

STUDY ON THE EFFECTS OF VARIOUS TYPES OF SEAWEED ON VEGETARIAN BURGERS



Seaweed has a significant impact in the agri-food industry, with their increasing use offering numerous advantages. As a natural and nutrient-rich source, algae enhance food products by providing essential vitamins, minerals, and fatty acids. They are often utilized as sustainable substitutes for animal-based ingredients, enabling the development of healthy and environmentally friendly plant-based alternatives. Moreover, their unique texture and subtle taste contribute to culinary diversity.

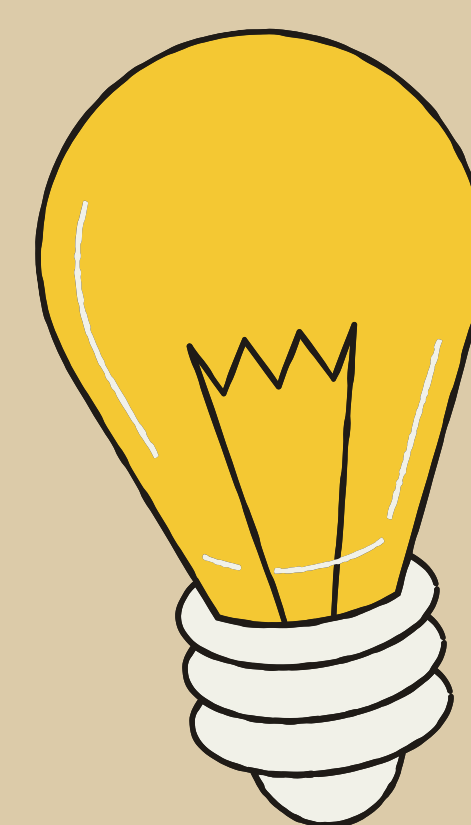
INTRODUCTION

This study on veggie burgers stems from an exciting EU-funded project called "Minerva", which aims to harness Europe's under-utilized and sustainably produced seaweed biomass, to develop new high-value products and reduce waste in current processes. The main objective of this study is to investigate the impact of 2 types of brown algae and 2 types of red algae on vegetarian burgers. A total of 5 seaweeds will be tested. The specific effects of each seaweed variety on the composition, and taste of veggie burgers remain to be explored. This topic raises interesting questions about the optimization of veggie burgers and the integration of algae in the food industry.



OBJECTIVE

The objective of this project is to produce, study, and analyze vegetarian burgers using different types of algae in order to compare them and determine which one would yield the best results in this type of product.



METHODOLOGY

Ingredients :

- Kidney beans
- Vegetable mix
- Bread crumbs
- Seaweed (As2 /S19 /GHS /GRHS2 /GRH+S)
- Onions
- Cumin
- Salt
- Garlic
- chilli powder
- Water (Variable in controls)

Manufacturing Process:

1. Weigh each ingredient and set them aside.
2. Wash and drain the kidney beans.
3. Blend all the vegetables (vegetable mix, onions, kidney beans, etc.) at speed 1 for 30 seconds.
4. Add the dry ingredients (breadcrumbs, spices, seaweed, etc.).
5. Blend at speed 1 for 2 minutes.
6. Place the mixture into burger press, using 100g portions.
7. Repeat the process 5 times to make 5 burgers.
8. Place the burgers in the freezer overnight.
9. Cook the burgers at 200 degrees Celsius for 30 minutes.
10. Perform the analyses.



IMPORTANT!

All the methods were carried out under the same conditions to obtain the most repeatable result possible.

ANALYSIS

The characteristics of the different burgers were studied using various analysis methods.

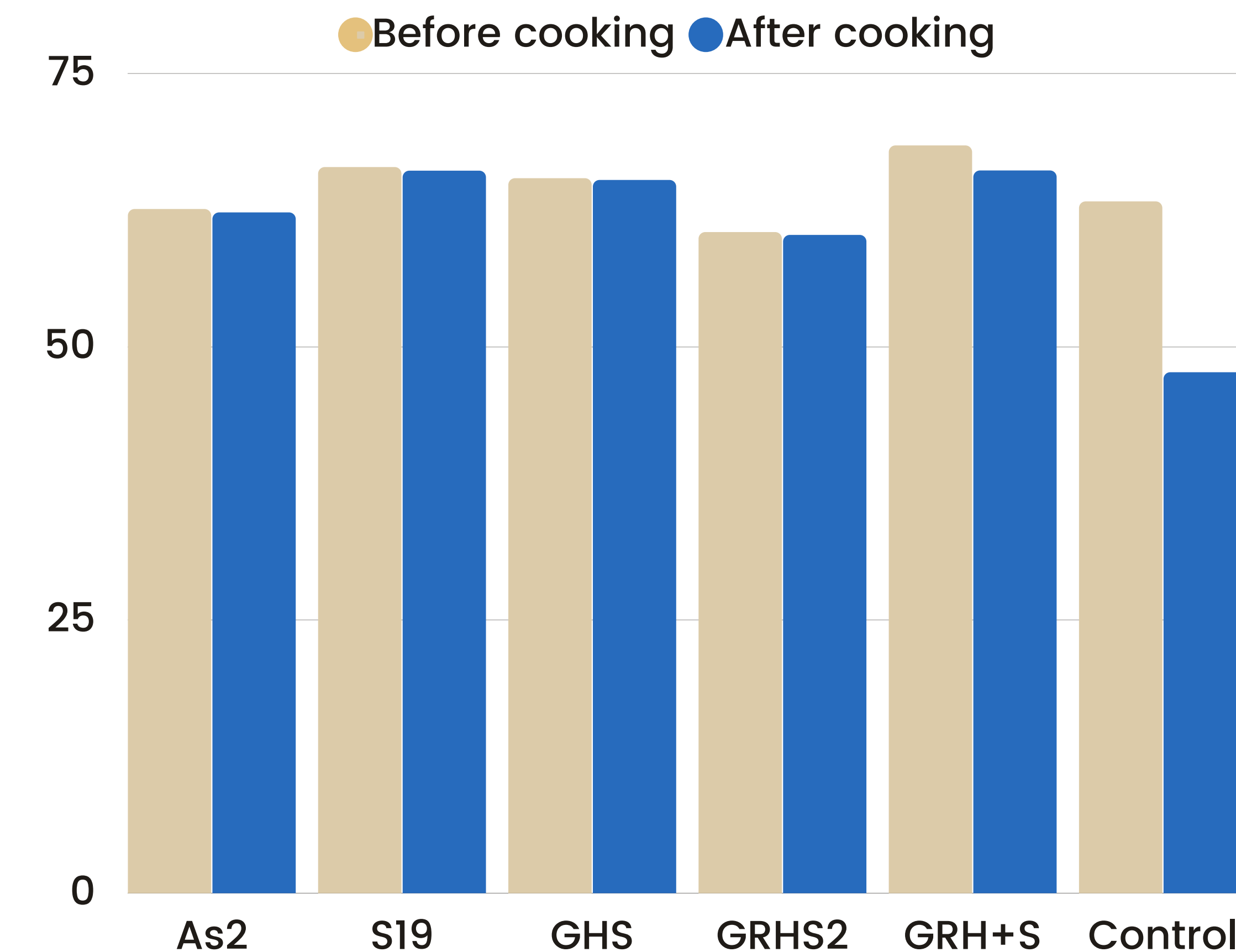
Texture analysis was performed using a texture analyzer (TAXT2) to measure hardness(g), providing valuable insights into the consistency and quality of the final product.

Color (L*/A*/B*) analysis was conducted using a colourmetre to accurately measure brightness, hue, and saturation values, allowing for visual evaluation and comparison of the burgers' colour to that of traditional meat-based burgers.

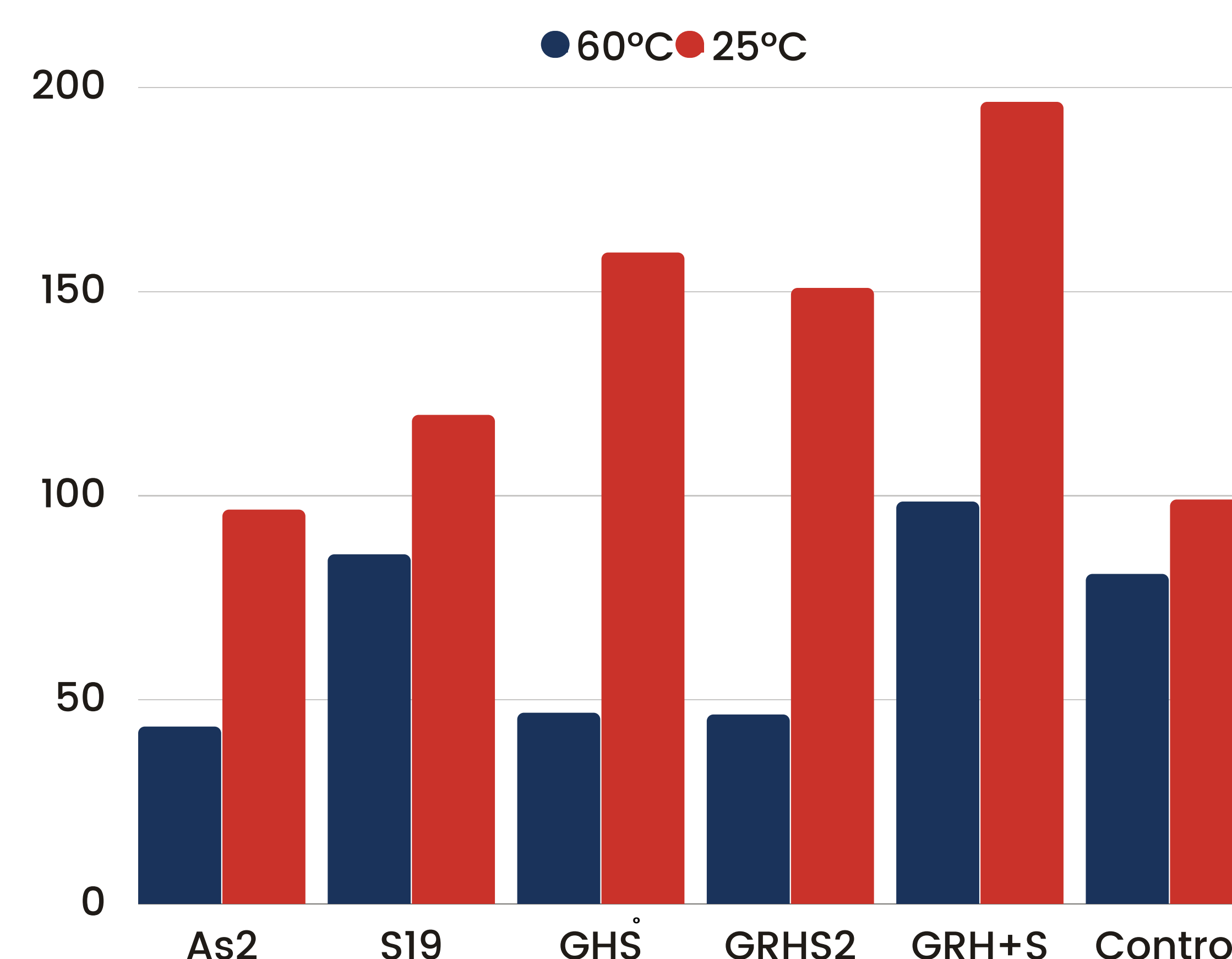
Cooking loss (%) was determined through weight measurements taken before and after cooking, assessing the burgers' ability to retain moisture and juiciness.

Moisture (%) analysis was carried out using an MA 150 Sartorius instrument to precisely measure the water content of the burgers, evaluating their water retention throughout the manufacturing process.

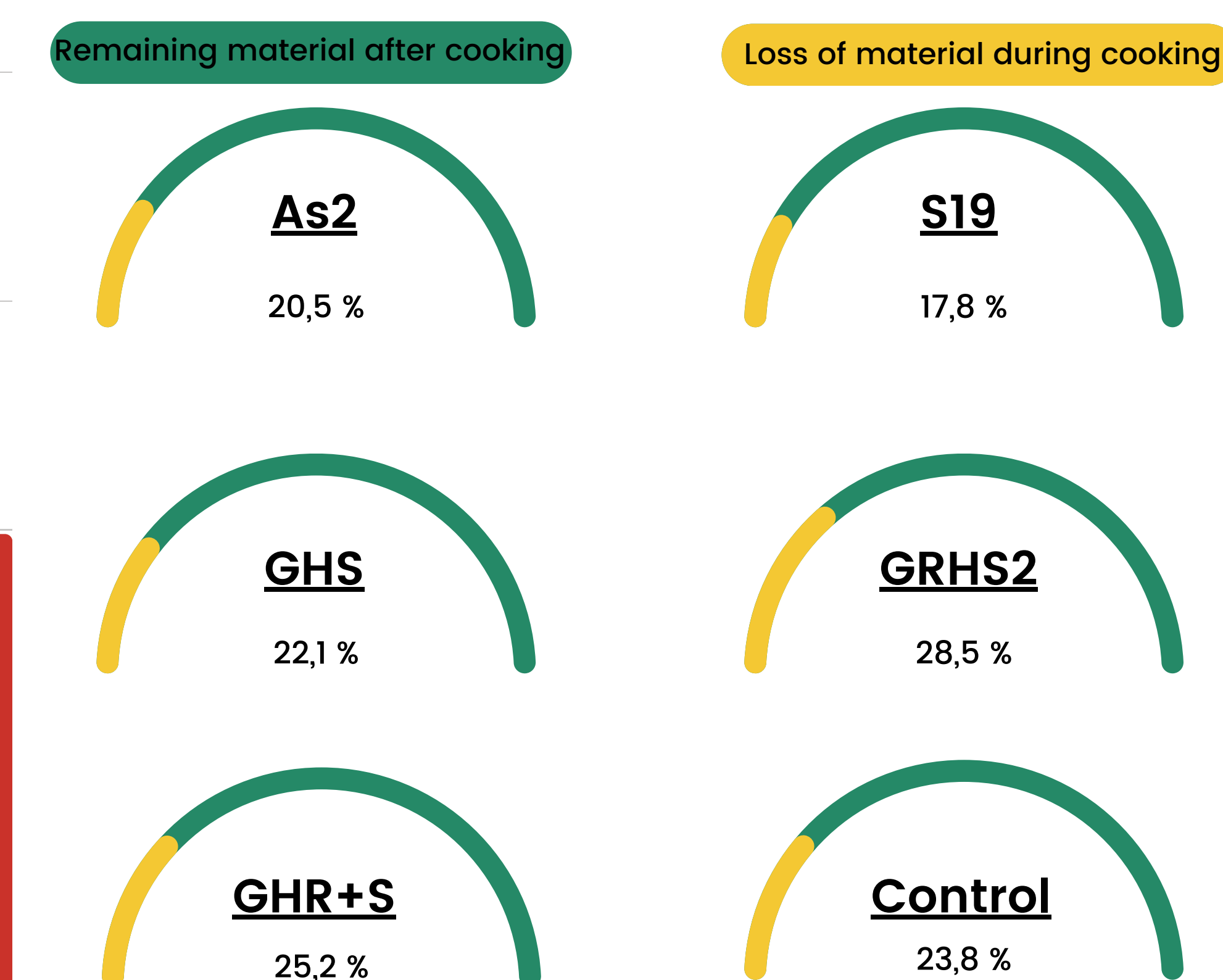
Moisture



Texture



Cook loss (%)



RESULTS/ FINDINGS

Two types of seaweed stand out from the others (AS2 and S19). In fact, the results obtained with seaweed AS2 showed a better texture compared to the other seaweeds, being softer and less firm, with a lower cooking loss compared to both the control and the other seaweeds. However, when it comes to moisture, there is not a significant difference compared to the other seaweeds.

Seaweed S19 also yielded good results with a slightly firmer texture that showed minimal changes with different temperatures. It was very similar to the control, with a lower cooking loss than the control and consistent moisture throughout the process. These results are very promising.

The other seaweeds tested in this study showed differences in texture and cook loss indication that changes in the recipe may be needed to optimise performance, making it difficult to provide a good opinion on their use in this type of product.



CONCLUSION

This study has demonstrated that certain types of seaweed can truly enhance vegetarian burgers, whether in terms of texture, color, or cooking loss. An adaptation of the process may potentially lead to even better results. A sensory evaluation study would also be necessary to obtain a comprehensive understanding of all the characteristic changes.

Authors

Corresponding author : Pierre Gaborieau
Other people participating in the study ; Aislinn Richardson, Mariel Brooks, Sarah Hotchkiss, Sean Garvey



Reference

All the references used in this study are internal documents of the company, providing information on the recipe of the vegetarian burger and the different analysis methods. These documents are therefore confidential.