Agriculture and Agri-Food Canada

Exploring commercial utilization of yellow mustard (*sinapis alba l.*) gum: stabilization and emulsification in vegetarian mayonnaise and non-dairy whipping cream

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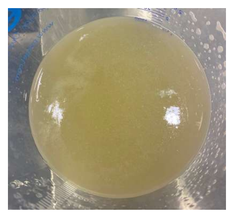
BACKGROUND

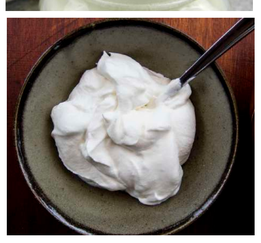
A new type of mucilage has low cost and better functional properties [1, 2].

Water extraction



Yellow mustard gum (YMG)

The challenges of **vegetarian mayonnaise** are to substitute traditional yolks products while maintaining flavor, texture, and stability[3]



Non-dairy whipped cream may undergo serum separation during resting, and partial coalescence of fat spheres may also lead to emulsion instability[4]

OBJECTIVES

Application of YMG in preparation of vegetarian mayonnaise

Application of YMG-fenugreek mixed gum in preparation of non-dairy whipping cream

CONCLUSION

- YMG improves the stability of egg-free mayonnaise and non-dairy whipping cream.
- Both mayonnaise and whipping cream formulated with YMG or YMG-fenugreek gum mixture have comparative or better properties comparing with commercial counterparts.
- Using yellow mustard gum is able to develop clean-label food products, without any commercial gums or synthetic additives.
- The products have the potential to substitute traditional products; YMG is especially beneficial to vegetarian and non-dairy project development.

METHODS & MATERIALS

Vegetarian mayonnaise

Formulated with different amounts of YMG solution (0%, 0.2%, 0.4%, 0.6%, 0.8% and 1%)

Methodology:

- Index of stability (centrifuge method)
- Microstructure observation (optical microscope)

Commercial samples:

1. Commercial mayonnaise (CM) (HELLMANN'S, Saint John, NB)

2. Commercial vegan mayonnaise (CVM) (Maison Orphee, Quebec)

Non-dairy Whipping cream

Formulated with YMG-Fenugreek gum mixture (0, 0.05, 0.1, 0.15, 0.2, and 0.25 w/w%)

Methodology:

- Foam stability (Serum loss)
- Visual stability

Commercial samples:

1. Commercial whipping cream sample (CWCS) 1: Sealtest 35% Whipping Cream (ON, Canada)

2. CWCS 2: Cool Whip Original Frozen Whipped Topping (Kraft Heinz, ON, Canada)

RESULTS

Vegetarian mayonnaise

Samples	0%YMG	0.2%YMG	0.4%YMG	0.6%YMG	0.8%YMG	1%YMG
After 10 mins						

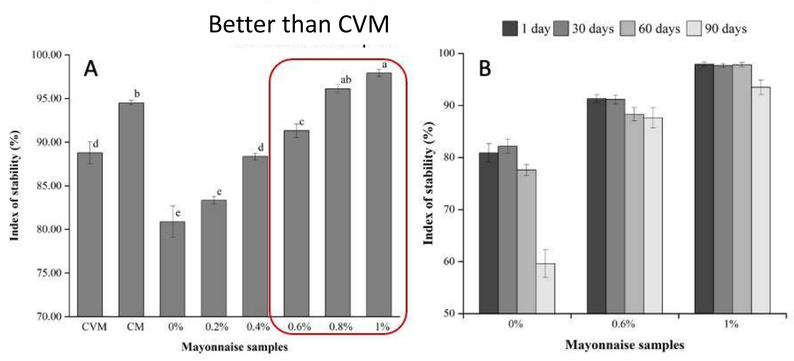
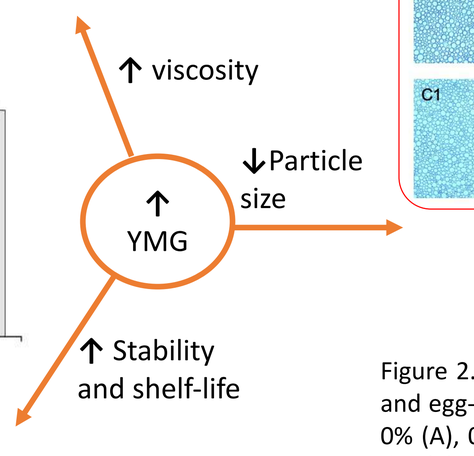


Figure 1: Index of stability (%) of CM, CVM, and YMG-formulated egg-free mayonnaise during storage at 4°C (A) and YMG-made samples storage after different times (B).



As the YMG increases, the size of droplets gets smaller.

Phase separation has occurred.

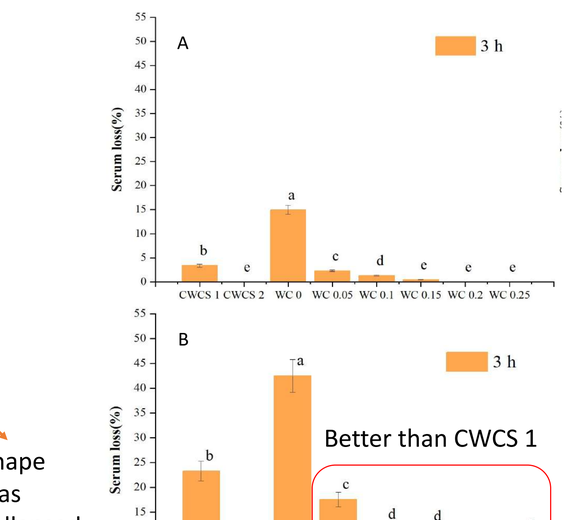


Figure 2. Microstructure observation of CM, CVM, and egg-free mayonnaise of YMG concentration at 0% (A), 0.6% (B) and 1% (C) storage at 4°C after 1 day (1), 60 days (2) and 90 days (3).

Non-dairy whipping cream

The increase in the content of gum mixes reduces the serum loss , and improves collapse resistance of whipping cream after storage at 4°C and 22°C

4 °C	WC 0	WC 0.05	WC 0.1	CWCS 1
10 mins				
Overnight				
	WC 0.15	WC 0.2	WC 0.25	CWCS 2
10 mins				
Overnight				

22 °C	WC 0	WC 0.05	WC 0.1	CWCS 1
10 mins				
Overnight				
	WC 0.15	WC 0.2	WC 0.25	CWCS 2
10 mins				
Overnight				

Shape was collapsed

Figure 3. Visual stability of CWCS1, CWCS 2, and whipped cream formulated with different content of gum mixture at 4°C and 22 °C.

Figure 4. Serum loss (%) of CWCS1, CWCS 2, and whipped cream fortified with different concentrations of gum mixture after 3 hours at 4°C (A) and 22 °C (B).

Reference

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Mustard 21 Canada inc.

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