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Gelled Emulsions based on Amaranth Flour with Hemp and Sesame Oils

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Objectives

The aim of this study was to develop oil-in-water (O/W) gelled emulsions formulated with hemp oil, sesame oil, amaranth flour and different gelling agents.

Materials and Methods

Materials and Methods

Formulation of hemp and sesame oils-in-water emulsion gels.

Samples[1]	Water	Flour	Gel instant	Gellan gum	Hemp oil	Sesame oil
GAH	47	10	1.5	1.5	40	-
GAS	47	10	1.5	1.5	-	40

[1]GAH: Gelled emulsion of amaranth flour and hemp oil. GAS: gelled emulsion of amaranth flour and sesame oil. The results are expressed in g/100g.

Materials and Methods

Water

GI — Gel instant

AF — Amaranth flour

GG — Gellan gum

Oil — Hemp or sesame

DETERMINATIONS:

COLOR SPACE CIEL*a*b* ON TIME 0 AND 15.

TEXTURE (SPREADABILITY)

EMULSION STABILITY ON TIME 0 AND 15.

OXIDATION BY TBARS ON TIME O AND 15.

Results

Color parameters at t_0 and t_{15} of the gelled emulsions.

Samples[1]	Day	L*	a*	b*
GAH	0	69.45±1.91^{ab}	-1.03±0.21^{d}	23.52±0.54^{a}
	15	61.83±2.30^{c}	-0.52±0.28^{c}	23.22±1.62^{a}
GAS	0	71.47±0.95^{a}	0.71±0.08^{b}	12.72±0.22^{b}
	15	67.37±0.65^{b}	0.75±0.09^{a}	13.04±0.44^{b}

[1] GAH: gelled emulsion amaranth flour and hemp oil. GAS: gelled emulsion amaranth flour and sesame oil. L*: luminosity; a *: red / green coordinate; b *: yellow / blue coordinate. Values followed by the same lowercase letter within the same column indicate that there are no statistically significant differences (p> 0.05) according to the Tukey multiple range test.

GAH

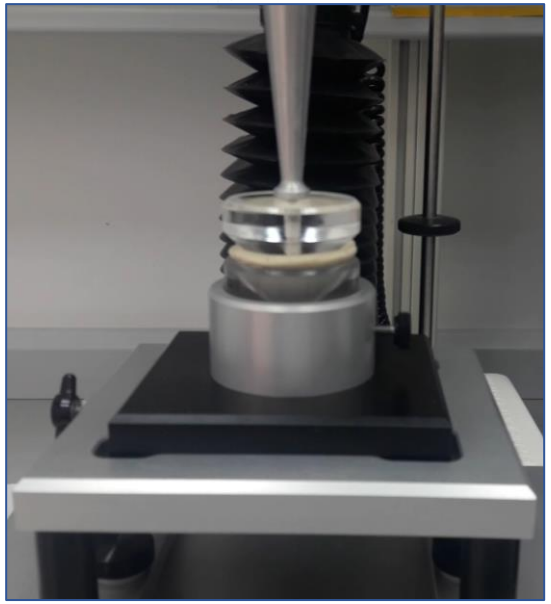
GAS

Results

Texture parameters at t_0 to mesure the spreadability of samples.

Samples[1]	Firmess (g)	Work of shear (g.s)
GAH	536.67±21.28[a]	460.00±8.17[a]
GAS	466.67±11.45[b]	366.67±13.42[b]

[1]GAH: gelled emulsion amaranth flour and hemp oil. GAS: gelled emulsion amaranth flour and sesame oil. Values followed by the same lowercase letter within the same column indicate that there are no statistically significant differences (p> 0.05) according to the Tukey multiple range test.



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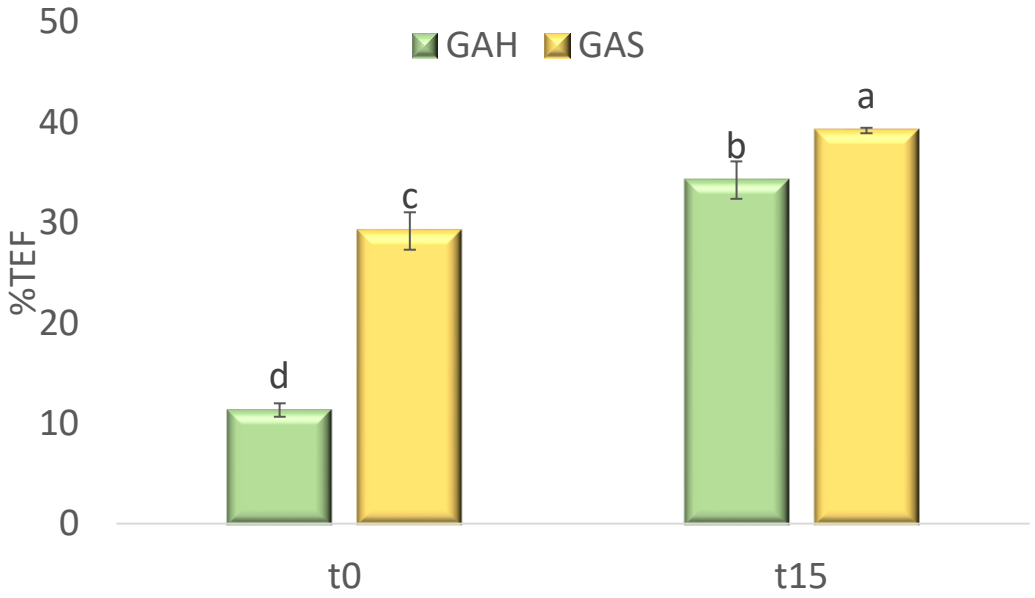
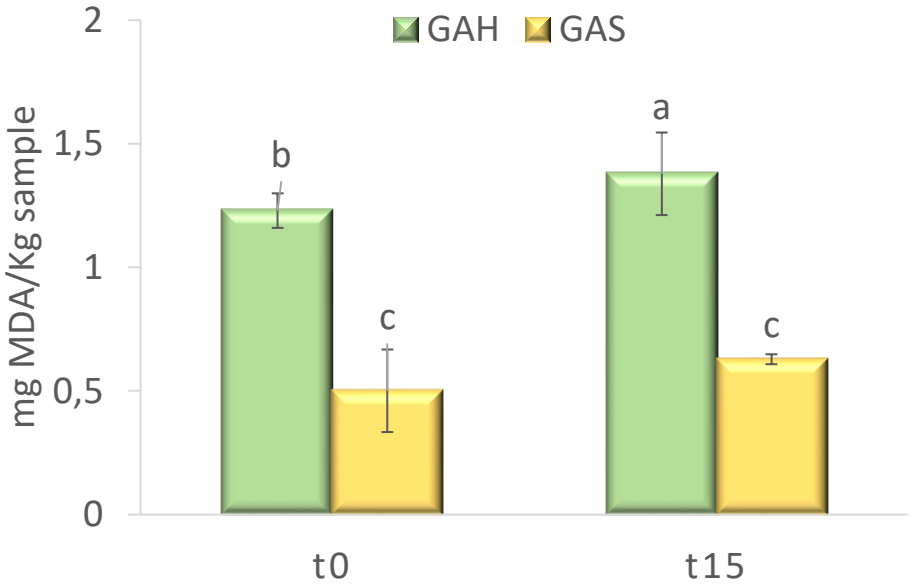
Results



Emulsion stability.

Measured as g of total liquid expelled/ 100g sample. Values followed by the same lowercase letter there are no statistically significant differences (p> 0.05) according to the Tukey multiple range test.



Lipid oxidation by measuring change in TBARs.

Values followed by the same lowercase letter there are no statistically significant differences (p> 0.05) according to the Tukey multiple range test.

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Conclusions

In view of the results obtained, the GAH emulsion showed the highest stability, the best firmness values, although GAS has a higher initial lipid oxidation than GAS and a more greenish color. The color could be a small inconvenience when the gelled emulsion is introduced in meat products to replace the fat. The both emulsions are not viable after freezing because their stability is lost and their lipid oxidation values are triggered.

Conclusions

Despite this, gelled emulsions could be a potential alternative for their application in the development of functional foods. So, in future studies could investigate the use of oil in water gelled emulsion prepared with healthier combinations of pseudo-cereal flour with seed oils as possible future fat replacer.

Thank you for your attention