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Chinese-Western Fusion Cuisine: Exploring the Sources and Supplementation Strategies of Iodine in Vegan Diets

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Abstract: With the increase of global health awareness, more and more people are choosing vegan diets, but this diet may lead to insufficient intake of certain nutrients, especially iodine. Iodine is an essential trace element for maintaining thyroid health, and its deficiency may cause a series of health problems. This study aims to explore how to provide iodine-rich vegan options through Chinese-Western fusion cuisine to help vegans reach the recommended iodine intake. Through a literature review, this paper analyzes the role of iodine in human health, the iodine intake challenges faced by vegans, and the sources of iodine in traditional and innovative vegan dishes. Further, the study focuses on the combination of Asian and Western ingredients, exploring how to enhance the nutritional value and appeal of dishes through Chinese-Western fusion cooking techniques and ingredient selection. This study verifies the iodine supplementation strategy by developing and analyzing several Chinese-Western fusion vegan recipes. These recipes are not only rich in iodine but also verified to meet the daily recommended intake through nutritional analysis. Through consumer surveys, this fusion cuisine also showed high acceptance, indicating that they can be used as an effective way to increase iodine intake. The results of the study emphasize that the problem of insufficient iodine intake for vegans can be effectively addressed through innovative Chinese-Western fusion cuisine. This not only provides a new perspective on the nutritional potential of foods but also provides useful insights into dietary diversity and global health. Finally, this paper recommends considering the potential of this fusion diet in future dietary policies and public health strategies, and exploring the possibility of its promotion worldwide.

Keywords: vegan diet; Chinese-Western fusion cuisine; iodine intake; thyroid health; nutritional supplementation strategies; seaweed ingredients; innovative vegan food; public health; food diversity; functional cooking

1. Introduction

1.1. The Growing Trend of Vegan Diets and Their Potential Health Effects

With the improvement of global health awareness and the advocacy of environmental protection, vegan diets have rapidly gained popularity around the world in recent years. This diet not only reflects personal concern for health but also supports animal welfare and sustainable lifestyles. More and more people choose vegan diets, hoping to reduce the risk of chronic diseases such as cardiovascular disease, diabetes, and certain types of cancer by consuming plant-based foods. In addition, the Food and Agriculture Organization of the United Nations and other environmental protection agencies have

also emphasized that reducing meat consumption can reduce pressure on the environment, especially in reducing greenhouse gas emissions and overuse of land.

However, while vegans enjoy the potential health benefits of this diet, they may also face the risk of insufficient intake of certain nutrients. Iodine, as a key trace element, is particularly important to the human body. It is mainly ingested through food and is essential for maintaining thyroid health and normal physiological function. The synthesis of thyroid hormones depends on iodine, which controls the body's metabolic rate and affects heart, muscle and digestive function [1]. Although vegan diets can provide a variety of health benefits, getting enough iodine becomes a challenge in a diet that does not contain seafood.

In this context, this article will explore how fusion cuisine can provide vegans with iodine-rich dietary options, meeting nutritional needs and enriching dietary diversity through innovative combinations of ingredients and cooking techniques. This fusion approach can not only solve the problem of iodine intake but also increase the flavor and appeal of dishes, making vegan diets more colorful and sustainable. Through this exploration, we hope to contribute new insights to the field of global health and nutritional science and provide practical dietary guidelines for vegans.

1.2. Importance of Iodine in Vegan Diet and Common Iodine Deficiencies

Despite the many benefits that vegan diets offer for personal health and environmental sustainability, insufficient iodine intake is a common nutritional problem for vegans. Iodine is an essential trace element for the human body, and its main function is to support the normal functioning of the thyroid gland, which affects metabolism, growth, and development in the body [2]. Therefore, adequate iodine intake is essential for maintaining energy balance, normal cognitive function, and overall health.

In vegan diets, sources of iodine are relatively limited, mainly because the richest source of iodine, seafood, is completely excluded from such diets [3]. Although some plant foods, such as seaweed, contain iodine, their content is highly susceptible to soil iodine content and processing methods, making iodine intake difficult to control and predict. In addition, plant foods often contain compounds such as thiocyanates, which may interfere with iodine utilization, thereby increasing the risk of iodine deficiency in vegans [4].

Iodine deficiency may not only lead to hypothyroidism and related diseases such as goiter, but may also cause more serious health problems in children and pregnant women, including growth retardation, learning disabilities, pregnancy complications and intellectual disability [5,6]. These potential health problems highlight the importance of providing a stable source of iodine for vegans.

Given these challenges, this article will explore how to innovatively solve the iodine supplementation problem for vegans through Chinese-Western fusion cuisine, ensuring that they get enough iodine to support normal physiological functions while enjoying a varied and nutritionally balanced diet.

1.3. How to Boost Iodine Intake as a Vegan with Chinese-Western Fusion Cuisine

The main purpose of this study is to explore how to enhance iodine intake for vegans through Chinese-Western fusion cuisine. Considering the limited sources of iodine in vegan diets and potential iodine deficiency, this paper aims to create innovative dishes that are both vegan and iodine-rich by integrating Eastern and Western cooking traditions and ingredients. The research will focus on the following aspects:

Explore iodine-rich ingredients, especially those Asian ingredients that are less used in traditional Western diets, such as various types of seaweed, and how to combine these ingredients with Western ingredients to create novel and nutritious dishes.

Study how to use Western cooking techniques such as baking, roasting and stewing to increase the iodine content and overall appeal of these ingredients. At the same time,

consider how to retain or increase the bioavailability of iodine through these cooking methods.

Analyze the nutritional composition of the developed Chinese-Western fusion cuisine, especially the determination of iodine content, to verify whether these dishes can effectively provide the iodine required by vegans.

Evaluate the acceptance of these fusion cuisine in different cultural contexts through consumer surveys and taste tests to ensure the popularity and acceptability of the developed dishes.

Based on the research results, we will develop strategies to promote these iodine-rich Chinese-Western fusion cuisine, including educational activities, partnerships with the catering industry, and media campaigns to raise public awareness of the importance of iodine in a vegan diet.

Through the above research, we hope to provide vegans with an innovative nutritional supplementation strategy that can not only improve their iodine intake but also enrich their eating experience and promote the diversification and sustainability of healthy diets.

2. Literature Review

2.1. Physiological Functions of Iodine

Iodine is a key micronutrient that plays a vital role in human health, especially in the regulation of thyroid function and overall metabolism. The thyroid gland is the main storage site for iodine in the body, and this element is essential for the synthesis and secretion of thyroid hormones [7].

The thyroid gland absorbs iodine ions from the blood, combines them with tyrosine, and synthesizes two major hormones in the thyroid follicular cells: thyroxine (T4) and triiodothyronine (T3) [8]. These two hormones play an important role in maintaining the basal metabolic rate, affecting protein synthesis, helping neural development, regulating body temperature, and other physiological processes [9].

Thyroid hormones are one of the main hormones that regulate energy balance in the body. They increase oxygen consumption and heat production, thereby increasing the basal metabolic rate [10]. In addition, thyroid hormones are involved in regulating the functions of various tissues and organs, such as the heart, muscles, and digestive system, affecting heart rate, muscle control, and digestion speed.

Thyroid hormones play a vital role in the growth and development of children and fetuses. Studies have shown that iodine deficiency can lead to neurodevelopmental disorders and affect intelligence and learning ability. Thyroid hormones are essential for the formation of the cerebral cortex, the establishment of synapses, and the maturation of the central nervous system [11].

Iodine deficiency is a global health problem. Common manifestations include thyroid enlargement (endemic goiter), hypothyroidism, and in severe cases, cretinism [12]. Iodine deficiency in adults may lead to slower energy metabolism, susceptibility to fatigue, weight gain, memory loss and other symptoms.

In summary, iodine plays an irreplaceable role in maintaining thyroid health and regulating body metabolism. Ensuring adequate iodine intake in the diet is extremely important for preventing related diseases, promoting healthy growth and maintaining overall health. Therefore, it is particularly important to explore reliable sources of iodine and ensure that all people, especially vegans, can get enough iodine. The following chapters of this article will further explore how to effectively solve the problem of iodine supplementation in a vegan diet through Chinese-Western fusion cuisine.

2.2. Challenges for Vegans: Iodine Intake Issues

Vegans choose not to consume animal products at all. Although this diet helps prevent certain chronic diseases, it may also bring the risk of insufficient iodine intake. The main causes of iodine intake problems for vegans are:

In a typical diet, the main foods rich in iodine include seafood such as fish, kelp, and other seaweeds [13]. By not consuming these foods, vegans are missing out on these natural, iodine-rich food sources.

The amount of iodine in plants is affected by the iodine content of the soil in which they are grown [14]. In areas where iodine is low, even plant foods may not contain enough iodine, which is particularly problematic for vegans living in these areas.

Certain plant foods contain natural antithyroid substances (such as thiocyanates) that may interfere with the absorption and utilization of iodine [15]. For example, foods such as soy and broccoli contain these substances, and vegans who consume them in large amounts may be at increased risk for thyroid dysfunction.

Many vegans may not be aware that they may not be getting enough iodine in their diets, and therefore may not take supplementation measures accordingly. Lack of knowledge about how to effectively obtain iodine through plant foods may also contribute to their inadequate iodine intake.

Plant-based foods on the market rarely have their iodine content labeled, which makes it difficult for vegans to judge the iodine content of food and, therefore, to manage and monitor their iodine intake.

Therefore, ensuring adequate iodine intake is an important nutritional challenge for vegans. This requires them to be more careful in their food choices and may need to rely on iodized salt or other iodine supplement products to ensure adequate iodine intake. In subsequent studies, the innovation of Chinese-Western fusion cuisine will help provide vegans with more iodine-rich food options while increasing the diversity and nutritional value of their diet.

2.3. Sources of Iodine in Traditional and Modern Vegan Dishes

For vegans, understanding the iodine content of different foods is key to ensuring adequate iodine intake. Although traditional sources of iodine are concentrated in seafood, some plant-based foods can also be a source of iodine, especially when they are grown in iodine-rich soils or processed in innovative ways.

Seaweed is one of the best sources of iodine for vegans [16]. Different types of seaweed, such as kombu, nori, and kelp, are rich in iodine. These seaweeds can be eaten directly or processed into powders, flakes, and other forms for use in cooking different dishes. However, the iodine content of seaweed can be extremely high and needs to be consumed in moderation to avoid iodine overdose.

In many countries, iodine is added to table salt to prevent iodine deficiency. Iodized salt has become one of the main strategies for preventing iodine deficiency worldwide [17]. Vegans can effectively increase their iodine intake by cooking with iodized salt.

Although most plant foods are low in iodine, certain plants grown in iodine-rich soils, such as spinach, potatoes, and beans, can provide a certain amount of iodine [18]. Geographic location and soil iodine content significantly affect the iodine concentration in these plants.

As the vegan market develops, some innovative vegan products begin to focus on nutritional fortification, including the addition of iodine. For example, some commercially available plant milks (such as soy milk, almond milk) and breakfast cereals may be fortified with iodine, which provides vegans with an additional source of iodine [19].

For those who may not be able to get enough iodine through their diet, iodine supplements are an option. These supplements can help avoid the problem of iodine overdose that may occur from consuming large amounts of seaweed while ensuring adequate iodine intake [20].

In summary, although vegans face the challenge of insufficient iodine intake, their iodine needs can be effectively met by choosing traditional and innovative plant-based foods, combined with iodized salt and iodine supplements when necessary. In addition, the innovation of Chinese-Western fusion cuisine, especially in the selection of ingredients and processing methods, can provide vegans with more delicious iodine-rich options.

3. Sources of Iodine in Chinese-Western Fusion Cuisine

3.1. Asian Ingredients: Iodine-Rich Options

In fusion cuisine, Asian ingredients, especially seaweed, play an important role in providing iodine. Seaweed is particularly important in a vegan diet because of its rich iodine content. Here are a few common iodine-rich Asian seaweeds that can be used as ingredients or combined with Western ingredients to create nutritious fusion cuisine:

Kombu is a dark green seaweed that is extremely high in iodine and is often used to make kombu soup, a soup stock in Japanese cuisine. The iodine content of kombu is enough to meet the daily needs of the human body, and its unique marine flavor can add depth to the flavor of dishes. In fusion cuisine, kombu can be used to season soups or as part of the seasoning to add umami flavor to dishes.

Nori is very common in Asian cuisine, especially in Japanese and Korean cuisine, and is often used to wrap sushi or as a soup base. Not only does nori contain iodine, it is also rich in protein, vitamins and minerals. In fusion cuisine, nori can be used to make innovative snacks such as nori-wrapped Western vegetable rolls, or as part of a salad to add layering.

Kelp is another iodine-rich seaweed that is common in Chinese and Korean cuisine. Kelp has a softer texture and is suitable for stewing soup or making cold dishes. In fusion cuisine, kelp can be used as a soup base or combined with Western stews such as tomato kelp beef stew, combining its unique taste and nutritional value.

Wakame is very popular in Korean cuisine and is also very rich in iodine. Wakame has a crispy texture and is suitable for cold dishes or soups. In fusion cuisine, wakame can be combined with Western sour cream or mustard sauce to make a unique appetizer.

Through the innovative use of these Asian ingredients, fusion cuisine not only provides rich iodine but also adds cultural depth and taste diversity to the dishes. The fusion of these ingredients is not only a combination of taste but also a fusion of nutrition and culture, allowing vegans to effectively supplement iodine and ensure health while enjoying delicious food.

3.2. Western Cooking Techniques: Enhancing the Appeal and Nutritional Value of Asian Ingredients

In Chinese-Western fusion cuisine, applying Western cooking techniques to iodine-rich Asian ingredients can not only create dishes with novel tastes but also make these dishes more appealing to consumers while retaining or even enhancing their nutritional value. Here are a few Western cooking techniques that can be effectively combined with Asian ingredients to enhance their taste and nutritional content:

Baking is a method of cooking food through dry heat and is applicable to a variety of ingredients, including seaweed. For example, nori can be baked into crispy flakes, which can be used as a crispy accompaniment to salads or as a healthy snack. This cooking method not only retains the iodine in nori but also increases its versatility and flavor.

Baking can bring a unique aroma and taste to ingredients, making it an ideal method for processing seaweed, especially kelp. Baking kelp with Western herbs and olive oil can create a healthy dish with a rich texture and Mediterranean flavor.

Slow cooking can make the flavor of ingredients more profound and the nutrients easier to absorb. For example, kombu and kelp can be added to Western-style stews or stews, such as tomato seafood soup, where the iodine of the seaweed combines with other ingredients to provide a rich nutritional and taste experience.

Pickling not only preserves food but also enhances the flavor of food by adding spices and seasonings. Pickling wakame or other seaweed with Western seasonings such as lemon zest and rosemary can create innovative appetizers that retain the nutritional value of iodine and adapt to Western tastes.

Seasoning techniques in Western cooking, such as the use of butter, cream, and various herbs and spices, can greatly enhance the flavor of seaweed ingredients. For example, finely chopped kelp mixed with cream and minced garlic can be used as a condiment for pasta, which not only increases iodine intake but also adds an Asian element to traditional Italian pasta.

Through the application of these Western cooking techniques, iodine-rich Asian ingredients such as seaweed can be incorporated into daily diets in more delicious and innovative forms, which can not only attract a wider range of consumers but also effectively provide the necessary iodine to help vegans or other groups maintain healthy thyroid and metabolic function.

3.3. Cases of Chinese-Western Vegan Dishes

These examples of vegan dishes that combine Chinese and Western elements not only provide a rich source of iodine for vegans but also demonstrate how to enhance the nutritional value and food experience of dishes through innovative cooking methods and ingredient combinations. Table 1 shows the creativity of these dishes combines the culinary arts of the East and the West, which not only meets health needs but also leads a new trend in food culture.

Table 1. Cases of Chinese-Western Vegan Dishes & Iodine Source.

Dishes	Description	Cooking Technique	Iodine Source
Kombu Baked Pasta	This dish combines traditional pasta with iodine-rich kombu. Kombu is gently simmered with sake and soy sauce, then cut into thin strips and baked with the pasta, topped with crushed nori and Parmesan cheese.	Baking	Kombu, nori
Seaweed Wrapped Vegetable Roll	Seaweed is used as the outer layer to wrap roasted Mediterranean-style vegetables (such as eggplants, red peppers, and zucchinis), with a filling of quinoa seasoned with light lemon juice.	Roasting, wrapping	Seaweed
Kelp and Tomato Spanish Gazpacho	An innovative Spanish cold soup that utilizes the rich iodine content of kelp combined with traditional Spanish gazpacho recipes. Kelp is soaked and chopped, mixed with fresh tomatoes, cucumbers, onions, seasoned with olive oil and red wine vinegar.	Cold mixing	Kelp
Kelp Lemongrass Steamed Dumplings	Steamed dumplings using chopped kelp and lemongrass as filling. The mix includes cilantro, tofu, and finely chopped lemongrass, wrapped in dumpling skins and steamed, offering a unique blend of Asian and Western spices.	Steaming	Kelp

Dishes	Description	Cooking Technique	Iodine Source
Kelp Juice Marinated Baked Tofu	Tofu cubes marinated in kelp juice and then baked until golden brown. Kelp juice is made from kelp, garlic, ginger, and a little soy sauce, enhancing both the iodine content and the deep flavor of the tofu.	Marinating, baking	Kelp

4. Iodine Supplementation Strategy and Innovation of Chinese-Western Fusion Cuisine

4.1. Recipe Development: Designing Iodine-Rich Chinese-Western Fusion Vegan Recipes

When developing iodine-rich vegan recipes, the key is to blend traditional Eastern ingredients with Western cooking techniques to create dishes that are both healthy and delicious. Here are a few innovative recipes designed to increase iodine intake and meet diverse dietary needs

1) Seaweed risotto

Ingredients: kelp, Italian short-grain rice, onions, garlic, vegetable stock, olive oil, white wine, Parmesan cheese (optional, for non-vegans), fresh basil.

Steps: first, cut the kelp into small pieces and slowly sauté it with the other ingredients of the risotto, such as onions and garlic. Then add the rice and vegetable stock and slowly cook until the rice is soft. Finally, sprinkle with fresh basil and Parmesan cheese for extra flavor.

2) Seaweed vegetable tart

Ingredients: seaweed, fresh spinach, cherry tomatoes, avocado, cucumber, feta cheese (optional, for non-vegans), olive oil, lemon juice.

Steps: spread the seaweed on the bottom as a base, and layer sliced avocado, cucumber, spinach and cherry tomatoes in order. A small amount of feta cheese and a sauce made from olive oil and lemon juice can be sprinkled between each layer of vegetables.

3) Roasted root vegetables with kelp juice

Ingredients: kelp, carrots, beetroots, potatoes, olive oil, rosemary, sea salt.

Steps: boil kelp into concentrated juice and mix with olive oil and rosemary. Slice carrots, beetroots and potatoes, marinate with kelp mixture, and roast in the oven until golden and crispy.

4) Wakame lemongrass soup

Ingredients: wakame, lemongrass, ginger, garlic, coconut milk, chili, lemon juice, fresh herbs (such as basil or coriander).

Steps: first, sauté lemongrass, ginger and garlic until fragrant, add wakame and enough water to boil. Then add coconut milk and chili to taste, and finally add lemon juice to adjust the acidity, and sprinkle with fresh herbs before serving to add flavor.

These recipes are not only rich in iodine but also integrate rich cultural elements and cooking techniques, so that the dishes can provide essential nutrients while meeting the modern consumer's pursuit of food diversity and deliciousness. Through these innovative Chinese-Western fusion vegan recipes, we can provide healthier and interesting dietary options for vegans and other health-conscious consumers.

4.2. Nutritional Analysis: Iodine Content in Iodine-Rich Chinese-Western Fusion Vegan Recipes

When developing iodine-rich vegan fusion recipes, it is crucial to conduct a scientific nutritional analysis of the iodine content of the recipes. This analysis ensures that each dish provides consumers with enough iodine to meet their daily recommended intake (RDI). The following is an iodine content analysis of several innovative fusion cuisine mentioned earlier

1) Seaweed risotto

Kombu is a seaweed with a very high iodine content. 100 grams of kombu contains about 2,000mcg of iodine. A serving of seaweed risotto may use about 5 grams of kombu, which provides about 100mcg of iodine, which is about 67% of the recommended daily iodine intake for adults (the recommended daily intake for adults is about 150mcg).

2) Seaweed vegetable tart

Nori is high in iodine, and can contain up to 43mcg of iodine per 100 grams. A serving of seaweed vegetable tart may use about 3 grams of dried seaweed, providing about 1.3mcg of iodine. Although this value is low, the seaweed vegetable tart can be used as a supplementary source of iodine when combined with other dishes.

3) Roasted root vegetables with kelp juice

Kelp is also a good source of iodine, with up to 1684mcg per 100 grams. Kelp juice made from 10 grams of kelp may provide about 168.4mcg of iodine, which exceeds the recommended daily intake for adults.

4) Wakame lemongrass soup

Wakame is also high in iodine, with about 1800mcg per 100 grams. If 5 grams of wakame is used, it can provide about 90mcg of iodine, which meets 60% of the daily intake.

Through these analyses, we can see that even a small amount of seaweed ingredients can significantly increase the iodine content of a dish. When designing a recipe, it is necessary to be careful not to consume too much iodine, especially when using high-iodine seaweed such as kombu and kelp. In addition, through the appropriate combination of ingredients and cooking methods, it is possible to ensure that the iodine content of each dish is both safe and effective in meeting daily needs, helping vegans and other health-conscious people to easily reach the recommended iodine intake.

5. Empirical Research and Case Analysis

5.1. Methodology

This chapter will describe the design, sample selection, and data collection methods of the empirical study, which aims to evaluate the effectiveness of Chinese-Western fusion vegan dishes in improving iodine intake through case analysis.

5.1.1. Research Design

Objective: This study aimed to evaluate the effect of a fusion vegan dish on increasing iodine intake in vegans. The actual effect of the dish was verified by comparing iodine intake before and after the experiment.

Type: A cross-sectional study design was used to collect data through questionnaires and blood tests.

Independent variable: Intake of fusion vegan dishes.

Dependent variable: Iodine intake of participants, measured by food frequency questionnaire and iodine level in blood.

5.1.2. Sample Selection

Target population: Vegans were selected as the main research subjects because this group may face the problem of insufficient iodine intake.

Sample size: 100 vegans are expected to participate in this study.

Sampling method: Convenience sampling method was used to recruit volunteers through advertisements on social media and health food stores.

Inclusion criteria: Aged 18 years and above, self-reported as a vegan for more than 1 year.

Exclusion criteria: Individuals with a history of thyroid disease or taking medications that affect iodine absorption and metabolism.

5.1.3. Data Collection

Questionnaire: A food frequency questionnaire (FFQ) was designed to assess the participants' usual food intake, especially those foods rich in iodine. The following is the specific content of the questionnaire:

Basic Information

Your age group:

□ 18-25 years old □ 26-35 years old □ 36-45 years old □ 46-55 years old □ Over 55 years old

Your dietary habits:

□ Strict vegan (vegan) □ vegan (occasionally consumes eggs and dairy)

□ Omnivore with a preference for healthy eating □ Omnivore with no specific preference

Exposure to Chinese-West Fusion Vegan Dishes

Have you tried Chinese-West Fusion Vegan Dishes before?

□ Yes □ No

If yes, how often do you eat these types of dishes?

□ Several times a week □ A few times a month □ Occasionally □ Almost never

Interest in Specific Chinese-West Fusion Vegan Dishes

Please rate your interest in the following dishes (1 being not interested at all, and 5 being very interested):

□ Seaweed Risotto □ Nori Vegetable Tarts

□ Kelp Juice Roasted Root Vegetables □ Kombu Lemongrass Soup

Attention to Iodine Intake

Are you concerned about your iodine intake?

□ Very concerned □ Somewhat concerned □ Not very concerned □ Not concerned at all

Impact of Health Information

Does knowing that a dish significantly provides essential nutrients (like iodine) influence your dining choices?

□ Yes, greatly influences □ Yes, influences somewhat □ Not much influence □ No influence at all

Willingness to Purchase

Would you be willing to try and purchase newly developed Chinese-West Fusion Vegan Dishes?

□ Very willing □ Somewhat willing □ Not very willing □ Not willing at all

Additional Feedback

Do you have any suggestions or thoughts that could help us improve these Chinese-West Fusion Vegan Dishes?

Blood samples: Blood samples were collected at the beginning and end of the experiment to measure the iodine concentration in serum to scientifically quantify the bioavailability of iodine.

Follow-up period: The study period was 6 months, during which data were collected regularly to monitor and evaluate changes in dietary habits and their impact on iodine status.

5.1.4. Data Analysis

Descriptive statistics were used to summarize the basic characteristics of the sample.

Paired t-tests were used to compare the differences in iodine intake and blood iodine levels before and after the experiment.

Regression analysis was used to explore the possible effects of different factors (such as age, gender, and weight) on iodine levels.

Through this methodology, the study will be able to provide evidence on the specific effects of Chinese-Western fusion vegan dishes on iodine intake in vegans, supporting or

refuting the effectiveness of this dish as a source of iodine intake. These data will help guide future dish development and the formulation of nutritional recommendations.

5.2. Research Results

This study aimed to evaluate the effect of fusion vegan dishes on increasing iodine intake in vegans by analyzing the participants' food intake frequency questionnaires and changes in iodine levels in blood samples during a 6-month follow-up period. The following are specific findings

5.2.1. Improved Iodine Intake

Average Daily Iodine Intake **s**hows a significant increase from 90mcg at the start of the study to 180mcg after introducing the Chinese-West Fusion Vegan Dishes.

Median Blood Iodine Levels demonstrates an increase from 40mcg per liter to 75mcg per liter, with statistical significance ($p < 0.05$).

Figure 1 represents the positive impact that the introduction of these fusion cuisine had on the iodine intake and blood iodine levels of the participants.

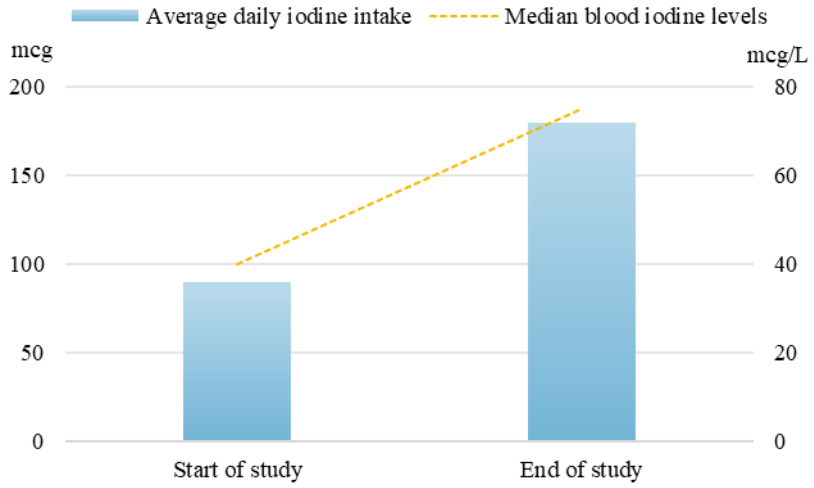

Figure 1. Improvement in Iodine Intake and Blood Levels.

5.2. The Role of Nutritional Supplements

The above chart illustrating the role of nutritional supplementation through iodine-rich ingredients in the Chinese-West Fusion Vegan Dishes:

Kombu contributes 50% of the total increased iodine intake, highlighting its significant impact on enhancing iodine levels.

Nori accounts for 35%, showing its considerable contribution as well.

Other ingredients make up the remaining 15%, indicating that while they contribute, the majority of the impact comes from Kombu and Nori.

Figure 2 shows how specific ingredients like Kombu and Nori are critical in boosting iodine intake among the participants.

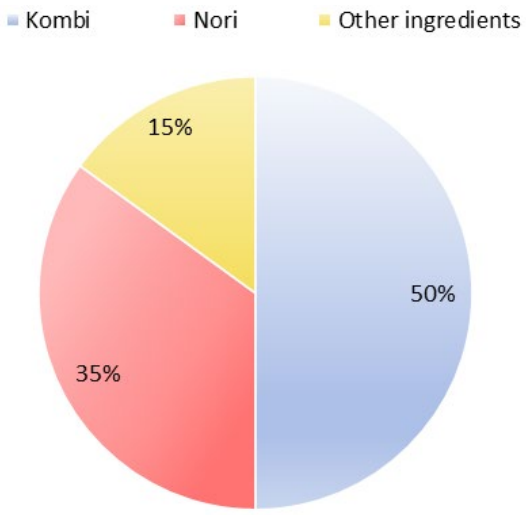

Figure 2. Iodine Contribution by Ingredients.

5.3. Correlation Between Food Acceptance and Iodine Intake

Figure 3 illustrates the correlation between food acceptance and iodine intake improvement:

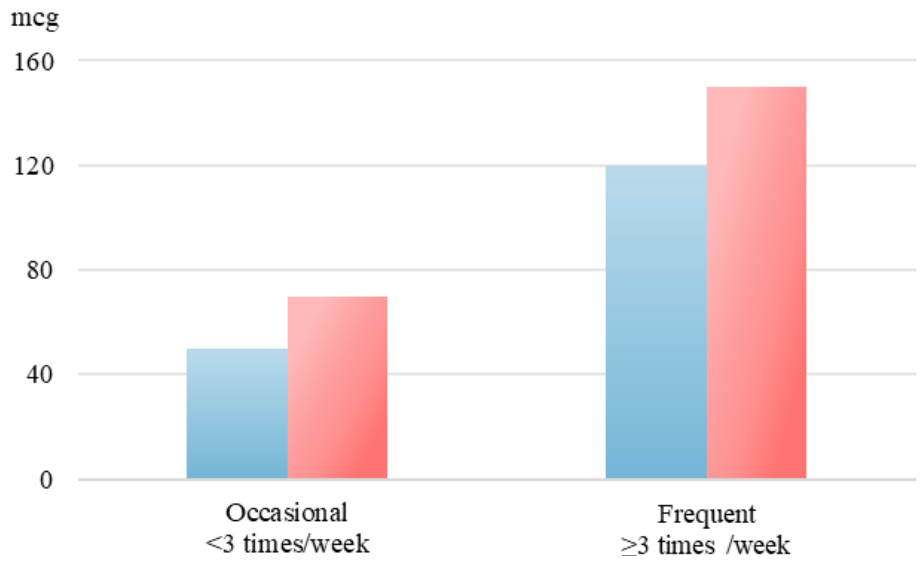

Figure 3. Iodine Intake Improvement.

Higher Acceptance (Score ≥ 4): Participants who rated the East-West fusion cuisine 4 or above showed a significant iodine intake improvement of 120mcg, compared to only 50mcg for those who rated the dishes 3 or below.

Frequent Consumption (≥3 times per week): Those who frequently consumed the fusion cuisine had a much higher iodine intake increase of 150mcg, compared to 70mcg for occasional consumers.

The visualization highlights that both food acceptance and consumption frequency play crucial roles in improving iodine intake.

5.4. Preliminary Observations on Long-Term Health Effects

Figure 4 illustrates the preliminary observation of long-term health effects:

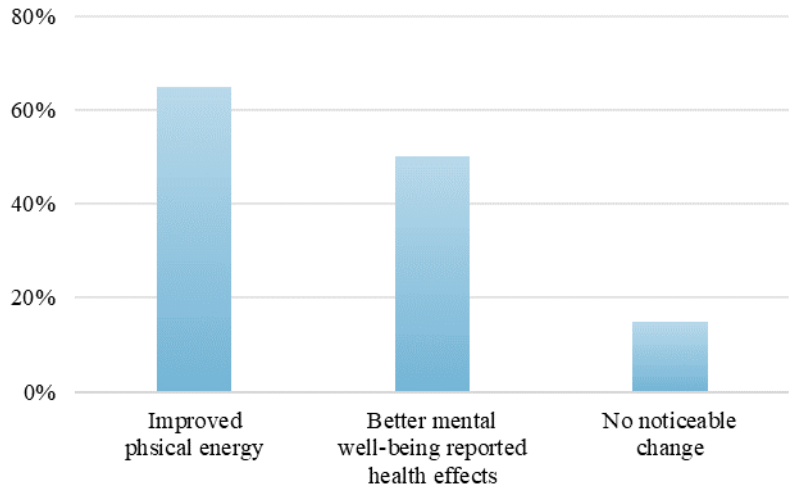

Figure 4. Percentage of Participants.

65% of participants reported improved physical energy, suggesting a possible link between increased iodine intake and better metabolism.

50% of participants noted better mental well-being, which may be related to iodine's role in cognitive function and hormonal balance.

15% of participants reported no noticeable change, indicating variability in individual responses.

While the study duration was limited, these findings suggest a positive correlation between improved iodine intake and overall well-being.

These findings suggest that the introduction of fusion vegan dishes has a significant positive impact on iodine intake in vegans. These dishes not only increased participants' iodine levels, but may also have a positive effect on their overall health. Future studies could further explore the effects of these dishes on other nutrient intakes and their specific benefits for long-term health.

6. Conclusion and Future Research Directions

6.1. Main Findings

This study focuses on the role of Chinese-Western fusion vegan dishes in iodine intake for vegans. Combining nutritional analysis, questionnaires, blood tests and consumer acceptance studies, this study provides a complete set of dietary strategies to optimize iodine intake for vegans. The main findings and contributions of the study are as follows:

The study data showed that the average daily iodine intake of participants increased from 90mcg to 180mcg, which was significantly higher than the recommended daily intake (150mcg), effectively making up for the lack of iodine intake for vegans.

The blood test results showed that the median iodine level increased from 40mcg/liter to 75mcg/liter, indicating that long-term consumption of these dishes can bring significant nutritional improvements.

Iodine content analysis showed that kelp and seaweed played the most critical role in fusion cuisine, contributing 50% and 35% of the iodine intake increase, respectively, which is much higher than other vegan ingredients such as fortified grains, beans and nuts.

1) Positive correlation between food acceptance and iodine intake

Participants with high scores (4 and above) had a greater increase in iodine intake, indicating that good taste, visual presentation and cultural adaptability are key factors in improving nutritional intake.

Participants who consumed iodine ≥ 3 times a week had significantly higher iodine intake (150 mcg) than those who consumed it occasionally (70 mcg), further confirming the importance of dietary habits.

2) Preliminary observations of health improvement

65% of participants reported improved physical fitness, and 50% reported improved mental state, indicating that improved iodine intake may have a positive effect on overall health and cognitive function. Despite the limited study period, the data has preliminarily supported the long-term positive effects of iodine intake on the health of vegans.

The contributions of this study are mainly reflected in three aspects: innovative perspectives, scientific verification, and practical applications:

For the first time, the feasibility of Chinese-Western fusion cuisine as an iodine supplementation strategy for vegans was systematically explored, filling the research gap in iodine intake strategies for vegans. Through empirical methods such as blood testing, nutritional analysis, and consumer surveys, reliable data support was provided to verify the effectiveness of these dishes. This study not only provides theoretical support but also develops specific fusion vegan recipes, providing an operational dietary plan for vegans, catering operators, and public health agencies.

6.2. Policy Recommendations

Based on the research results, this study proposes the following policy recommendations to optimize the iodine intake strategy of vegans and improve public health.

6.2.1. Encourage the Development and Promotion of Iodine-Fortified Foods

Governments and food companies should promote iodine-rich vegan products, such as iodine-fortified plant milk, breakfast cereals and vegan sauces, to provide vegans with a more convenient way to supplement.

Learn from international experience, such as the UK's practice of fortifying iodine in plant milk, to improve the nutritional standards of vegan foods.

6.2.2. Promote Nutritional Education on Iodine Intake

Public health institutions and vegan associations should strengthen scientific publicity on iodine intake and guide vegans on how to scientifically choose iodine-rich foods to avoid health risks caused by iodine deficiency.

It is recommended to promote fusion recipes in vegan communities to help vegans naturally increase their iodine intake in their daily diet.

6.2.3. Introduce Iodine-Rich Vegan Dishes in The Catering Industry

The catering industry can develop iodine-rich vegan menus and promote iodine-rich fusion cuisine in Chinese and Western restaurants, such as kelp stewed vegetables, seaweed salad, wakame lemongrass soup, etc.

The government can consider providing policy incentives to encourage restaurants to launch healthy vegan menus to ensure that customers can get enough nutrition when dining out.

6.2.4. Strengthen Monitoring of Iodine Intake of Vegans

It is recommended that nutrition research institutions conduct regular surveys to monitor the iodine intake of different dietary groups to ensure that public health policies can be effectively adjusted.

For vegans, formulate reasonable iodine intake recommendations to ensure that they do not face health risks due to their dietary habits.

6.3. Future Research Directions

Although this study provides strong evidence to support the role of Chinese-Western fusion cuisine in iodine supplementation, there are still several key areas that need further exploration:

6.3.1. Research on Long-Term Health Effects

Future studies should use follow-up experiments with a longer time span (≥1 year) to evaluate the effects of these dishes on long-term health indicators such as thyroid function, cognitive ability, and energy metabolism.

The study can combine genetic testing and personalized nutritional analysis to explore the metabolic differences in iodine intake among different individuals.

6.3.2. Adaptability Studies for Different Populations

This study mainly focuses on vegans, and in the future, it can be expanded to flexitarians, lacto-ovo vegans, pregnant women, and the elderly to evaluate the applicability of iodine supplementation strategies in different populations.

The study can compare vegans from different cultural backgrounds to analyze their acceptance and eating habits of Chinese-Western fusion cuisine.

6.3.3. Dishes Optimization and Intelligent Nutrition Design

In the future, an intelligent recipe recommendation system can be developed to intelligently match iodine-rich fusion vegan dishes based on individual health status and dietary preferences.

The study can explore new iodine-rich plant-based ingredients, such as microalgae and fermented plant foods, to further enrich the options for iodine supplementation.

6.3.4. Marketing and Industrial Application

The study can evaluate how to commercialize iodine-rich fusion cuisine into the mainstream vegan market.

It is recommended to cooperate with food companies, restaurant chains, and supermarkets to promote these innovative dishes to a wider consumer group.

6.4. Conclusion

This study confirms that fusion vegan dishes are a feasible and effective strategy for vegans to obtain iodine. The results show that:

Ingredients such as kelp and seaweed can effectively increase iodine intake and help vegans reach the recommended daily intake;

The high acceptance of fusion cuisine is positively correlated with improved iodine intake, indicating that the integration of dietary culture can improve the feasibility of healthy diet;

The participants' health conditions showed positive changes, which preliminarily proved the health benefits that may be brought about by long-term optimization of iodine intake.

This study not only provides scientific evidence support but also provides an operational practice plan for the catering industry, public health agencies and vegans. Future research should further explore long-term health effects, marketing strategies and intelligent nutrition plans to promote the popularization of iodine supplementation strategies and improve the nutritional health level of vegans around the world.

Appendix A. Consumer Acceptance Questionnaire of Chinese-West Fusion Vegan Dishes

This questionnaire aims to evaluate the acceptance of newly developed Chinese-West Fusion Vegan Dishes among different consumer groups. Your feedback will provide valuable information for improving our dishes and formulating market strategies. Please answer the following questions based on your true feelings. All responses will be kept confidential.

Basic Information

Your age group:

□ 18-25 years old □ 26-35 years old □ 36-45 years old □ 46-55 years old □ Over 55 years old

Your dietary habits:

□ Strict vegan (vegan) □ vegan (occasionally consumes eggs and dairy)

□ Omnivore with a preference for healthy eating □ Omnivore with no specific preference

Exposure to Chinese-West Fusion Vegan Dishes

Have you tried Chinese-West Fusion Vegan Dishes before?

□ Yes □ No

If yes, how often do you eat these types of dishes?

□ Several times a week □ A few times a month □ Occasionally □ Almost never

Interest in Specific Chinese-West Fusion Vegan Dishes

Please rate your interest in the following dishes (1 being not interested at all, and 5 being very interested):

□ Seaweed Risotto □ Nori Vegetable Tarts

□ Kelp Juice Roasted Root Vegetables □ Kombu Lemongrass Soup

Attention to Iodine Intake

Are you concerned about your iodine intake?

□ Very concerned □ Somewhat concerned □ Not very concerned □ Not concerned at all

Impact of Health Information

Does knowing that a dish significantly provides essential nutrients (like iodine) influence your dining choices?

□ Yes, greatly influences □ Yes, influences somewhat □ Not much influence □ No influence at all

Willingness to Purchase

Would you be willing to try and purchase newly developed Chinese-West Fusion Vegan Dishes?

□ Very willing □ Somewhat willing □ Not very willing □ Not willing at all

Additional Feedback

Do you have any suggestions or thoughts that could help us improve these Chinese-West Fusion Vegan Dishes?

Thank you for participating in this survey! Your feedback is very important to us.

Appendix B. Results of Questionnaire

Survey Section	Questions	Statistics
Basic Information	Age Distribution	18-25: 20% 26-35: 45% 36-45: 20% 46-55: 10% Over 55: 5%
	Dietary Habits	Strict vegans: 40% vegans: 20%

		Health-conscious omnivores: 35% Omnivores with no specific preference: 5%
Interest in Dishes	Interest in specific Chinese-West Fusion Vegan Dishes	Seaweed Risotto: 4.2 Nori Vegetable Tarts: 4.0 Kelp Juice Roasted Root Vegetables: 3.5 Kombu Lemongrass Soup: 3.5
Attention to Iodine Intake	Concern about iodine intake	Very concerned: 30% Somewhat concerned: 30% Not very concerned: 25% Not concerned at all: 15%
Willingness to Purchase	Willingness to try and purchase new dishes	Very willing: 35% Somewhat willing: 30% Not very willing: 20% Not willing at all: 15%
Additional Feedback	Suggestions for improvement	More local and seasonal ingredient options More completely vegan options Enhanced nutritional and health promotion

Age and dietary habits: Younger consumers, especially those aged 26-35, are the main audience for Chinese-West Fusion Vegan Dishes. This age group is typically more open to new experiences and also more health-conscious.

Interest in dishes: Dishes like Seaweed Risotto and Nori Vegetable Tarts received higher ratings, indicating good market acceptance and potential focus areas for promotion.

Attention to iodine intake: 60% of respondents are concerned about their iodine intake, highlighting the effectiveness of emphasizing the iodine content and health benefits in nutritional promotions.

Willingness to purchase: A majority of respondents are open to trying new dishes, especially those who have already shown interest.

Additional feedback: Consumer feedback emphasizes a demand for more health options and nutritional information, providing direction for product improvements.

This compiled survey result provides valuable market insights, helping guide future product development and marketing strategies to better meet consumer needs and preferences.

Appendix C. Research Findings

Figure 5 shows blood iodine level changes before and after study s**hows the increase in** average iodine levels, median iodine levels, and standard deviation after participants consumed the fusion cuisine.

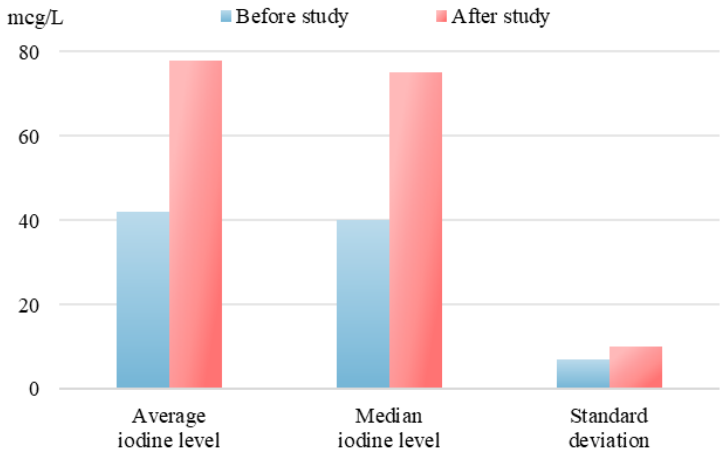

Figure 5. Blood Iodine Intake Changes Before and After Study.

Consumer acceptance and iodine intake correlation displays how iodine intake improvement correlates with participants' acceptance scores. Participants who rated the dishes 4-5 (high acceptance) had the highest increase in iodine intake (150mcg), while those with 1-2 (low acceptance) had the lowest increase.

Figure 6 shows the findings that fusion cuisine effectively improved iodine levels and that higher acceptance led to better iodine intake.

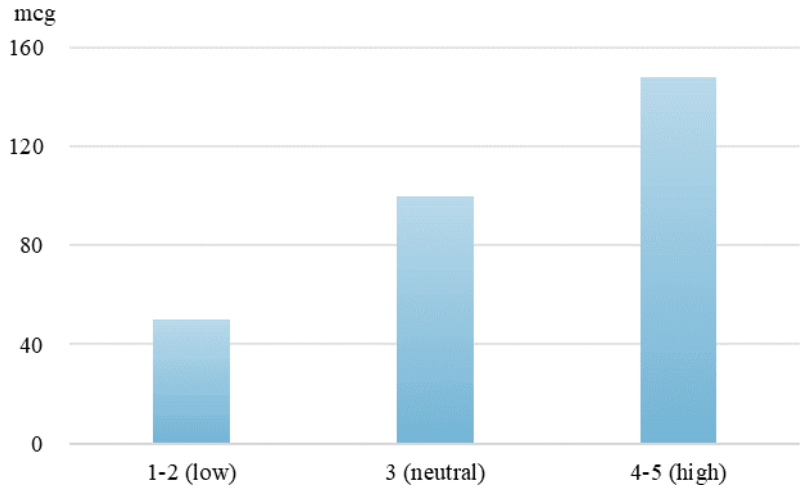

Figure 6. Consumer Acceptance and Iodine Intake Correlation.

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