

# **EFFECT OF HIGH HYDROSTATIC PRESSURE COMBINED WITH SODIUM CHLORIDE AND SODIUM PHOSPHATE ON THE PALATABILITY OF CHICKEN MEAT GELS**

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## **I. INTRODUCTION**

The growing number of older adults, including those with chewing and swallowing disorders (dysphagia), creates a high market demand for texture-modified food products for hospitals, nursing homes, and home consumption [1]. Often, especially among older people with dysphagia, malnutrition is a concern, and protein-rich foods are usually needed to improve their nutritional status. Additionally, a wide variety of foods with different aromas and flavors can help stimulate appetite in this population [2,3]. Various food processing technologies, such as high hydrostatic pressure processing, high hydrodynamic pressure processing, pulsed electric field treatment, plasma processing, ultrasound-assisted processing, and irradiation, are used to modify the texture and sensory characteristics of foods while maintaining their nutritional value [4]. The objective of this study was to investigate the effect of high hydrostatic pressure (HHP) at 0.1-200 MPa for 10 minutes at 20°C in combination with sodium chloride and sodium phosphate addition on the sensory evaluation and mastication parameters of chicken meat gels.

## **II. MATERIALS AND METHODS**

The chicken breast meat was used for meat gel preparation, following the method of Maksimenko et al. [5]. Briefly, the minced chicken meat was mixed with various concentrations of sodium chloride (0-2%) and sodium pyrophosphate (0-0.3%) and subjected to HHP treatment at 0.1-200 MPa for 10 min using a high pressure food processor (Dr. CHEF, Kobe Steel, Japan), followed by heat treatment at 80°C for 30 min. The sensory evaluation of chicken meat gels was conducted using Scheffe's paired comparison method. Twenty-one untrained panelists (10 males and 11 females; aged 21-31 years) from the Faculty of Agriculture at Niigata University of Japan were selected based on their interest and availability to participate in the study, in accordance with ethical standards. Participants were asked to assess the odor, taste, texture, and overall acceptance of thermal meat gels on a 7-point scale ranging from -3 to +3. Friedman's test was used to compare significant differences between the scores for each evaluation item at the 5% level. For the masticatory test, ten untrained panelists (5 males and 5 females; aged 21-31 years) from the Faculty of Agriculture at Niigata University of Japan were selected based on their interest and availability to participate, in accordance with ethical standards. Each participant's total chewing time duration (s) and the number of chewing cycles (n) before the first swallow were determined. A confidence level of 1% was used to compare significant differences among means using the Student's t-test.

## **III. RESULTS AND DISCUSSION**

Food textures recommended for dysphagia diets (patients with chewing and swallowing dysfunctions) should be soft, moist, elastic, smooth, and easy to swallow [6,7]. Our previous studies showed that pressurized meat gels at 150-200 MPa exhibited higher hardness, cohesiveness, and elasticity compared to unpressurized meat gels, according to the texture profile analysis [5]. In this study, the

sensory evaluation of the pressurized chicken meat gels at 150-200 MPa showed high scores for the "Hardness," "Juiciness," "Cohesiveness," "Springiness," "Easy to swallow," and "Pleasant taste" items ( $P < 0.05$ ) compared to unpressurized chicken meat samples, irrespective of the sodium chloride and sodium phosphate content. The panelists reported that the texture of pressurized meat gels was moist, elastic, more pleasant to bite, and easy to swallow. In the mastication experiment, the number of chewing cycles (n) and chewing time duration (s) increased in pressurized meat gels at 150-200 MPa compared to unpressurized meat samples ( $P < 0.01$ ).

#### IV. CONCLUSION

HHP treatment at 150-200 MPa was effective in providing high cohesiveness and elasticity; however, it resulted in low softness. The increased hardness may have affected the number of chewing cycles and chewing time in the mastication test. Nevertheless, panelists reported that the texture of pressurized meat gels was more pleasant to chew and easier to swallow due to the increased moisture and elasticity of the meat bolus. Future research on the analysis of bolus formation and transportation is needed, as it is an important aspect of texture and swallowing characteristics.

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