **38**(7): 599–637.

Deshpande, H.W. *et al*. 2020. Development of Protein-Enriched Soup Premix Enriched soup premix with legumes and cereals for improved protein content.

Dev, R., Chauhan, P., Shambhvi & Gupta, M. 2025. Development of finger and barnyard millet-based probiotic soup mix incorporated with bioactive flower waste of Himalayan region. *Journal of Food Science and Nutrition Technology*, **4**: 101084.

Divekar, R., Shivali, R., Mohan, R., Kalbhor, R., Kasat, R. and Bhavsar, G. 2025. Value addition through malting: Development of legume-based soup premix. *Asian Journal of Food Research and Nutrition*, **4**(3): 713–719.

Fellows, P.J. 2017. Food processing technology: Principles and practice (4th ed.). Woodhead Publishing.

Fernández-Pérez, V., Tapiador, J., Martín, A. and Luque de Castro, M.D. 2004. Optimization of the drying step for preparing a new commercial powdered soup Innovative *Food science and Emerging Technology*, **5**(3): 361-368.

Gandhi, N., Singh, B. and Sharma, S. 2017. Storage stability and quality assessment of instant vegetable soup mixes prepared by extrusion processing. *Bulletin of Environment, Pharmacology and Life Sciences*, **6**(6): 73–82.

Ganga, M.D.A. 2002. Formulation of an instant vegetable soup and evaluation of shelf-life (Undergraduate research project). Sabaragamuwa University of Sri Lanka.

Garcia-Ochoa, F., Santos, V.E., Casas, J.A. and Gomez, E. 2000. Xanthan gum: Production, recovery, and properties. *Biotechnology Advances*, **18**(7): 549–579.

Garg, M., Ali, M., Batra, V., Sadhu, S.D., Sharma, S., Basak, S. and Sablania, V. 2023. Quality evaluation of nutri-premix prepared by using millets and seeds of fruits and vegetables. *Journal of Food Science and Technology*, **60**: 2782–2791.

Grunert, K.G. 2005. Consumers, food and convenience: The long way from resources constraints to actual consumption patterns. *J. Economic Psychology*, **26**(1).

Gupta, R.K., Gangoliya, S.S. and Singh, N.K. 2015. Reduction of phytic acid and enhancement of bioavailable micronutrients in food grains. *Journal of Food Science and Technology*, **52**(2): 676–684.

Haleem, A.M. and Omran, A.A. 2014. Preparation and evaluation of dried vegetarian soup supplemented with legumes. *Journal of Food Processing and Preservation*, **38**(5): 1826–1834.

Islam, M.R., Biswas, M.M.H., Esham, M.K.H., Roy, P. and Khan, M.R. 2023. Jackfruit (*Artocarpus heterophyllus*) by-products: A novel source of pectin—Studies on physicochemical characterization and its application in soup formulation as a thickener. *Food Chemistry Advances*, **2**: 100273.

Karel, M. 1975. *Food Technology*, **29**(2): 20–27.

Kaur, S. and Das, M. 2015. Nutritional and functional characterization of barley–flaxseed based functional dry soup mix. *Journal of Food Science and Technology*, **52**(9): 5511–5521.

Köse, S., Tufan, B., Pompe, M., Veber, M. and Koçar, D. 2025. The Effect of Taxifolin and Arabinogalactan Premixed with Dihydroquercetin on the Storage Quality of Fish Soup Prepared from Brook Trout (*Salvelinus fontinalis*, Mitchill, 1814). *Journal of Aquatic Food Product Technology*, **34**(1): 14–29.

Lee, S.K. and Kader, A.A. 2000. Pre-harvest and post-harvest factors influencing vitamin-C content of horticultural crops. *Post-harvest Biology and Technology*, **20**(3): 207–220.

Liu, W., Zhang, M., Adhikari, B. and Chen, J. 2020. A novel strategy for improving drying efficiency and quality of cream mushroom soup based on microwave pre-gelatinization and infrared freeze-drying. *Innovative Food Science & Emerging Technologies*, **66**: 102516.

M.D.A. 2002. Formulation of an instant vegetable soup and evaluation of shelf-life (Undergraduate thesis). Sabaragamuwa University of Sri Lanka.

Mathangi Sudarsan, S., Geethanjali Santhanam, S. and Visalachi, V. 2017. Development and formulation of instant soup mix from sprouted horse gram and radish leaves. *International Journal of Food Science and Nutrition*, **2**(5): 01–05.

Mohamed, R.S., Abozed, S.S., El-Damhougy, S., Salama, M.F. and Hussein, M.M. 2020. Efficiency of newly formulated functional instant soup mixtures as dietary supplements for elderly. *Journal of Food Measurement and Characterization*, **14**, 3057–3066.

Monteiro, M.L.G., Mársico, E.T., Lázaro, C.A., Ribeiro, R.O.R., Jesus, R.S. and Conte-Júnior, C.A. 2014. Flours and Instant Soup from Tilapia Wastes as Healthy Alternatives to the Food Industry. *Food Science and Technology Research*, **20**(3): 571–581. (3):713-19.

Moulya, H.P., Hevlin, S.S. and Xavier, J.R. 2025. Development of instant moringa soup mix using factorial design and its physico-chemical evaluation. *Journal of Food and Agriculture Research*, **5**(2): 141–161.

Mudgil, D., Barak, S. and Khatkar, B.S. 2014. Guar gum: Processing, properties and food applications – A review. *Journal of Food Science and Technology*, **51**(3): 409–418.

Muth, R.M. and Antony, J. 2025. Development and evaluation of a red rice–vegetable soup premix as a functional food for tuberculosis recovery. Manuscript in preparation.

Papagianni, M. 2007. Citric acid production and applications. *Biotechnology Advances*, **25**(3): 244–263.

Patil, S.S. 2016. *Journal of Ready to Eat Food*, **3**(1): 25–30.

Peerkhan, N., Pandey, M. and Bhandari, Y. 2024. Formulation of prebiotic, low glycemic index millet soups using foxtail, barnyard and kodo millet. *Journal of Food Measurement and Characterization*, **4**(1): 62.

Peje, S.G. 2019. Dehydration studies of Amaranthus (*Amaranthus cruentus*) leaves for making RTS soup mix (B.Tech. dissertation, College of Agricultural Engineering and Technology, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India).

Prabhavathi, S.N. and Prakash, J. 2017. Acceptability profile of tomato soup prepared using flavor potentiator and spices. *International Journal of Food, Nutrition and Dietetics*, **5**(2): 45–52.

R.S., Abozed, S.S., El-Damhougy, S., Salama, M.F. and Hussein, M.M. 2020. Efficiency of newly formulated functional instant soup mixtures as dietary supplements for elderly. *Heliyon*, **6**(1): e03197.

Rahman, M.S. (Ed.). 2020. Handbook of food preservation (3rd ed.). CRC Press.

Riswin Mohammad Muth, & Antony, J. 2025. Development and evaluation of a red rice–vegetable soup premix as a functional food for tuberculosis recovery. *Journal of Food Science and Nutrition.*

Roberfroid, M. 2007. Inulin-type fructans: Functional food ingredients. *Journal of Nutrition*, **137**(11): 2493S–2502S.

Saha, D. and Bhattacharya, S. 2010. Hydrocolloids as thickening and gelling agents in food: A critical review. *Journal of Food Science and Technology*, **47**(6): 587–597.

Senanayake, S.A., Ranaweera, K.K.D.S., Gunaratne, A. and Bamunuarachchi, A. 2014. Formulation of Vegetable Soup Mixture Using Physically Modified Sweet Potato Starch as a Thickener. *J. Food Process Technology*, **5**: 313.

Sharma, P. and Gujral, H.S. 2011. *Journal of Food Science and Technology*, **48**(6): 719–725.

Sinchaipanit, P., Sangsuriyawong, A., Visetchart, P. and Nirmal, N.P. 2023. Formulation of ready-to-eat soup for the elderly: Nutritional composition and storage stability study. *Foods*, **12**(8): 1680.

Singh, J., Kaur, L. and McCarthy, O.J. 2007 Factors influencing the physicochemical, morphological, thermal and rheological properties of some chemically modified starches for food applications. *Food Hydrocolloids*, **21**(1): 1–22.

Singh, R. and Sonkar, S. 2024. Study on development cum standardization of instant soup mix using Malabar spinach (*Basella alba*) leaves powder. *International Journal of Advanced Biochemistry Research*, SP-8(2), 514–518

Smith, A.F. 2012. Soup: A global history. Reaktion Book, page no -9-18.

Sofos, J.N. 2000. Sorbic acid and sorbates. *In:* Antimicrobials in Food (3rd ed.), CRC Press.

Sreelatha, S. and Padma, P.R. 2009. Antioxidant activity and total phenolic content of *Moringa oleifera* leaves in two stages of maturity. *Plant Foods for Human Nutrition*, **64**(4): 303–311.

Srivastava, A., Attri, B.L. and Verma, S. 2019. Development and evaluation of instant soup premix using oyster mushroom powder. ICAR-Directorate of Mushroom Research, Solan, Himachal Pradesh, India.

Stone, A.K., Karalash, A., Tyler, R.T., Warkentin, T.D. and Nickerson, M.T. 2015. Functional attributes of pea protein isolates prepared using different extraction methods. *Food Research International*, **76**: 31–38.

Tufan and Sevim Köse, 2021. Production of a Nutritious Canned Salmon Soup Suitable for Human Consumption from Filleting By-products Using Plant Processing Conditions, *Journal of Aquatic Food Product Technology.*

Upadhyay, S., Tiwari, R., Kumar, S. and Kohli, D. 2017. Production and evaluation of instant herbal mix soup. *International Journal of Agricultural Science and Research* (IJASR), **7**(3): 37–44. Addition Through Malting: Development of Legume-Based Soup Premix". *Asian Journal of Food Research and Nutrition* 4

Wadikar, D.D., Wandhekar, S.S., Sharma, G.K. and Semwal, A.D. 2022. Development and evaluation of multigrain soup sticks based on Box–Behnken design. *Journal of Culinary Science & Technology*, **20**(6): 539-550.

Yatnatti, S. and Vijayalakshmi, D. 2018. Study of soup mix incorporated with starch extract from mango (*Mangifera indica*) seed kernels. *Journal of Food Science and Nutrition*, **7**(1): 45–50.