

World's First Utilization of Transcutaneous Electrical Stimulation*¹
to Adjust the Taste of Low-salt Foods

Ajinomoto Co., Inc. Develops “Electric Seasoning” Technology through Joint Research with The University of Tokyo and Ochanomizu University

Toward the Realization of Delicious Salt Reduction Using Wearable Device

*¹ Electrical Stimulation through the skin

TOKYO, September 10, 2024 – Ajinomoto Co., Inc. (“Ajinomoto Co.”) has developed the world’s first “electric seasoning,” a novel concept of adjusting the taste of foods utilizing transcutaneous electrical stimulation, through joint research with Project Associate Professor Hiromi Nakamura of the Junichi Rekimoto Laboratory, Interfaculty Initiative in Information Studies, The University of Tokyo (currently Associate Professor, Tokyo City University) and Project Professor Chinatsu Kasamatsu of the Institute for SDGs Promotion, Ochanomizu University (currently Project Professor, Tokyo Kasei Gakuin University). “Electric seasoning” specifically refers to the technology itself (rather than the device), developed to control taste through weak electrical stimulation of the anterior part of the lower jaw and back of the neck. The results of this research, which demonstrate that the tastes of various foods are enhanced through transcutaneous electrical stimulation, have been published in *Hypertension Research*.^{*2}

*² An international scientific journal published by Springer Nature featuring mainly original articles on clinical and basic research in the field of hypertension.

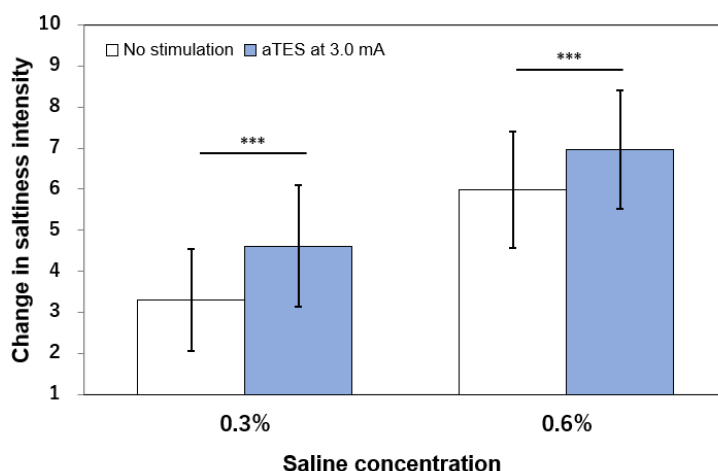
Excessive salt intake, a cause of various health risks, is a global health issue. The World Health Organization recommends a salt intake of less than 5 grams per person per day. However, according to the *National Health and Nutrition Survey* (2019) conducted by the Ministry of Health, Labour and Welfare, the average daily salt intake (grams per day) of Japanese people is excessive at 10.1 grams (10.9 grams for men, 9.3 grams for women). Therefore, new means of salt reduction are necessary. In recent years, reports have been published on technologies that enhance the taste of foods while they are in the mouth using utensils, such as forks or spoons, through which electric currents can be passed to stimulate the tongue electrically via the food, and these technologies are beginning to be used with liquid foods. On the other hand, the transcutaneous electrical stimulation technology developed by Ajinomoto Co. has an electrical stimulation effect during both chewing and swallowing, making possible its application to both liquid and solid foods.

In this joint research project, as a result of verifying the saltiness enhancement effect on saline solutions of 0.3% and 0.6% concentrations as models of foods with a low salt concentration, it was demonstrated that the saltiness of both was significantly enhanced.^{*3} Next, when tests were conducted on the effects of transcutaneous electrical stimulation regarding six types of low-salt foods, both solid and liquid, from various

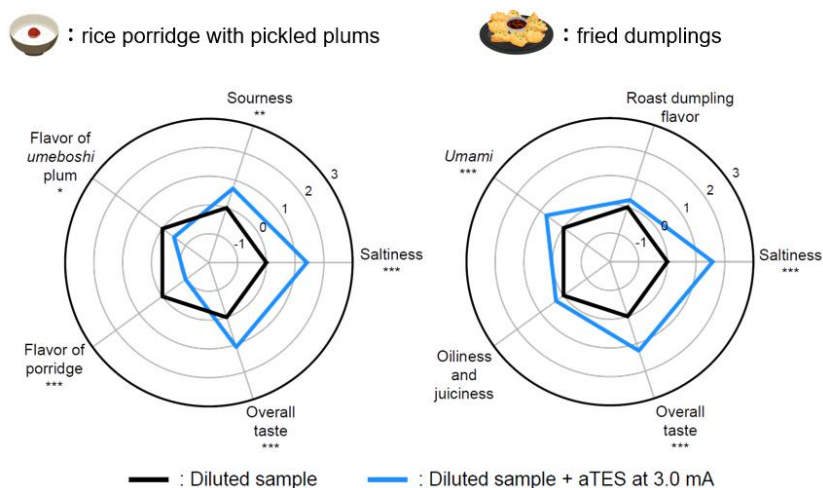
genres such as Japanese, Western, and Chinese cuisines, a significant enhancement of saltiness was confirmed in all of them.^{*4} Furthermore, depending on the food, not only saltiness but also umami and sourness were enhanced, and changes in flavor were indicated, demonstrating that electrical stimulation influences both the taste and the flavor of foods.

^{*3} Through transcutaneous electrical stimulation (aTES), the saltiness of 0.3% and 0.6% saline solutions was significantly enhanced: Wilcoxon signed-rank test (** $P < 0.001$).

^{*4} Through transcutaneous electrical stimulation (aTES), it was confirmed that saltiness was significantly enhanced in every case of six types of diluted foods, both solid and liquid, with various characteristics such as Japanese, Western, and Chinese cuisines (cold potato potage, chicken broth soup, rice porridge with pickled plums, stir-fried pork and radish, Chinese pork stir fry, fried dumplings). In addition, the sourness of the rice porridge with pickled plums and the umami of the fried dumplings were significantly enhanced, and the distinctive flavors of each food were increased or decreased through transcutaneous electrical stimulation: Wilcoxon signed-rank test ($P < 0.05$, $P < 0.01$, $P < 0.001$).



Transcutaneous Electrical Stimulation (aTES) and Changes in Strength of Saltiness



Verification of Changes in Taste through Transcutaneous Electrical Stimulation (Examples: rice porridge with pickled plums, fried dumplings)

Furthermore, Ajinomoto Co. has examined specifications for devices to facilitate the use of this technology and has developed the concept of wearable devices that can be worn around the neck or on the ear. By wearing these devices while eating, the saltiness of foods being consumed can be continuously enhanced, reducing the burden on consumers who need to reduce their salt intake and providing support for delicious salt reduction. Going forward, Ajinomoto Co. will develop new services utilizing these wearable devices.



Top: Concept for device worn around neck

Bottom: Concept for device worn on ears

Toward the achievement of its purpose of “contributing to the well-being of all human beings, our society and our planet with 'AminoScience’”, Ajinomoto Co. is aiming to extend the healthy life expectancy of one billion people by 2030. Leveraging the novel concept of “electric seasoning,” it will contribute to healthy and comfortable lifestyles by enriching the foods eaten by consumers, including those who need to reduce their salt intake.

Reference

Article published in *Hypertension Research* :

Takumi Funamizu, Ryo Matsumoto, Akane Suzuki, Koichiro Watabe, Hiromi Nakamura, Chinatsu Kasamatsu, “Sensory studies on the taste and flavor perception of food products by anodal transcutaneous electrical stimulation” *Hypertension Research*, Sep 10, 2024, doi: 10.1038/s41440-024-01867-5.

<https://www.nature.com/articles/s41440-024-01867-5>

The Ajinomoto Group will contribute to the well-being of all human beings, our society and our planet with “AminoScience” based on the corporate slogan “Eat Well, Live Well.”. The Ajinomoto Group has offices in 36 countries and regions, and sells products in more than 130 countries and regions. In fiscal 2022, sales were 1.3591 trillion yen (10.0 billion U.S. dollars). To learn more, visit www.ajinomoto.com.

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