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A Review on the Recent Developmentson New Formulations to Prepare Nutrient Dense Noodles

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Abstract:
Noodles were among the first foods to serve a purpos, whose effects on health have been the subject of several research. The current communication provides an overview of studies that have been published recently on the subject and considers potential future trends in the enhanced nutritional and health properties used in the bakery industry, concentrating on the creation of functional noodles through formulation and designThe findings demonstrate that several advantageous components, including protein isolate, dietary fibers, antioxidants, and pitaya peel powder, can be employed in the bread sector to increase efficiency and create wholesome, calorie-efficient products, cholesterol, and celiac disease risk factors.
Additionally, adding Amaranthus, flax seed, and prebiotics to gluten-free noodles may be a potential new direction in enhancing their general look, quality, and sensory qualities as well as their shelf life.

Keywords Food products; functional food; noodle; nutrients; gluten

1. INTRODUCTION

Noodles are regarded as a staple in Asian civilizations. The initial indication of noodles consumption was in long past return to historic China, around. 4000 years ago or so. By past research we got to know that noodles were launch later to japan, and then got in sight of the world as a mark of recipes for Chinese noodles together with japan process engineering. According to previous data, consumption is increasing of Asian noodles no indeed in eastern market even so in other parts of the globe too (Alfaro et al., 2023). In Asia, white salted noodles are the staple food. The thing that are typically made up by addition of flour,water and salts. Around forty percentage of the wheat flour formed every year was utilized to produce noodles for food. The tone of white salted noodles is shining and bright. The small yellowness deviation of white salted noodles is made up of various type of wheat flour and cooking method, which might too accepted by consumers (Wang et al., 2021).
Wheat is also one of the three major crops grown worldwide, whose worldwide overall manufacturing touched in 2022, 783.92 million tonnes (Hembram, 2023). Depending on how wet they are, noodles are isolated into dry and sodden assortments.in china. Immediate and dried noodles mostly include dry noodles, while wet noodles involve new and cooked wet noodle (frozen noodles and lengthy life noodles) because of due to their brand new, amazing taste and different flavour in compared with other noodles, the brand new(fresh) noodles are famous in modern consumers (Guo et al., 2023). One of the most important parts ofwheat flour is starch, Noodles are divided into dry and wet varieties

according to moisture content. Depending on how wet they are, noodles are isolated into dry and sodden assortments. Amylose shows twenty percentage of the starch present in the regular wheat, since amylopectin counts for the rest seventy five percentage (Alfaro et al., 2023). Now days food processing is more and more concerned to the formation of products with simple aerated microstructures which find to a big extent of mechanical and aesthetic assets of these products. The evolution of analysis of such latest products want non-invasive technique for enlightenment and measurement of the inside microstructure (Lai 20 and Hwang,2018).The texture, flavour, cooking, and right properties of fresh noodles were significantly diminished due to the excessive proliferation of germs, even posing a threat to the consumers' health. As a result, both buyers and sellers must determine whether the quality of the fresh noodles has declined over time. Acidity and the total number of microorganisms are currently two indicators used in China to evaluate how fresh noodles are faring (Guo et al., 2023).

Noodles, and Chinese noodles are just a few of the numerous varieties of noodles available worldwide. Chinese noodles are a common meal with a significant market share in the convenience food category. The noodles manufactured from whole potato flour satisfy the criteria for a staple food made from potatoes and have a sizable market. Nonetheless, the starch, protein, and lipid detection technologies have an impact on the development of the potato sector (Zhang et al., 2023). It was investigated how adding fresh egg whites affected the qualitative traits and Oat noodles' agglomeration of proteins made with gluten and wheat flour. The addition of egg whites reduced cooking loss while lengthening the cooking time of 70% oat noodles (Guo et al., 2020). The addition of exogenous proteins, according to the results, slowed the rate of starch hydrolysis. The most resistant starch was found in the noodles with wheat protein (WP), Whey protein isolate and egg white protein come next. The pace at which noodles' starch was digested was decreased by the rise in protein polymerization degree brought on by disulfide cross-links. Also, The results from the confocal laser scanning microscope revealed that the protein network's robustness helped lower starch digestibility by limiting enzyme accessibility to starch. (Liu et al., 2021).

Gluten, as we are all aware, was very vital to the noodles' quality The texture of cooked noodles during storage was influenced thanks to the gluten network that was cross-linked by gliadin and glutenin. The quality of noodles was impacted by the polymerization of wheat gluten's proteins and alterations to these proteins during processing. Protein-starch networks made up the majority of the structure of noodles, and the gluten networks significantly impacted the textural characteristics of noodles. Studies on frozen cooked noodles have primarily concentrated on the effects of raw materials, processing, and the addition of food additives to enhance their attributes. Low protein and weak gluten content wheat flour had poor texture characteristics and was inappropriate for creating frozen cooked noodles (Wang et al., 2022). Whole-grain flat rice noodles and to determine how the soy protein isolate performed in comparison to whole-grain flat rice noodles, affected the texture, cooking abilities, and flavour of the whole-grain flat rice noodles. The whole-grain flat rice noodles with soy protein isolate outperformed the other two varieties in terms of cohesion, adhesiveness, robustness, and springiness.rice noodles made from whole grains and fortified with soy protein had higher humidity level and water absorption than Whole-grain and plain flat rice noodles are both available, but the opposite pattern was shown for cooking loss (Cao et al., 2021).

Grain that has been overly processed loses a significant amount of the phytochemicals and dietary fibre found in the bran layer. These physiologically active ingredients are preserved in whole grain diets, which are beneficial to human health. The whole grain noodle is crucial in boosting the consumption of extremely healthy foods worldwide due to the rising the prevalence of Asian noodles.The primary ingredients are whole grain flour, water, and salt. recipe ingredients for whole grain noodles, while the type of noodles and wheat source affect the processing method. The nutritional value, flour quality, colour, cooking efficiency, and textural and sensory characteristics are among the whole grain noodle quality traits that are frequently assessed (Niu and Hou ,2020). According to global dietary recommendations, the World Health Organization acknowledges whole grains as a crucial part of a balanced diet. In addition, to better promote the health of both people and

the earth, Project on healthy diets from sustainable food systems by the EAT-Lancet Commission suggests that whole grains account for 32% of our daily calories in their 2019 report. Consuming whole grains may help to maintain a better gut flora and is linked to reduced incidences of heart disease, type 2 diabetes, and premature mortality (toupas et al., 2020). Nutritionally, whole wheat flour (WWF) is higher in nutritional fibre, vitamins, minerals, and antioxidants than refined wheat flour. It is thought that eating whole wheat lowers the risk of a variety of illnesses, including obesity, hypertension, and colon cancer. Yet, despite these advantages, adding WWF to meals may lead to poorer sensory quality and weaker structural integrity, which would decrease customer approval. Producing whole wheat goods is therefore difficult, especially those without bran and with quality equivalent to conventional items (Wang et al., 2022).

Dietary fiber to produce functional noodles

In contrast to the recommended three or more ounce-equivalents per day, The average American only consumed 0.6 ounces' worth of whole grains each day daily when at least half of all grains were first explicitly recommended in the 2005 Dietary Guidelines for Americans consumed entire grains should be used. Consumers did not always have easy access to choices for healthy grains in the grocery aisles and food service settings, and even when they did, they sometimes did not know how to recognize(Toupas et al., 2020). Wheat is also known as Triticumaestivum L, is one of the main food sources consumed worldwide. Endosperm, germ, and bran are all components of whole wheat grain. Bran is taken out of whole wheat grain, which contains many nutritional fibres and phytochemicals when flour is refined. Also, it has health advantages that shield against conditions like diabetes, heart disease, and obesity. People are interested in eating healthy meals that can help prevent chronic diseases all around the world. With consumers becoming more health conscious, they are eating more meals that contain whole grain wheat. But the bran component causes the gluten structure to alter harmony, transitioning from an intermolecular sheet structure to a viscoelastic spiral. In other words, the capability of bran to absorb water dehydrates the gluten network and lowers the dough's viscoelastic characteristics. Moreover, the bran inclusion results in a gritty texture,which lowers the standard of goods made using whole wheat. As a result, numerous research experts have worked to enhance the quality of whole wheat products (Kang et al., 2021). Whole wheat noodles, which are primarily composed of whole wheat flour, water, and salt, are becoming more and more well-liked by consumers because of their dietary benefits, distinctive flavour, and simplicity of preparation. Bran, on the other hand, prevents the whole wheat noodles are the outcome of the network's growth of the gluten protein that are easy to break, have a hard texture, are unappealing, and have a gritty mouthfeel. Moreover, fatty rancidity, enzymatic browning, lipase, lipoxygenase, and polyphenol oxidase each has an adverse effect on the sensory quality and functional qualities of whole wheat noodles as well as their storage stability (Kai et al., 2022).

Benefits of dietary fibre noodles in disease

According to epidemiological research, eating whole wheat reduces the chance of developing chronic conditions. Whole wheat foods' positive effects on health include related to their bioactive ingredients, which also include dietary fibre and phytochemicals. The most recent research on bioactive substances, their functions in improving health, and the underlying mechanisms has been compiled and reviewed in this review. Included were the most recent processing technological developments that might Boost the nutritional content of foods made with wheat and other grains. This review might motivate more research, creation, and consuming whole-wheat food can reduce the risk of developing chronic conditions in people (Liu et al., 2020). In order to lower the risk of cardiovascular disease in those who do not have indications for anti-atherosclerotic medications, nutritional methods, including consumption of functional foods, are given significant attention. A key anti-atherogenic feature and a predictor of the risk of cardiovascular disease is cholesterol efflux ability. In healthy overweight or obese people, we assessed the impact of daily ingestion of a novel whole-wheat synbioticpasta on serum ATP-dependent protein kinase Cholesterol efflux capability in

comparison to a control pasta made with whole wheat (Favari et al., 2020). We still don't fully understand how nutrition and liver disease are related. This study assessed the relationships between consumption of dietary fibre and whole grains and death from chronic liver disease and risk of liver cancer. In 1995–1996, 485, 717 retired Americans were enrolled in the cohort of the Food and Health Study conducted by the National Institutes of Health and the American Association of Retired People. 940 sporadic cases of liver cancer and 993 fatalities were discovered by follow-up through 2011. The highest quintile of whole grain consumption was linked to a decreased Compared to other cancers, liver cancer risk(Liu et al., 2021).

Cancer care makes up 19% of Australia's overall illness burden and is the top cause of disease burden internationally. After breast and lung cancers, The third most common cancer kind in the world is colorectal cancer (CRC) (1.93 million cases), and it ranks In 2020, cancer deaths from all causes will rank second (935,00 deaths). In line with this, cancer is responsible for a large financial burden on healthcare, including direct and indirect medical expenses as well as lost wages. Additionally, Australia and New Zealand also have CRC rates that are higher than those of other nations (Abdullah et al., 2021). There is still much to learn about the biological mechanisms underlying the inverse relationships between dietary fibre and whole grains and liver disease. Whole grains contain oligosaccharides, resistant starch, and dietary fibre may increase stool volume, hasten intestinal transit, and lessen colon carcinogen exposure. Antioxidants and phytoestrogens included in whole grains have been shown to protect against several gastrointestinal cancers and hormone-sensitive malignancies. the metabolic syndrome, blood sugar, insulin sensitivity, fat accumulation in the liver are among the disorders linked to liver disease and liver cancer that have been shown to benefit from dietary fibre. In the colon, oligosaccharides are digested as fermentable carbohydrates, which boosts short-chain fatty acid synthesis (Liu et al., 2021).

Gluten free noodles

Rice flour was used to create gluten-free noodles, and the protein level was increased by adding Protein isolate from two varieties of germination-stage chickpeas (2, 4, 6, 8, and 10%).. Rice dough with added protein appeared to exhibit pseudoplastic behaviour, according to dynamic rheology. When more chickpea protein isolate substituted,The dough's elastic and viscous moduli increased. The findings demonstrated a Significantly higher protein content (7.52 to 19.3%), and longer cooking time (13.4 to 15.1 min), (22.6% to 31.3%) antioxidant activity, and a significant decrease in cooking loss and Cooking weight rising as the concentration of protein isolate does. Chickpea protein isolate was added, and the results included less light and more green and blue coloration (Sofi et al., 2020). Many substances have been used to make gluten-free noodles, but frequently without using components and procedural expertise. This research's objective was to develop gluten-free noodles utilising flour made from tiger nuts and several hydrocolloids, containing inulin, guar gum, xanthan gum, and carboxymethyl cellulose, while taking into account how dough hydration affected the development of the noodles. The characteristics of raw noodles, signs of good cooking, andAfter cooking, the noodles' quality was evaluated. The findings indicated that the hydration level had a substantial influence of the mixing, heating, and cooling processes on the rheology of the dough, as well as on the firmness as well as the firmness of both raw and cooked noodles. The sort of hydrocolloids had a big impact on how fresh and cooked noodles behaved (Gasparre et al., 2019). Rice flour has to have better textural qualities, such increased hardness and decreased adhesiveness, in order to be used as a component in gluten-free noodles. We looked at the physicochemical characteristics of rice flour produced by koji fermentation of japonica rice, as well asThe gel that resulted's pasting and textural characteristics. We also proposed producing gluten-free noodles using this technique. The fermentation of rice grains over 24 and 48 hours produced koji-fermented rice flour. Rice that has undergone koji fermentation has less protein and ash and a lower pH.Chain length to short chain ratio in amylopectin rose, while the change in amylose concentration was insignificant. Leaching of starch and swelling of the rice flour were made easier by changes in the structural and compositional properties (Park et al., 2021).

For the majority of Japanese people, rice is a staple diet. Yet, figures made public by the Japanese government show that in the previous 50 years, the per capita consumption of rice has decreased to less than half its original level. This may be due to the Japanese population's growing preference for foods made from wheat flour, like noodles and bread, over rice. This change might make Japan less able to feed itself. Because gluten is a derivative of the wheat flour protein, increasing the consumption of foods made with The use of wheat flour by Japanese people could lead to an increase in the population who have celiac disease and wheat allergies. Around 1% of people worldwide have celiac disease (Sugiyama et al., 2020). The peak viscosity and gel hardness of rice flour rose with changes in its gelatinization and hydration properties, but the gel adhesiveness decreased. For gluten-free recipes, koji-fermented rice flour is a popular ingredient for noodles because it produces noodles with enhanced physical attributes, such as altered textural properties brought on by heightened brightness and a gel-like texture (Park et al., 2021).

Addition of antioxidants to noodles (turmeric, plant extract, fruit peel)

Kiss et al (2019) formulated an antioxidant-rich noodle derived from pseudocereals. He found that fortification with pseudocereals improved the antioxidant content of noodles 597-920 mg GAE/kg of polyphenols),and the noodles' antioxidant capacity (3.47-7.23 mM Fe2+/kg).A meal with a high glycaemic index raises blood sugar levels quickly and may result in long-term metabolic diseases like type 2 diabetes and obesity. The bioactive substances in shiitake are abundant. To examinethe impact of adding shiitake mushrooms on the nutritional value, physical characteristics, also the textural qualities,Shiitake (Lentinusedodes) powder (cap, stem, whole) was added to wheat flour noodles to enhance their flavour. To ascertain the bioaccessibility of antioxidants during digestion and the glycaemic glucose equivalents, in vitro digestion was used. Following in vitro digestion, there was a significantly higher release of reducing sugars (p 0.05) decreased whenThe noodles had 15% shiitake stem powder added. In response to oxidative stress brought on by H2O2, digestion also showed cellular antioxidant strength in IEC-6 cells (Wang et al., 2020).Studies using wheat flour noodles that have been fortified with anti-oxidants were conducted in vitro and in vivo. Five distinct types of noodles were made by adding various amaranth and buckwheat flours—in amounts ranging from 5% to 30%—to wheat flour. In vitro and in vivo tests were conducted to determine how human ingestion affects the absorption of polyphenols and the actual biological effects. To track the release of antioxidants during each gastrointestinal phase, various assays were used. Noodles' ability to cook well remained unaffected by fortification, although it did have a minor impact on their color and boosted theirantioxidant capacity and total polyphenol content (597-920 mg GAE/kg). It was determined that the overall gastrointestinal tracts'content of all polyphenols and antioxidant power showed a steady increase (Kiss et al., 2019).Tea appears to provide a wide range of health advantages, and efforts are being made to utilize it as a food ingredient. Three different tea powders—matcha, green, and black—were utilized to make the noodles in this study, the cooking qualities,We looked at the volatile profiles, antioxidant potential, and dried tea noodles. No matter the concentration, adding tea powder lowered the dry tea noodle's cooking time, cooking loss, and water absorption by 0.5% to 2%.While the matcha tea noodles' greenness and yellowness values, green tea noodles, and rednessand black tea noodles' yellowness values rose, tea powder decreased the brightness of dried tea noodles (Kayama et al., 2022).Most nations around the world consider noodles to be an important staple cuisine. Noodles are well-liked all around the world because of their simplicity in preparation, rapid urbanization, evolving gastronomic trends, and busy lifestyle. After pigs, chicken is the second most popular meat consumed worldwide. Experts frequently suggest chicken meat as a way to includeminerals and high-quality proteins in our meals. It also has a minimal fat level, making it perfect for any kind of diet. There have been numerous studieson the manufacture of noodles using composite flour, however, there are fewer studies on the inclusion of natural antioxidants in noodles (Pavan et al., 2019). ££££

Addition of protein and isolates (milk, rice, or soy protein, its whey)

Wheat noodle recipes occasionally use wholesome protein sources (such as egg, soy, or milk) to meet consumer demand for protein-rich, healthy foods. The interactions and reactions between different protein types are known as co-protein effects that can have an effect on intricate food systems. They may work in harmony or conflict. We investigated the relationship between wheat noodle characteristics, protein network development, and protein properties. The formula for the wheat-based noodles contained globular model proteins like soy glycinin, hen egg ovalbumin, S-ovalbumin, and lysozyme, or bovine serum albumin (BSA). The qualities of fresh (i.e., raw) and boiled noodles were affected by the features of these non-wheat proteins in terms of the kind, velocity, and volume of protein network formation during the making and boiling of noodle dough (Lambrecht, 2019). One of the most widely consumed grain products worldwide, along with bread, is instant noodle. They can be used in place of groats, potatoes, or rice. Instant noodles are a staple meal in the diets of many Asian nations, serving as one of the region's fundamental food groups. Instant noodles were first created in northern China approximately 5000 BC, and they then migrated to other Southeast Asian nations. Momofuku Ando created the first instant noodles in 1958 in Japan. Nissin Foods made them on a massive basis. Around 80 nations around the world enjoy instant noodles (Marciniak-Lukasiak et al., 2021). The characteristics of fresh noodles were not improved by any of the added proteins. Cooked noodles' BSA increased the Kieffer-rig extensibility parameters and soy glycinin. Ovalbumin or S-ovalbumin addition fried noodles' extensibility and cooking quality declined by causing excessive protein polymerization. Lysozyme was added, and Due to this, the rate and amount of polymerization during boiling was decreased. Studies when the recipe included urea, salt, or olive oil revealed that whereas covalent cross-links and The characteristics of cooked noodles are significantly influenced by hydrogen bonding, non-covalent interactions predominate in fresh noodles. In addition, the rate/extent of polymerization, Wheat-based noodles: optimum cooking time, cooking quality, and Kieffer-rig extensibility were all related to the synergistic or binary protein combinations' antagonistic effects on each other in model systems (Lambrecht, 2019). By examining the effects on the functional, textural, sensory, in-vitro protein digestibility, thermal, rheological, and morphological characteristics of instant noodles, the food application of ultrasound-assisted restructured soy protein was assessed. The addition of restructured soy protein dramatically improved the semolina's ability to absorb water, as well as its ability to bind oil and form gels. It also significantly changed the pasting profile. The dough's ability to mix, bond, form balls and sheets was further aided by the restructured soy protein. The storage and loss modulus displayed a continuous maximum increasing trend with frequency, which is consistent with rheological data and validates the impact of soy protein restructured on dough handling properties (Khatkar et al., 2021).the investigation of gluten in the types of wheat used to produce commercial dried noodles might still use some proteomics techniques, though. For the purpose of wheat breeding and the selection of wheat varieties carried out by noodle-making businesses, it is essential to identify the specific protein (subunits or alleles) from different wheat cultivars utilised to make dried noodles. The distinct proteins of wheat cultivars used in commercial dried-noodle manufacture by Hunan Kemen Noodle Manufacturing were therefore assessed Mass spectrometry analysis, one- and two-dimensional electrophoresis, and noodle texture assessment were all used in the current work.

Effect of flaxseed, buckwheat and quinoa flour on noodle functionality

The antinutritional substance phytic acid decreases the biological availability of minerals and proteins. Unsaturated fatty acids and antioxidants can both be found in abundance in flaxseed. In current investigation, phytase enzyme and fermentation were used to dephytinize flaxseed flour. To enhance nutritional value, We used untreated and dephytinized flaxseed flours in the manufacturing of noodles at levels of 0%, 10%, 20%, and 30% (Yaver, 2023). In this study, raw flaxseed was added to traditional handmade noodles, and the end goods' nutritious value was assessed—including estimated glycaemic index, total starch, total dietary fibre, and major mineral composition—were examined. Flaxseed was present in the noodle combination in three different concentrations (10, 15 and 20 g/100 g). The samples' resistant starch contents ranged from 0.6 to 2.14 g/100 g, with the highest resistant

starch levels seen in the sample containing 10% flaxseed. Highest value for total dietary fibre was found to be 8.28% for the sample of noodles enhanced with 20% flaxseed, compared to 1.68% for the control (Yuksel, 2019).

Because of its useful qualities, buckwheat noodles have become more popular recently. The quantity of bioactive substances (such as rutin and quercetin) and nutraceuticals is credited with these properties (B vitamins and unsaturated fats). Consumption of buckwheat noodles has been linked to better metabolic health. While lacking gluten, buckwheat flour exhibits qualities in food processing that are comparable to those of conventional cereal flours. Yet, maintaining strong textural qualities and a high level of sensory acceptance are significant obstacles when creating gluten-free products. As a result, buckwheat has not been widely used in the food sector. Nonetheless, ongoing technological advancements in the areas of processing raw materials, making noodles, and improving noodle quality have helped buckwheat noodles gain popularity and acceptance in recent years (Puligundla and Lim ,2021). The ease and flavour of noodles, a dish that is a staple in China, Korea, and Japan, have made them popular worldwide. Many individuals in the past decided to purchase dry noodles and quick noodles because they were convenient to preserve. The superb taste and nutritious value of fresh noodles, however, are increasingly preferred by an increasing number of customers. The manufacturing of buckwheat noodles is getting a lot of attention since they have the potential to enhance the nutrition and functionality of regular wheat flour noodles. Buckwheat noodles are also quite popular in Italy and most of Asia. Yet, since Tartary buckwheat doesn't contain gluten, pure buckwheat noodles are difficult to process and have a rough texture (Cheng et al., 2021).

Addition of pre biotics

27 papers underwent analysis. All but seven of these publications noted a favourable impact on inflammatory and/or metabolic indicators. Diabetes lasted anywhere from six months to eleven years, and interventions largely involved women and between 4 days and 12 weeks. Improvements in glycemia, cardiovascular indicators, body weight, and inflammatory markers were all mentioned in 19 papers. The most frequently reported benefits came from oligofructose-enriched inulin, resistant starch, and resistant dextrin. Fewer trials that used different compounds with prebiotic characteristics also saw improvements.Prebiotics and substances having prebiotic properties may improve inflammatory and metabolic processes indicators linked to Type 2 Diabetes Mellitus in women who are at least 18 years old, according to these findings. Due to the volume of publications and quality ratings, the interventionsThe use of resistant starch, resistant dextrin, and oligofructose-enriched inulin provided the strongest evidence for benefits. Despite the limited number of research, several prebiotics and compounds with prebiotic characteristics appear promising. It is necessary to do longer-term research that involve both sexes, other prebiotics, and compounds with prebiotic characteristics (Colantonio et al., 2020). Future food trends will focus on functional foods, which can be produced with health advantages that go beyond those of the original cuisine to satisfy the needs of contemporary customers. However, a variety of useful substances may have an impact on a product's attributes, including texture, which is crucial to consumer approval. Prebiotics (inulin, fructooligosaccharides, galactooligosaccharides) and probiotics (Lactobacillus bifidobacterium) are functional nutrients that have undergone extensive research. They may alter the texture of the food, either making it better or worse. As a result, research is concentrating on creating functional items with enhanced textural features that enhance the value of these products by combining the sensory component with the healthy component (Guimarães et al., 2020). A significant microbial ecosystem with a symbiotic link between the host and bacteria exists in the human gut. Every individual has their own ecology. According to research, the 'core' microbiota of humans, which makes up about the stomach contains one-third of the species, is shared. But the remaining two-thirds of the species can vary from person to person. Numerous things have an impact on its uniqueness. pH, antimicrobial proteins, mucus, and intestinal motility are examples of intrinsic variables, whereas drugs and food are examples of extrinsic factors. The ratio of bacterial to human cells was once estimated to be 10:1,

but more recent estimations show that the ratio is closer to parity. Despite this, microbial genomes provide around 150 times more genetic material than do human genomes (Snelson et al., 2021).

Addition of (Pitaya peel powder, dragon fruit, passion fruit)

The pitaya peel, a processing byproduct, is rich in phytochemicals. In order to maximise its potential,Noodles were prepared using a technique that involved adding bioactive substances such pitaya peel powder (PPP).The purpose of this study was to look at how the PPP level (0%-90%) affected the phytochemical, textural, and sensory characteristics of noodles.The 2, 2-diphenyl-1-picrylhydrazyl radical, free polyphenols, and total betacyanins of noodles increased as PPP level increased. Noodles with PPP were redder and darker in colour (Shiau et al., 2020). One of the most significant staple meals in the globe, particularly in Asian nations, is noodles.Without drying, fresh wet noodles are prepared and have more water in them than dry noodles do.Wheat flour has traditionally been the main basic material used to make noodles. Recently, various staple foods, such as vegetables, fruits, mushrooms, and plants, have been combined with wheat flour to create noodles, enhancing their flavour, nutrition, and character. These foods include oats, buckwheat, sweet potatoes, Hericiumerinaceus, pitaya peel, and others. The inclusion of potato flour enhanced the dough's ability to form a paste and the noodles' ability to absorb water and retain their shape, but it also lowered their texture and disrupted the dough's gluten network structure (Li et al., 2022).Consuming food products created with natural components that contain more phytochemicals is good for your health and follows the direction of the food market at the moment. Pitaya peels are typically thrown away as garbage after being used to make juice. Pitaya peels were used in this study and processed into pitaya peel powder (PPP) because they are rich in phytochemicals like dietary fibres, betacyanins, and polyphenols. PPP-enriched noodles are to be consumed more frequently for health benefits. The study showed that PPP can be used in noodles as a bioactive element. Noodles with good nutritional and sensory properties can be made using PPP (Shiau et al., 2020).The ginkgo biloba is one of Earth's oldest plant species, which is referred to be a "living fossil of ancient life." Ginkgo consumed and utilised as a traditional Chinese medicinethousands of years in China. It has a lot of flavonoids,nutrients with anti-inflammatory, antioxidant, and anticancer characteristics include protein, carbohydrate, polysaccharides, vitamin C, and trace minerals. Ginkgo extracts have previously been utilised as hypotensive and cerebrovascular medicines. Additionally, it is used in meals including ginkgo beverages, steamed ginkgo eggs, and ginkgo stewed chicken. Some hazardous substances can be found in ginkgo biloba. The two most poisonous species are ginkgolic acid and hydrocyanic acid generated from amygdalin (Li et al., 2022).One of the best strategies for preventing and controlling diseases related to fibre shortage iscurrently consume a sufficient amount of high-fiber basic foods. The main byproduct of passion fruit processing, passion fruit mesocarp flour (PFMF),was used to make dry, high-fiber noodles. The retrogradation and gelatinization of wheat flour was acceleratedby the presence of PFMF. Because PFMF and wheat flour competed with one another for water, Gluten network formation was unsuccessful, harming the dried noodles' ability to cook and decreasing consumer approval. However, adding PFMF could significantly raisedietary fibre content of noodles. Overall dietary fibre content was more than 6%, especially for the noodles with 9% PFMF, and they may be categorised as a high-dietary-fiber product (Ribeiro et al., 2022).

Table: 1. Describes the functional foods used in noodle preparation

Functional food	Researches	References
Dietary Fiber	1. Dietary fibres physical barrier impact on decreasing the digestion of starch. 2. At a high concentration of insoluble dietary fibre, The noodles' tensile strength and water absorption were decreased.	(Zhang et al., 2022) (Lei et al., 2021)

Antioxidant	1. Shiitake mushrooms were added to noodles to raise their protein content, reduce their glycemic reaction, and boost their antioxidant capacity. 2.Mulberry leaf tea was included in the recipe to boost the nutritional value of the rice noodles, notably in terms of their protein, fibre, and antioxidant capacity.	(Wang et al., 2020) (Makchuay et al., 2023)
Protein	1. The growth, dissolution, and reformation of gluten networks as well as textural variations of dough or noodle products may be influenced by dynamic changes in the network architecture, distribution, and molecular/structural transition of gluten proteins during the making of noodles. 2.Fresh egg whites considerably improved the hardness, chewiness, tensile force, and distance of cooked noodles while also significantly reducing the cooking loss.	(Zhang et al., 2022) (Guo et al., 2022)
Buckwheat	1. The tartary buckwheat bran flour has been studied can be added to noodles to lower their glycemic index. 2. The characteristics of the dough and noodles initially deterioratedwith the addition of more widely used buckwheat bran and hull, then improved, and finally decreased.	(Xue et al., 2022) (Liu et al., 2022)
Amaranthus leaf	Instant noodles could have their nutritional value increased by adding amaranthus leaf powder. 2. Amaranthus leaves can increase food security and nutrition.	(Qumbisa et al., 2022) (Qumbisa, 2019)
flaxseed	1. Noodles provide a sufficient level of eating quality, a glycemic index and glycemic load that are lower than expected, and improved antioxidant activity. 2.Because of stevia's antibacterial properties, the sample with stevia added showed the least microbial growth.	(Zhu and Li 2019) (Amala et al., 2022)

Gluten free	1.showed that functional components such resistant rice starch, XG, defatted rice bran, and inulin can be used to create gluten-free goods with low glycemic index and nutritional value. 2. When Tartary buckwheat starch was extruded, the molecular weight and amylopectin concentration were both dramatically reduced.	(Raungrusmee et al., 2020) (Han et al., 2021)

2. CONCLUSION

This study investigates several nutritious elements for the manufacture of functional noodles. The outcomes demonstrated that integrating healthy components like fibre and antioxidants in the noodles not only reduce the water absorption of the noodles but also boost their nutritional value, particularly in terms of protein, fibre and antioxidant capacity.Protein addition made cooked noodles harder, chewier, more tensile forceful, and longer while significantly reducing the cooking loss. The functional compounds such as amaranthus and ground linseed have a good effect in (increasing of food security and nutrition) and (have their nutritional value increased) by adding amranthus respectively. While on other hand, development of gluten free noodles not only have benefits in celiac disease but also to create low glycemic index and nutraceutical gluten free products.

3. REFERENCES

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