

Consumer liking of high pressure processed, sous-vide cooked sea scallops and lobster tails

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Introduction

Sous-vide, the cooking of vacuum-packaged foods in a low-temperature water bath, represents a growing trend in the foodservice industry, owing to the superior sensory and nutritive value of these products. Vacuum-packaged, pre-portioned seafood, intended for sous-vide cooking can offer better quality to consumers and convenience to foodservice facilities. However, the refrigerated shelf-life of vacuum-packaged seafood is an important concern. High pressure processing (HPP) has proven to extend shelf-life of various commercially available foods, with minimal effects on quality, making moderate HPP a potential technology for tender, vacuum-packaged, sous-vided seafood. However, the effects of HPP on the consumer acceptability of sous-vide seafood have not been reported. Moderate pressures (150 and 350 MPa) were used in this study primarily to prevent toughening of high value sea scallops and lobster tail meats.

Objective

To assess the effects of HPP on consumer acceptability of sous-vide cooked scallops and lobster tails on a nine-point hedonic scale and five-point "just-about-right" scale.

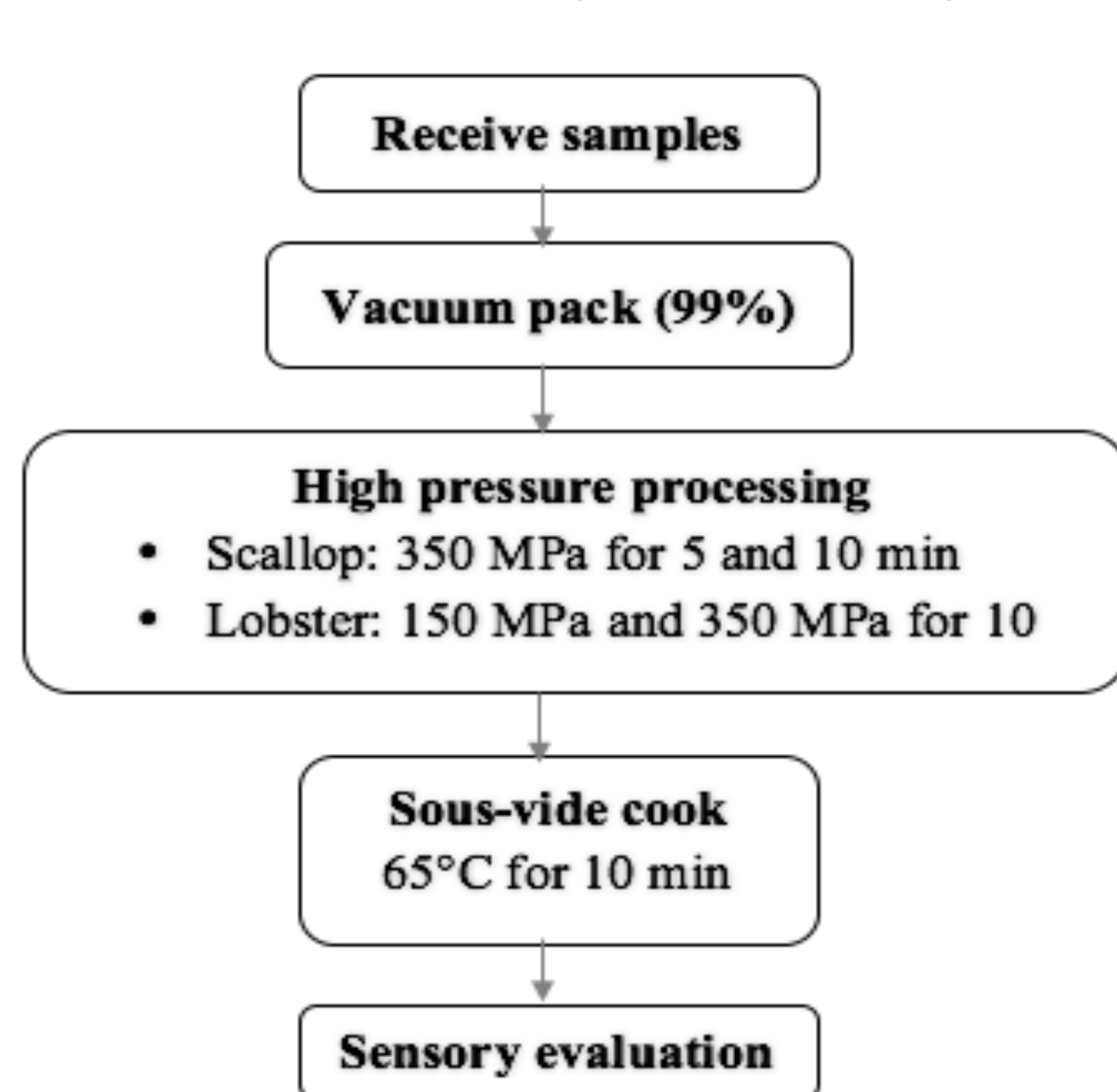


Fig 2. Scallop (top) and lobster tail (bottom) samples for consumer testing

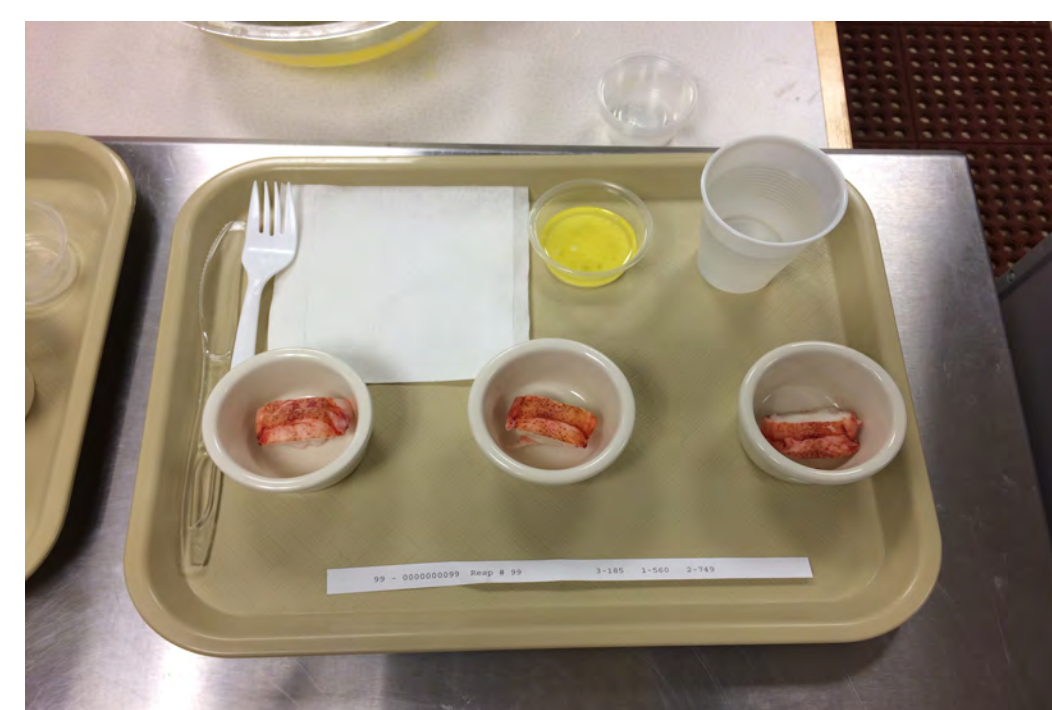


Fig 1. Process flow for HPP and sous-vide processing of scallops and lobster tails

Approach & Methods

Sample processing: Samples were vacuum packed at 99%. Treatments were processed in triplicate. For scallops, HPP-treated samples were processed at 350 MPa for 5 and 10 min. For lobster tails, HPP-treated samples were processed at 150 MPa and 350 MPa for 10 min. Samples were subsequently sous-vide cooked at 65°C for 10 min (Fig 1).

Consumer testing: Untrained panelists (n=100) interested in consuming seafood were recruited to evaluate sensory attributes.

- Aroma, color, texture, flavor, and overall acceptability of cooked scallops and lobster tails was assessed on a nine-point hedonic scale (1 = dislike extremely, 5 = neither like nor dislike, 9 = like extremely)
- Firmness, tenderness and juiciness were assessed on a five-point "just-about-right" scale (3= just about right).
- Whole scallops and lobster tail segments were served at room temperature with melted butter in randomized and balanced order post sous-vide cooking (Fig 2).

Statistics: Data were statistically analyzed by one-way ANOVA at a significance level of $p < 0.05$, followed by Tukey's HSD.

Results & Discussion



Fig 3. Spider map depicting percent of panelists' selection of best word to describe the scallop (left) and lobster tail (right) samples.

- When asked which word best described the scallop samples, significantly more people selected "chewy" and "firm" for the HPP treated samples, compared to the non-HPP control (Fig 3).
- Moreover, more panelists picked "soft" and "mushy" to describe control scallops compared to 10 min HPP treatment.
- When asked which word best described the lobster samples, all products were perceived as "tender" by ~26% of respondents.
- However, control samples were rated "mushier" and "softer" compared to the 350 MPa samples.

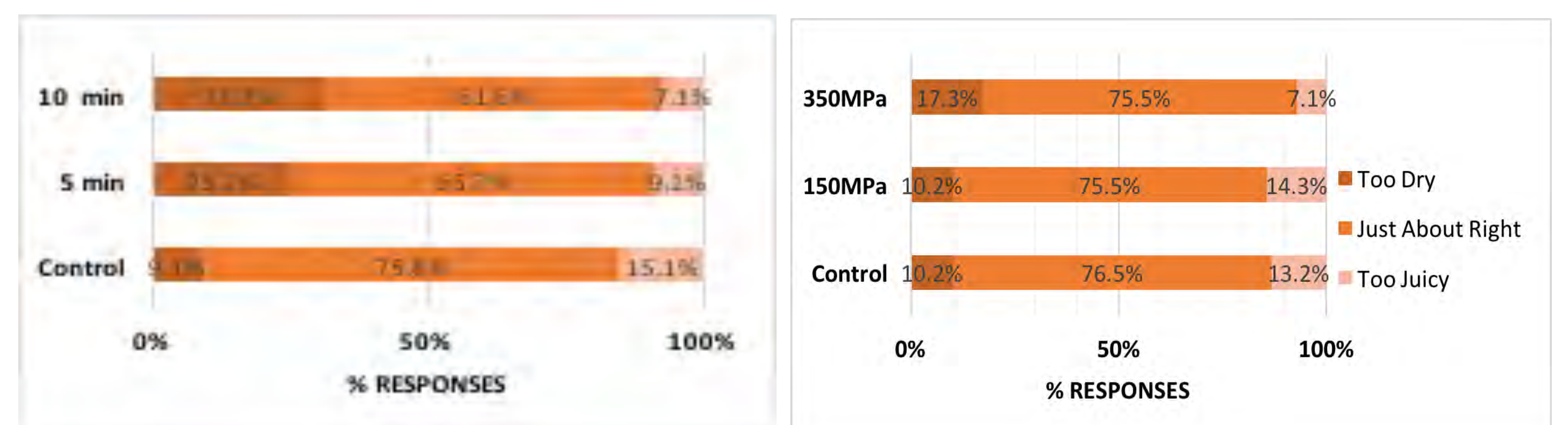


Fig 4. Distribution of responses on JAR scale for "Juiciness" of scallops (left) and lobster tails (right)

- A higher proportion (75.8%) of panelists reported just the right amount of juiciness in control scallops, compared to 5 min (65.7%) and 10 min (61.6%) HPP treatments (Fig 4).
- For lobster tails, a similar proportion (~75%) of panelists reported just the right amount of juiciness for all the treatments.

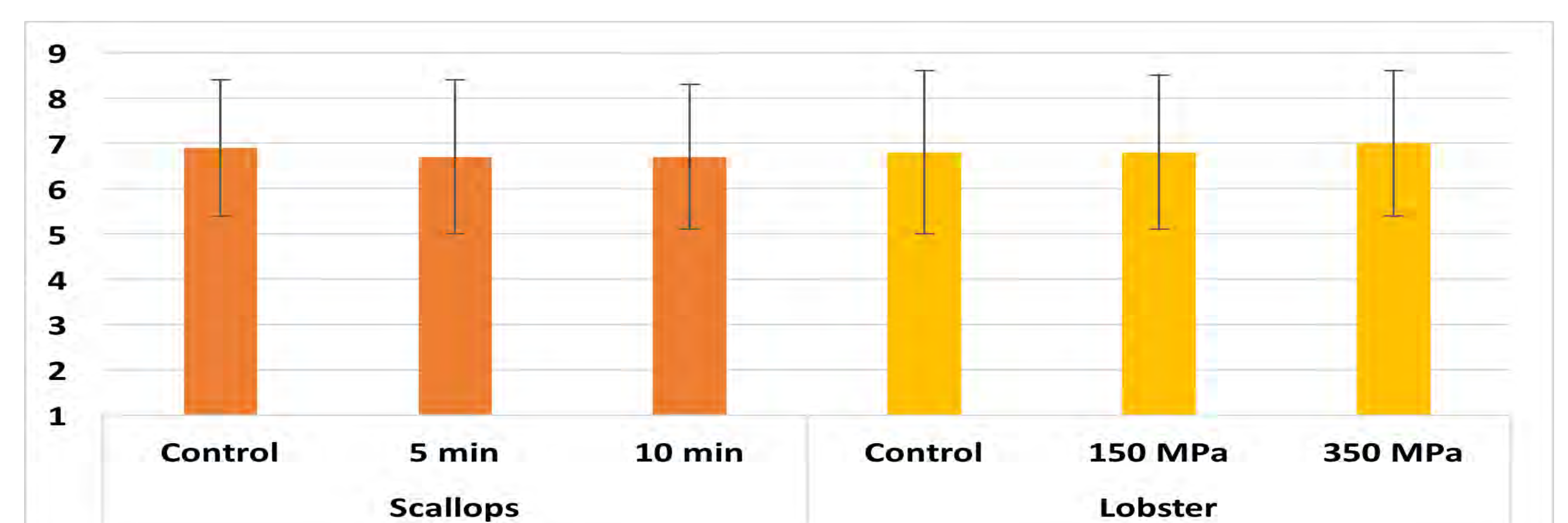


Fig 5. Acceptability of overall quality on a 9-point hedonic scale for scallops and lobster tails.

- Despite the differences in texture based on the JAR scale, the panelists' ratings for overall acceptability of HPP-treated, sous-vide cooked scallops and lobster tails were not significantly different than the control.
- Scores for all sensory attributes on the 9-point hedonic scale were not different and ranged between 6-7 among all treatments (Fig 5).

Conclusions

- Textural differences among scallops and lobster tail treatments were detected using the 5-point JAR scale and best word descriptors, however, overall acceptability ratings remained unaffected due to application of high pressure to sous-vide cooked seafood.
- HPP can be applied to potentially extend refrigerated shelf-life without affecting the consumer acceptability (9-point) of sous-vide cooked scallops and lobster tails.