

Study to promote the attractiveness of *nori*: New recipe development of *nori* from a college student's perspective

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Abstract

The Mikawa region of Aichi Prefecture, where a university is located, is a *nori* (*Porphyra* spp.) farming area, and *nori* cultivation plays an important role in the regional fisheries industry. Nutrients contained in *nori* are also appealing due to its high dietary fibre and folic acid content. In recent years, however, with the changing era, the term '*nori-banare*' (less-interested in *nori*) is being used. In a previous study, it was reported that over 80.0 % of college students liked *nori*, but the health benefits were not recognized as a reason for eating it. Therefore, in this study, an initiative was created, "recipes in which *nori* plays a leading role," to make university students aware of *nori* and encourage them to eat it. Twelve recipes were presented, and the participating students were asked to vote by secret ballot for the recipe they would like to try. As a result, a recipe arranged in the style of baklava, a baked pastry eaten in Turkey and Central Asia, was one of the top votes. The combination of *nori* and sweet snacks is different from the normal image of *nori*, however, the results showed that it is not strange for students but rather an object of interest. This study confirmed the need to know the interests of young people and to think of ways to combine their interests with *nori* to promote the attractiveness.

Key words

nori, industry-academia collaboration project, recipe creation, promoting attractiveness, young generation

1. Introduction

Nori is a foodstuff with a variety of attractions; historically, in terms of fishery resources, and also nutritionally. Although its value has been recognized and it has been consumed in Japanese food culture, with the changing of an era, interest in *nori* has been waning in recent years, as exemplified by the term '*nori-banare*' (less-interested in *nori*). Mikawa Bay in the Mikawa region of Aichi Prefecture, where a university is located, is a *nori* cultivation area and has played a major role in Aichi's fisheries industry (Inokawa, 2016). However, the current status of *nori* production from Mikawa Bay is in decline due to factors such as port development (Inokawa, 2016), rising seawater temperatures (Japan Meteorological Agency, 2023; Notoya, 2002: 2-35), and a lack of successors (Inokawa, 2016). *Nori* is characterized by its nutrients, which include high folate levels (Ministry of Education, Culture, Sports, Science and Technology, 2020). The Ministry of Health, Labour and Welfare's informational website, e-Health Net, introduces folic acid in "Insufficient intake of folic acid in early pregnancy increases the risk of developing Neural Tube Defect" (Ministry of Health, Labour and Welfare, 2021), the Ministry of Health, Labour and Welfare issued information for women of childbearing potential to reduce the risk in 2000. On the other hand, although the use of highly absorbable monoglutamate folate supplements is recommended, it is reported

that only 37 % of women are taking these supplements systematically before determining pregnancy (Sato et al., 2014). Therefore, it is recommended to be aware of folate intake daily from the age when pregnancy becomes possible and before pregnancy is confirmed. This study aims to promote the attractiveness of *nori* as a food ingredient to educate young people about folate intake as a way to utilize *nori* with high folate content. A previous study has confirmed that more than 80.0 % of college students like *nori* (Hattori et al., 2019). '*Onigiri*' (rice ball) is a food that represents the image of *nori*, but 28.6 % answered that they do not use *nori* for their *onigiri*. There were also several responses that viewed *nori* as a 'topping' or 'supporting role' (Hattori et al., 2019). These answers suggested the health benefits of *nori* were not a reason to eat it (Hattori et al., 2023). The goal of this study was to make university students, who will be future consumers, aware of *nori* and encourage them to eat it and to create 'recipes in which *nori* plays a leading role' for the young generation to eat. The students at the nutritionist training facility who participated in the project hoped that consumers' health awareness would be improved through the use and increased consumption of *nori*, which in turn would lead to the revitalization of the aquaculture region of *nori*.

2. Methods

2.1 Target

Sixty-three students who took the "Special Seminar" course in 2023 among the second-year students in the Department of Food and Nutrition at A College were enrolled for the proj-

ect. Twelve students who created the recipes gave a presentation of their recipes, after which the participating students were asked to vote by secret ballot for the recipe they would like to try.

2.2 Project summary

To increase awareness and consumption of *nori* from Mikawa Bay and to revitalize the local *nori* cultivation area, this study started an industry-academia collaboration project with Toda Rihei Shoten, a local *nori* wholesaler. As part of this project, this year's efforts included the creation of *nori* recipes based on young people's consumption awareness.

3. Activities

3.1 Understanding consumer awareness

Based on the results of past surveys, the students were asked to understand what young people their age felt about *nori*, and keywords were extracted from the information that might interest them in *nori*. As a result, the students noticed that although *onigiri* and *sushi* are the most common occasions for using *nori*, it is often used as a 'tool' to prevent rice grains from sticking to fingers or to prevent ingredients from falling out of the rice, and that *nori* is not eaten with the flavor of *nori* in mind. The students realized that *nori* is often used as a topping on other occasions as well; therefore, they proposed the need for recipes "to taste *nori* and to let *nori* take center stage" and recipes that suggest new ways to use *nori*.

3.2 Lecture by Rihei Toda, Mikawa *nori* wholesaler

As a preliminary step to creating the *nori* recipes, Mr. Kuniyoshi Toda of Rihei Toda Shoten, who handles *nori* in Mikawa Bay, was invited to give a lecture to the students about "Production (cultivation) of *nori*," "Types of *nori*," "Difference of *nori*," "Nutrients of *nori*," "Mikawa *nori*," and "Nori at the Rihei Toda Shoten" to familiarize them with *nori* produced in Mikawa Bay (Figure 1). The students had the opportunity to compare three different grades of *nori* and see the differences and characteristics.

3.3 Recipe creation

Consumers' perceptions of *nori* include 'tools' and 'toppings,' but to encourage new perspectives and interest, the theme was set as "Let's think of a menu with *nori* as the main ingredient!" Students were asked to write down the menu name, recipe, and selling points of the menu and to submit a photograph of the prototype recipe.

3.4 Recipe presentation

Presentations were given on twelve recipes submitted by the students (Figure 2). Mr. Kuniyoshi Toda of Rihei Toda Shoten was invited to participate in the presentation. The students who created the recipes had 5 minutes to introduce



Figure 1: Lecture by Mr. Toda from Rihei Toda Shoten, Mikawa *nori* wholesaler

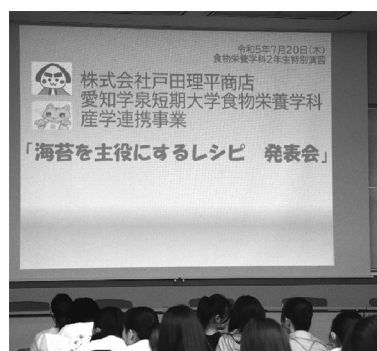


Figure 2: Photograph for 'recipes in which *nori* plays a leading role'

their recipes. Subsequently, after answering questions from the audience and Mr. Toda, the ideas for the recipe were shared by everyone. The recipes presented were: (1) *guru-gurunori tsukune*, (2) pizza-style potato galette with *nori* and *shirasu*, (3) *nori chikuwa tempura*, (4) *nori* salt butter *imomochi*, (5) *kabocha nori* galette, (6) *nori* roll with melted cheese, (7) *nori* and pork roll with yam and carrot, (8) baklava with *nori* in between, (9) *nori mochi* cheese hot sandwich, (10) *nori-nori* nugget, (11) chicken breast rolled in *nori tempura*, and (12) Japanese-style pancake with *nori* and *shirasu* (Figure 3).

After the presentations, Mr. Kuniyoshi Toda gave comments and picked "*guru-gurunori tsukune*" for the Rihei Toda Award. Mr. Toda appreciated the point in which the recipe was created from the perspective of making it together with children.

When participating students were asked to name one *nori* recipe they wanted to try, the top three were: (8) baklava with

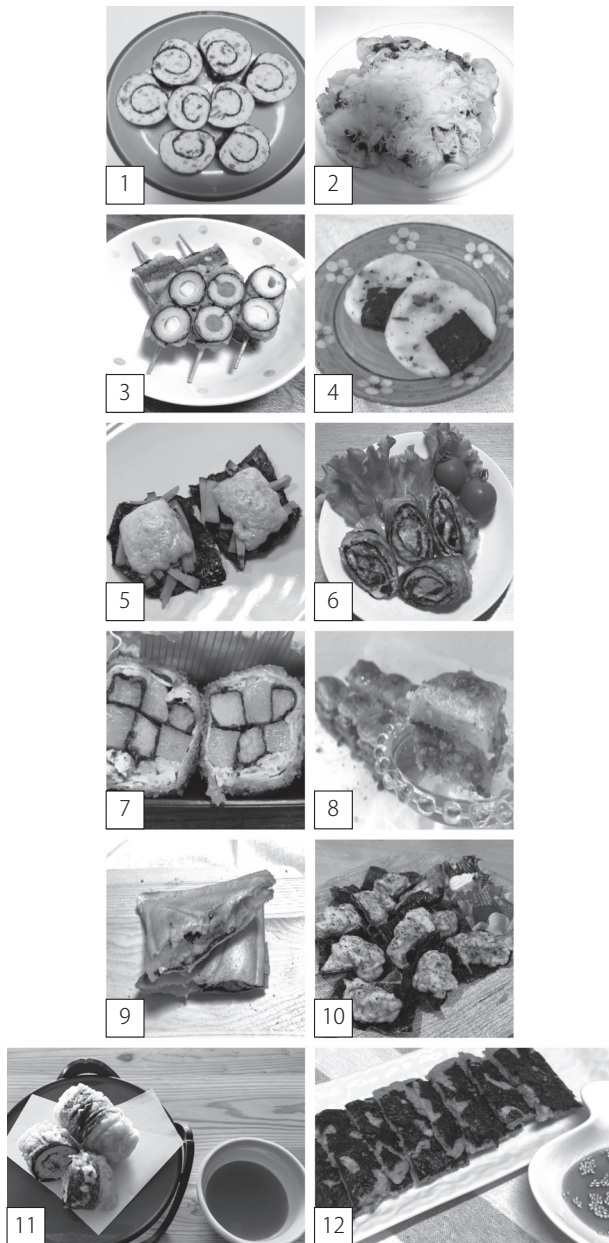


Figure 3: Recipe photographs for presentation

nori in between (20.6 %), (11) chicken breast rolled in *nori tempura* (20.6 %), and (10) *nori-nori* nugget (19.0 %) (see Table 1).

Baklava is a baked pastry eaten in Turkey and Central Asia. It is baked in layers with nuts and other ingredients in between the layers, and a thick syrup is poured over the top. The students who made the recipe included *nori* in between the dough, and the appeal of this recipe was to enjoy the matching of the buttery dough and the flavor of the seashore.

The baklava was one of the top votes and the combination of *nori* and dessert was different from the past image of *nori*, and from the students' point of view, it was not a matter of discomfort but rather an object of interest. The high rankings for chicken breast rolled in *nori tempura* and *nori-nori* nuggets also suggest the interest of *nori*. It showed that not only use

Table 1: Voting results *nori* recipe students

Ranking	Recipe Name	Number of votes (n = 63)	Percentage of votes (%)
1	(8) Baklava with <i>nori</i> in between	13	20.6
1	(11) Chicken breast rolled in <i>nori tempura</i>	13	20.6
3	(10) <i>Nori-nori</i> nugget	12	19.0
4	(2) Pizza-style potato galette with <i>nori</i> and <i>shirasu</i>	6	9.5
5	(12) Japanese-style pancake with <i>nori</i> and <i>shirasu</i>	4	6.3
6	(1) Guru-guru <i>nori</i> tsukune	3	4.8
6	(3) <i>Nori chikuwa tempura</i>	3	4.8
6	(4) <i>Nori</i> salt butter <i>imomochi</i> (sweet-potato rice cake)	3	4.8
6	(6) <i>Nori</i> roll with melted cheese	3	4.8
10	(9) <i>Nori mochi</i> cheese hot sandwich	2	3.2
11	(7) <i>Nori</i> and pork roll with yam and carrot	1	1.6
12	(4) <i>Kabocha nori</i> galette	0	0.0
Total		63	100.0

in Japanese food, but also a combination with non-Japanese food and a combination with fried food with the presence of *nori* is also of interest. The survey determined the need-to-know what young people are interested in and to think of ways to combine their interests with *nori* when considering the appeal of *nori* to young people.

3.5 Lecture on the appeal of *nori*

A faculty member of the Department of Food and Nutrition gave a lecture on a variety of attractions of *nori*, including historical, fishery resources, and nutritional attractions, to deepen understanding of *nori*. The lecture explained that *nori* has been documented in various records as a traditional Japanese food and that it plays a role as a fishery resource in the Mikawa region and Japan's sea-surface aquaculture industry. In addition, the lecture focused on folate as a nutritional attractant, explaining the attractiveness of *nori* as a high-folate-containing food, along with the timing of folate intake and the importance of habitual intake. Furthermore, the current state of *nori* in Mikawa Bay and the results of a survey on *nori* consumption awareness were introduced, and the lecture explained and concluded the importance of communicating the appeal of *nori* to young people who will be future consumers.

4. Summary

As part of an industry-academia collaboration project, this team of researchers has been working with Toda Rihei Shoten to promote the attractiveness of *nori*. The creation of *nori* recipes from the student's point of view has led to new ideas and combinations of ingredients that suggest new ways of eating *nori* that depart from *onigiri* and *gohan* (steamed rice) combinations that have become synonymous with the image of *nori*. It is questionable how novel a recipe based on an internet search could have been in this project. However, the students' ideas and innovations allowed them to learn about *nori*, and it is certain that the students' own learning was enhanced. It is hoped that the recipes created by the students at the nutritionist training facility will be shared with consumers and the local community to encourage young people to become interested in *nori*, promote the consumption of *nori* and *nori* produced in Mikawa Bay, and revitalize the local community.

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