

# Innovative confectionary product with nutritionally improved status

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## INTRODUCTION & AIM

Sustainability refers to processes capable to function on their own for a long period of time without interruption. One way to a more sustainable way of living is a plant-based diet. The consumption of saturated fats is considered to be a major issue due to their negative health effects, thus a reduction in their consumption is recommended.

Waffles are widely consumed products due to their special characteristics, but contain high amounts of saturated fats. The present study aims to reformulate the recipe in order to obtain products with a high-nutritional value.

Non-allergenic waffles with gluten-free oat flour, chickpea cans' liquid (aquafaba) and oleogel formed with glycerol monostearate (5%) and sunflower oil were obtained using 2 level 3 factorial Design generated with the Design Expert software (Minneapolis, USA) and characterized.

## METHODS FOR ANALYSING AQUAFABA

### 1. Refractometric analysis

### 2. FTIR analysis



FTIR spectra acquired with Cary630 FTIR Spectrophotometer (Agilent Technologies, Chelmsford, MA, USA)

### 3. Rheology

Amplitude sweep (0.01-100%, 1 HZ) with Anton Paar MCR302 Rheometer at 25°C using PP50 plate.



7%  
14%  
21%  
20°C

### 4. Foaming capacity determination

$$C_b = \frac{m_1 - m_2}{m_1} \times 100$$

$C_b$  – foaming capacity;  
 $m_1$  – sample weight before foaming;  
 $m_2$  – sample weight after foaming.

### 5. Stability determination



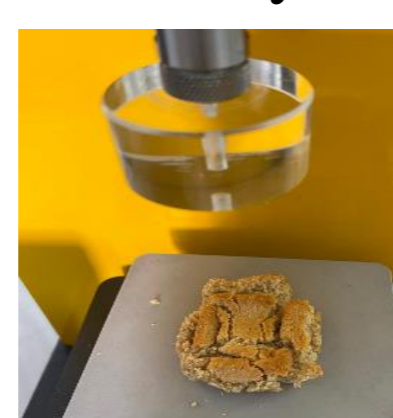
## METHODS FOR ANALYSING THE WAFFLES

### 6. Chemical profile determination (AOAC Methods)

- Water content by oven drying
- Protein content determination – Kjeldahl method
- Ash by Calcination in the calcining furnace

### 7. Texture profile analysis

TPA Test, TA11/1000 probe for dough and TA4/1000 for the waffles with the CT3 Brookfield Texture Analyzer

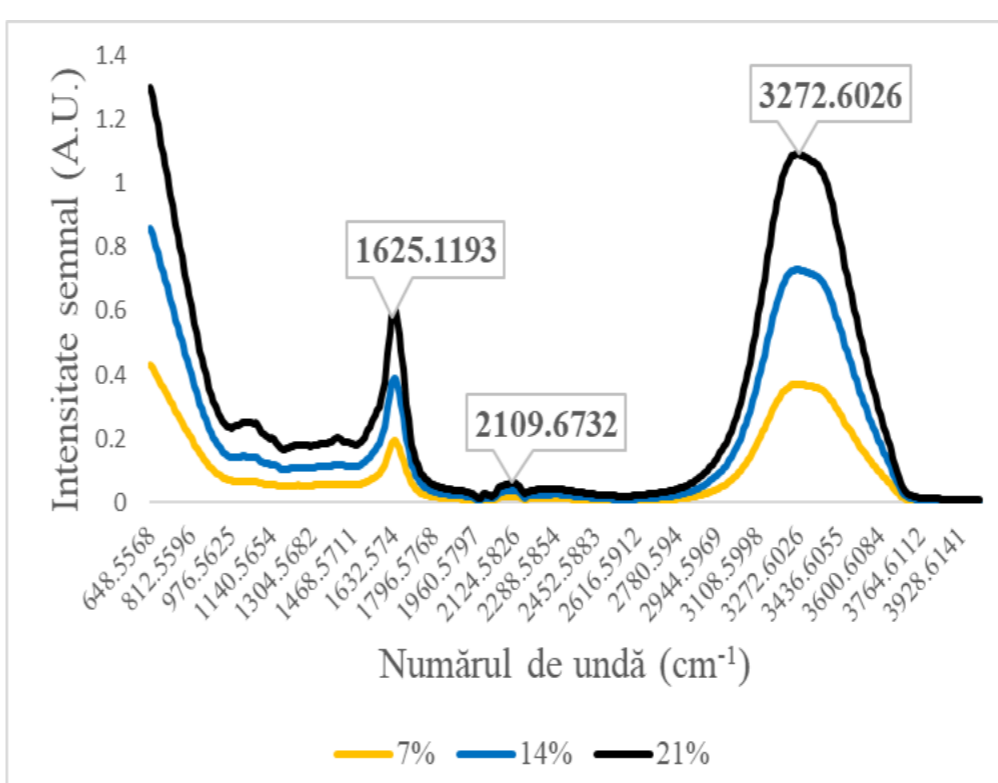


### 8. Color analysis

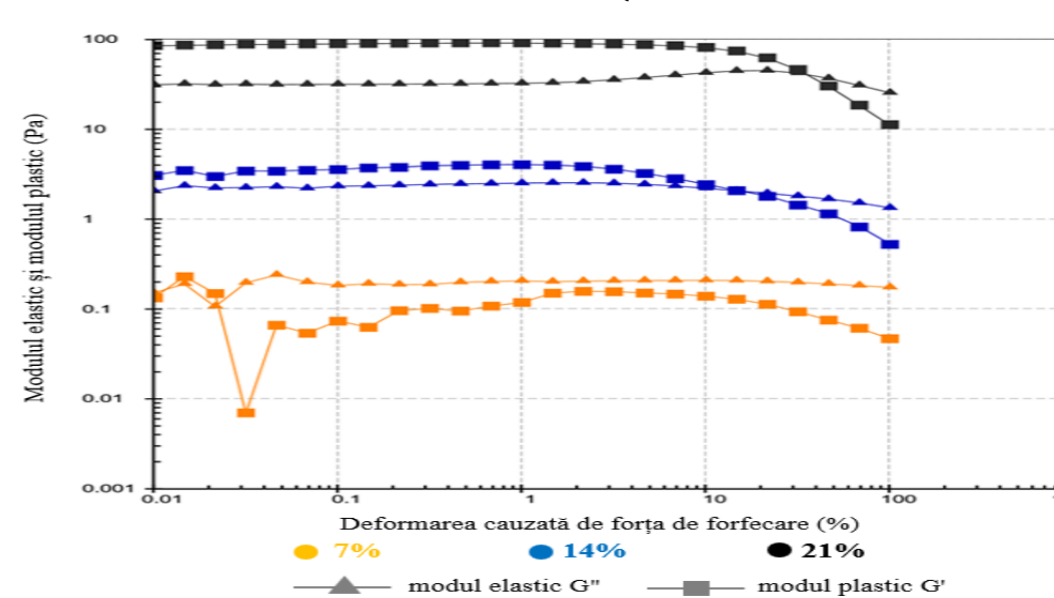


## RESULTS & DISCUSSION

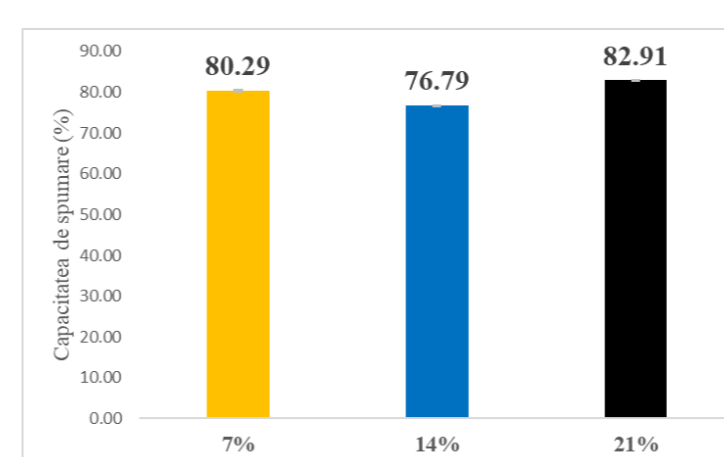
### FTIR SPECTRA OF AQUAFABA



### THE PLASTIC AND ELASTIC MODULUS OF AQUAFABA



### FOAMING CAPACITY OF AQUAFABA



### THE L, a\*, b\* color parameters of AQUAFABA BASED WAFFLES

Sample	8(7%3'U)	6(7%3'O)	4(7%9'U)	3(7%9'O)	1(14%3'U)	7(14%3'O)	5(14%9'U)	2(14%9'O)
L	53.53±1.04	60.5±0.95	60.46±0.44	57.85±0.97	55.39±1.75	53.03±2.19	56.64±0.07	55.81±0.55
a	15.39±3.22	9.06±0.46	14.57±2.35	15.32±0.76	12.57±3.42	12.94±0.92	19.71±0.55	16.63±2.99
b	34.39±3.18	29.74±0.55	33.44±1.63	33.8±0.13	32.61±2.82	32.31±1.25	38±0.31	34.29±3.4

## CONCLUSION

- ✓ Aquafaba concentrated up to 14% and 21% dry matter had a gel-like texture, whereas the sample with 7% concentration was a fluid;
- ✓ The protein and ash contents were directly proportional with the aquafaba concentration;
- ✓ Lower hardness was determined for the waffles and higher for the dough for the same whipping times and the same concentration, for the oleogel based samples;
- ✓ No significant differences were detected regarding the sample color.

## REFERENCES

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3. HE, Yue, et al. Aquafaba, a new plant-based rheological additive for food applications. Trends in food science & technology, 2021, 111: 27-42;