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Minimal processing for preservation of kelp

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Minimal processing for preservation of kelp

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Why process? Short shelf life limits market potential



Fresh and “fresh-like” products
command a premium price





BLANCHING



FREEZING

1. What is the effect of blanching on **microbial quality**?
2. Does blanching negatively affect **texture**?
3. Is blanching necessary to ensure **quality** of kelp during **frozen storage**?
4. What are the impacts of:
 - a. Product form
 - b. Blanching method
 - c. Blanching temperature
 - d. Blanching time



BLANCHING

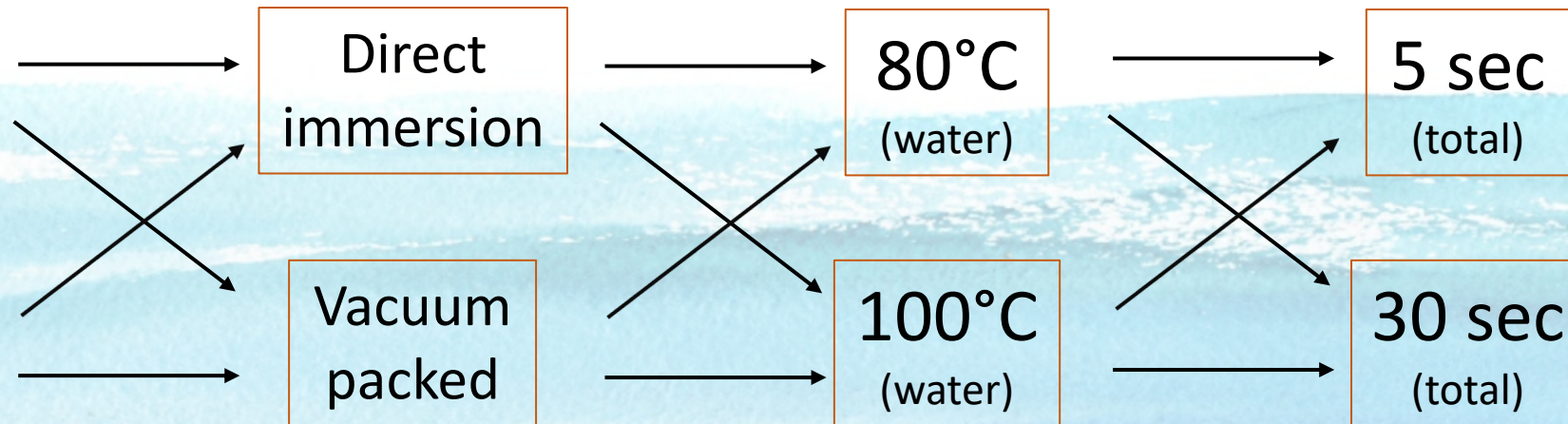
Blanching



Whole blade



Shredded slaw



1. What is the effect of blanching on **microbial quality**?

Minimal effect observed (APC, Fungi)



BLANCHING

2. Does blanching negatively affect **texture**?

No, blanching did not decrease instrumental texture (firmness, hardness, chewiness, resilience) immediately after treatment.

3. Is blanching necessary to ensure **quality** of kelp during **frozen storage**?

Potentially.

Unblanched samples exhibited greater change in **texture and drip loss (shredded)** during 12 months of frozen storage.

1. What are the impacts of:

- a. Product form: Whole blade is firmer than shredded slaw, but experiences more drip loss during storage.
- b. Blanching method: Vacuum packaging results in a firmer product, easier temperature control.
- c. Blanching temperature: Higher temperature decreased texture loss during frozen storage, but also resulted in darker color.
- d. Blanching time: Longer blanch time decreased texture loss during frozen storage.



BLANCHING

1. Does freezing negatively affect **texture**?
2. Does freezing negatively affect **color**?
3. What is the impact of product form?



FREEZING

Method: Vacuum packaged, blast frozen (-30°C) for 4 h, extended storage at -20°C for up to 12 months.

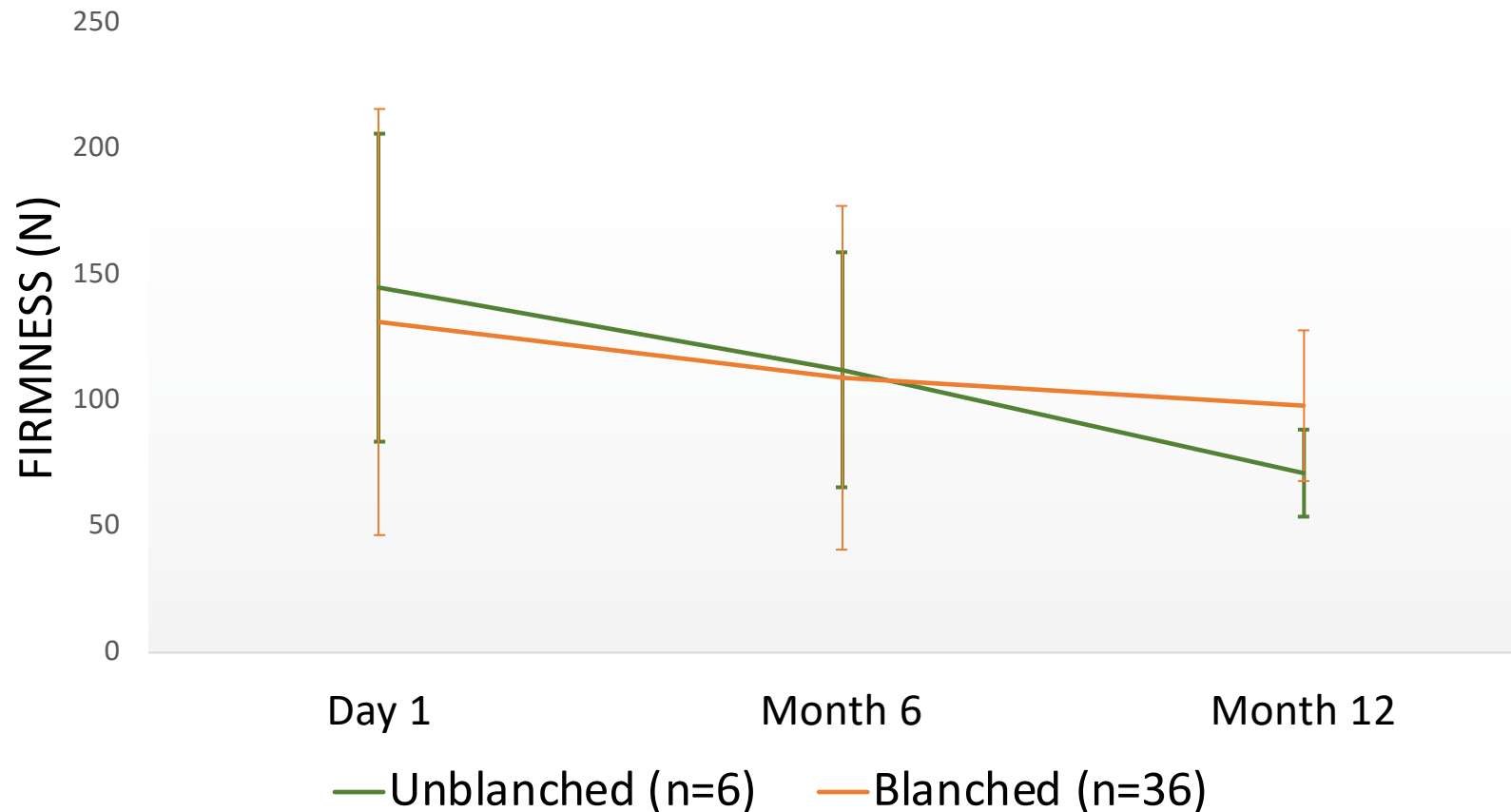
1. Does freezing negatively affect **texture**?

Texture of frozen samples begins to decrease after **six months** of frozen storage.



FREEZING

Firmness of blanch & unblanched frozen samples



2. Does freezing negatively affect **color**?

No clear trend.



FREEZING

3. What is the impact of product form?

Shredding decreases texture loss over time.



What do consumers think?

Raw

Blanched
60s

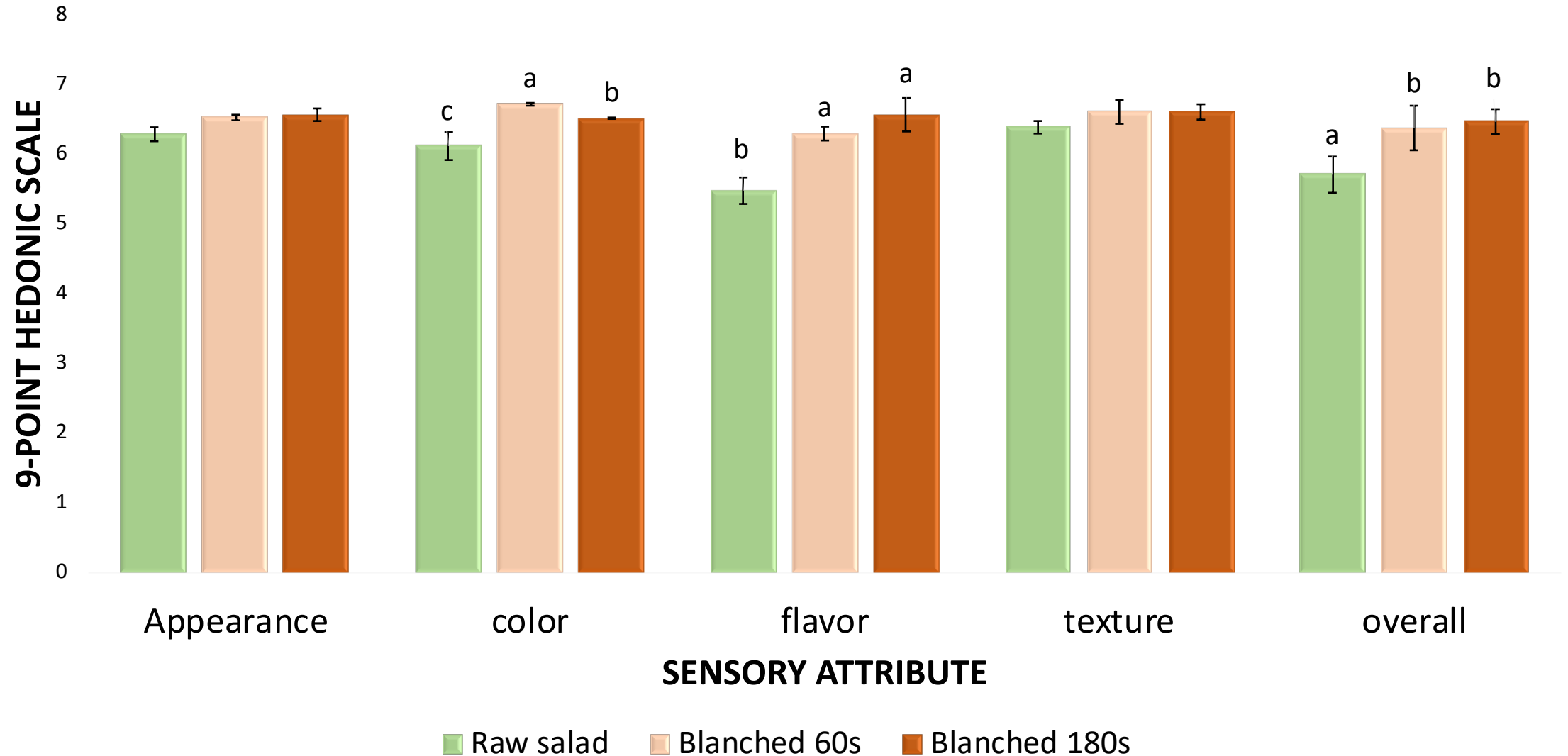
Blanched
180s



Consumer testing (n=102)

9 point hedonic scale

Average hedonic (liking) scores for seaweed salad



Conclusions

1. Blanching can benefit kelp quality by:
 - a. Imparting bright green color
 - b. Stabilizing color and texture during frozen storage
2. Higher blanching temperature and times in the range of 30 sec – 1 min maximize quality.
3. Vacuum packaging limits texture loss and drip loss, particularly in shredded product.
4. For salad applications, consumers report greater liking of blanched product.

Other/ongoing work

- Fermentation
 - Sauerkraut-style product produced with fresh/blanched/frozen product
 - Consumer sensory testing of resulting product
- Salting
 - Dry salting/brining
- Validation of blanching parameters for food safety

THANK YOU

