

Comparison of Physicochemical Characteristics of Soy Sauces Made from Germinated Soybeans with Different Salt Concentrations

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INTRODUCTION & AIM

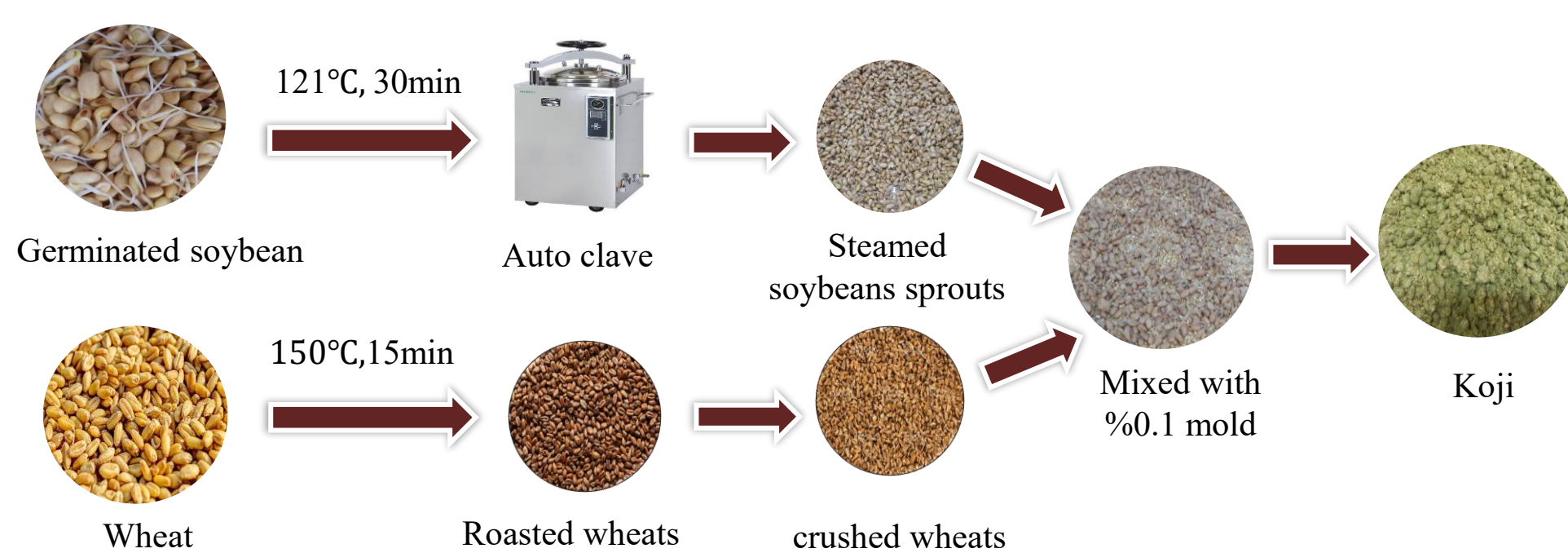
Soy sauce is a dark brown liquid with a light brown to black colour, characterized by a salty and intense umami flavour. In Cambodia, soy sauce is popularly used as a seasoning, which is mostly imported from the nearby nation. The amount of soy sauce that is produced locally is still rather small and fermentation has not yet been recognized widely [1]. Soy sauce contains excellent nutritional values of antioxidant substances, such as soy isoflavones, melanoidins, furan ketones, phenolic acids, organic acids, peptides, and β -carboline [2]. Soybean is a renowned plant protein source with numerous health benefits. The phenolics, L-ascorbic acid, and non-proteinogenic amino acids were found when soybeans were germinated [3]. Germination is considered to be the most direct and effective means to enrich the nutrient content of soybeans and reduce the harmful content when soy sauce is made from germinated soybeans [4].

This study was conducted to evaluate the effect of germinated soybeans to the nutritional values and the physicochemical characteristics of soy sauce during 210 days of fermentation with different salt concentrations.

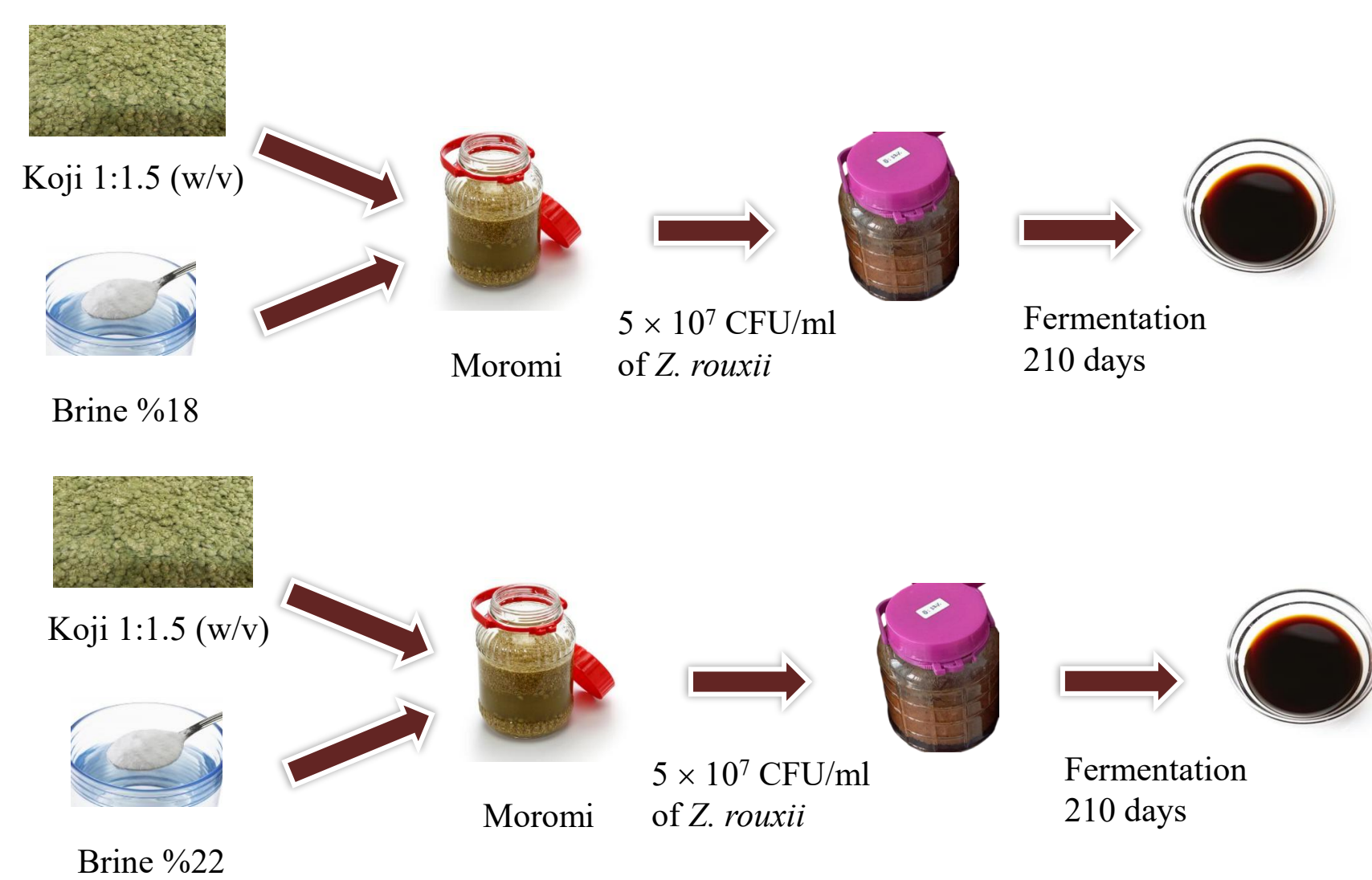


METHOD

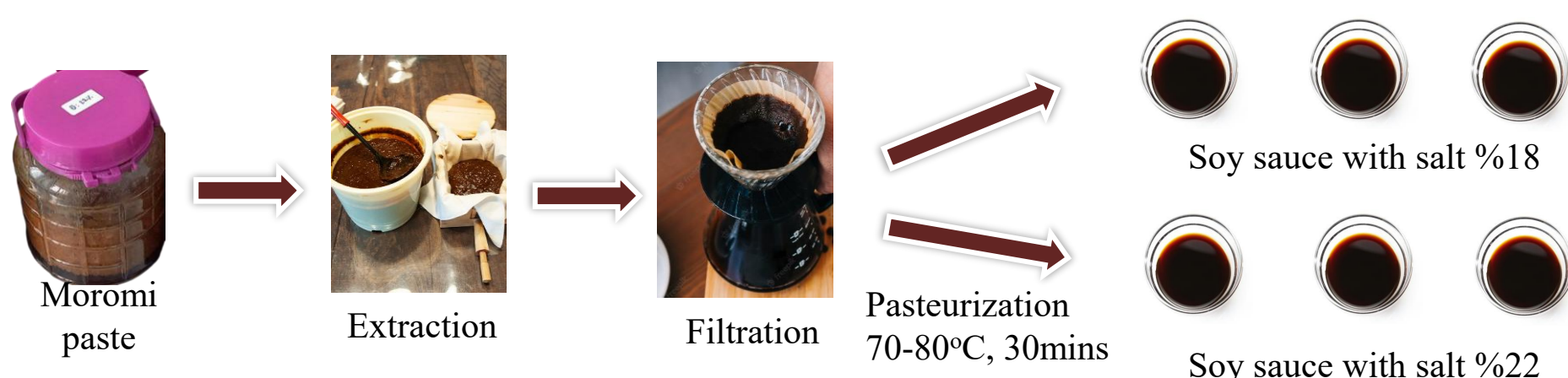
The preparation of koji for soy sauce fermentation



The preparation of moromi for soy sauce fermentation



The refining process of soy sauce after 210 days of fermentation



RESULTS & DISCUSSION

Sample	Duration (days)				
	0	30	90	150	210
NS18	0.10 ± 0.00 ^a	2.42 ± 0.01 ^a	3.41 ± 0.13 ^a	3.73 ± 0.21 ^a	5.44 ± 0.15 ^a
GF18	0.14 ± 0.00 ^b	2.93 ± 0.01 ^b	4.20 ± 0.03 ^b	5.62 ± 0.09 ^b	6.40 ± 0.10 ^b
GS18	0.15 ± 0.00 ^b	3.03 ± 0.01 ^c	4.29 ± 0.00 ^b	5.37 ± 0.03 ^b	7.76 ± 0.25 ^a
NS22	0.15 ± 0.00 ^b	3.08 ± 0.02 ^c	3.45 ± 0.40 ^a	3.62 ± 0.08 ^a	5.56 ± 0.15 ^a
GF22	0.11 ± 0.00 ^a	2.94 ± 0.02 ^b	3.79 ± 0.01 ^a	4.31 ± 0.02 ^b	5.70 ± 0.30 ^a
GS22	0.27 ± 0.00 ^c	2.33 ± 0.00 ^a	4.19 ± 0.04 ^a	5.02 ± 0.04 ^c	5.71 ± 0.12 ^a

The superscript (a-c) in the same row illustrated the significant differences at the p -value ≤ 0.05 . NS18, NS22, GF18, GS18, NS22, GF22, GS22 represented non-germinated soybean salt %18 & %22 and germinated soybean over 48 hours, germinated soybean over 72 hours with salt %18 & %22, respectively.

Table 1. Total phenolic content (mg GAE/ ml) of moromi fermentation during 210 days.

The content of TPC reached 7.76 mg GAE/ml during 210 days of moromi fermentation, relevant to the enzyme cellulase, facilitated by cellulose within the sprout matrix [4].

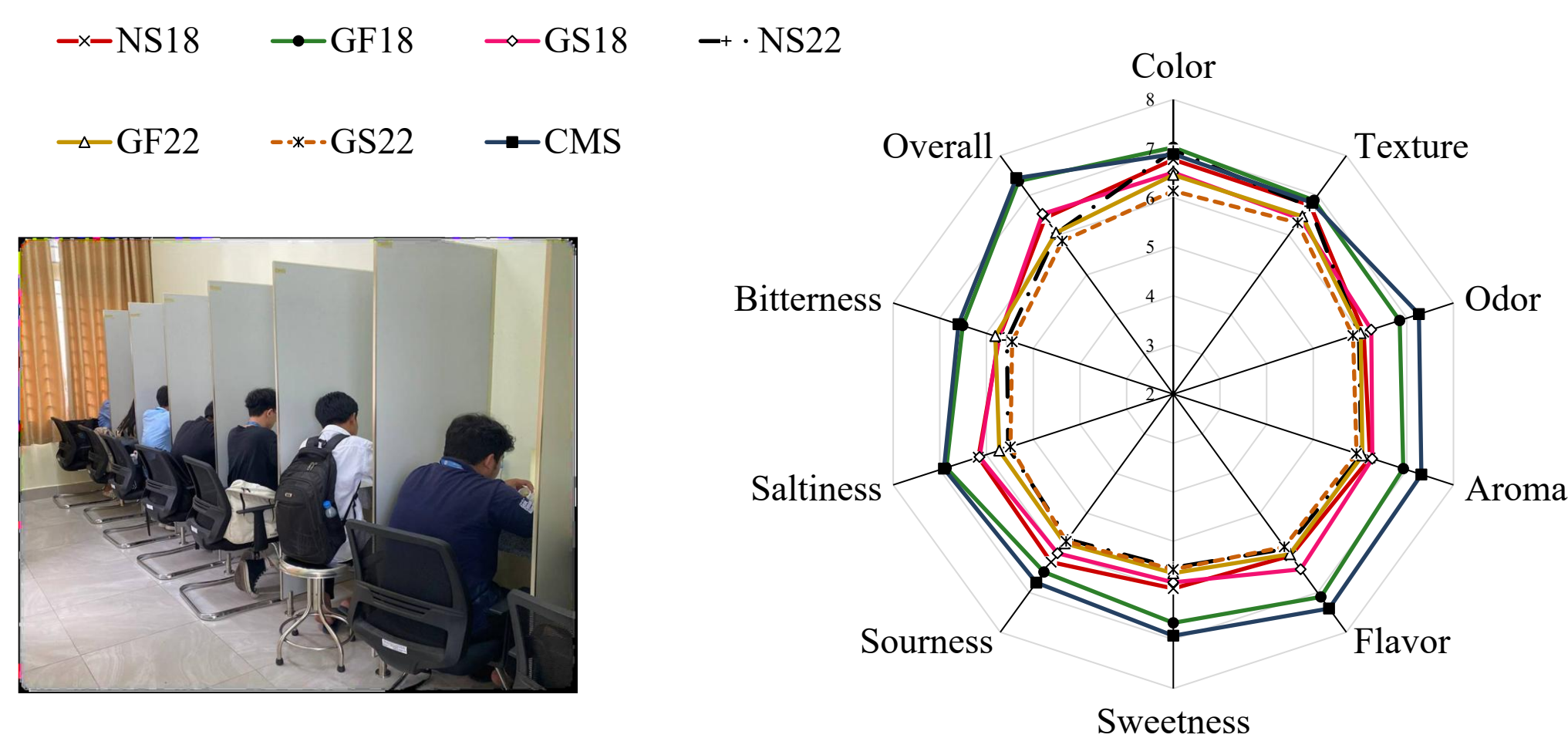


Figure 1. Sensory evaluation of soy sauce products in different conditions.

The soy sauce made from germinated soybeans with %18 a salt concentration gains the highest score of all descriptors based on sensory evaluation, using a 9-point hedonic scale. This high condition might be related to the germination leads to changes chemical composition of soybean, which alterations contribute to more complex and appealing flavor in the resulting soy sauce [5].

CONCLUSION

In this study, soy sauce made from germinated soybeans for 48h with salt %18 had the best quality in terms of RS, AN, TPC, TA and sensory evaluation. Germinated soybean utilization as a raw material in fermentation processes represents a dependable and efficient technological approach to elevate the nutritional and bioactive value in soy sauce.

FUTURE WORK / REFERENCES

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