

Development of ice-cream cones from cassava flour and corn starch

Huseina M. Njino¹, Divine B. Nde^{1,2}

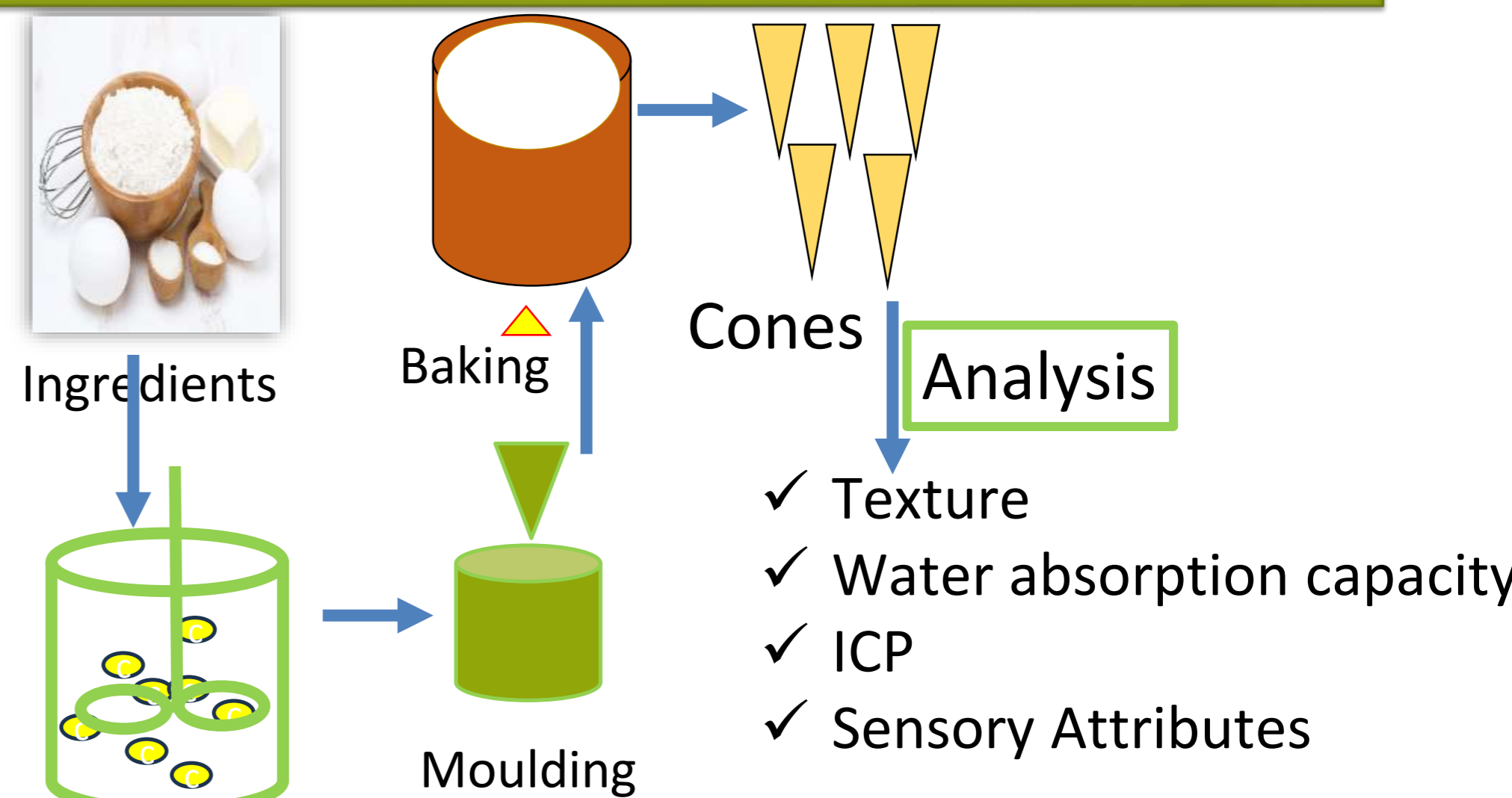
¹Department of Nutrition, Food and Bio-Resource Technology, College of Technology, University of Bamenda, Cameroon

²Present address: Department of Chemistry, Louisiana State University, Baton Rouge, LA 70803, USA

INTRODUCTION & AIM

- ✓ Wheat consumption in some African is almost entirely dependent on imports countries¹
- ✓ High market prices of wheat has provoked the need to explore potential markets of other cereal and tuber flours as a substitute to wheat flour in flour products²
- ✓ Cassava and cassava flour readily available in the tropics.
- ✓ This study was aimed at producing and optimizing ice cream cones from cassava flour and corn starch
- ✓ Fight against cassava waste and generate income for local farmers

METHOD



Cassava cone production process

METHOD

Experimental design

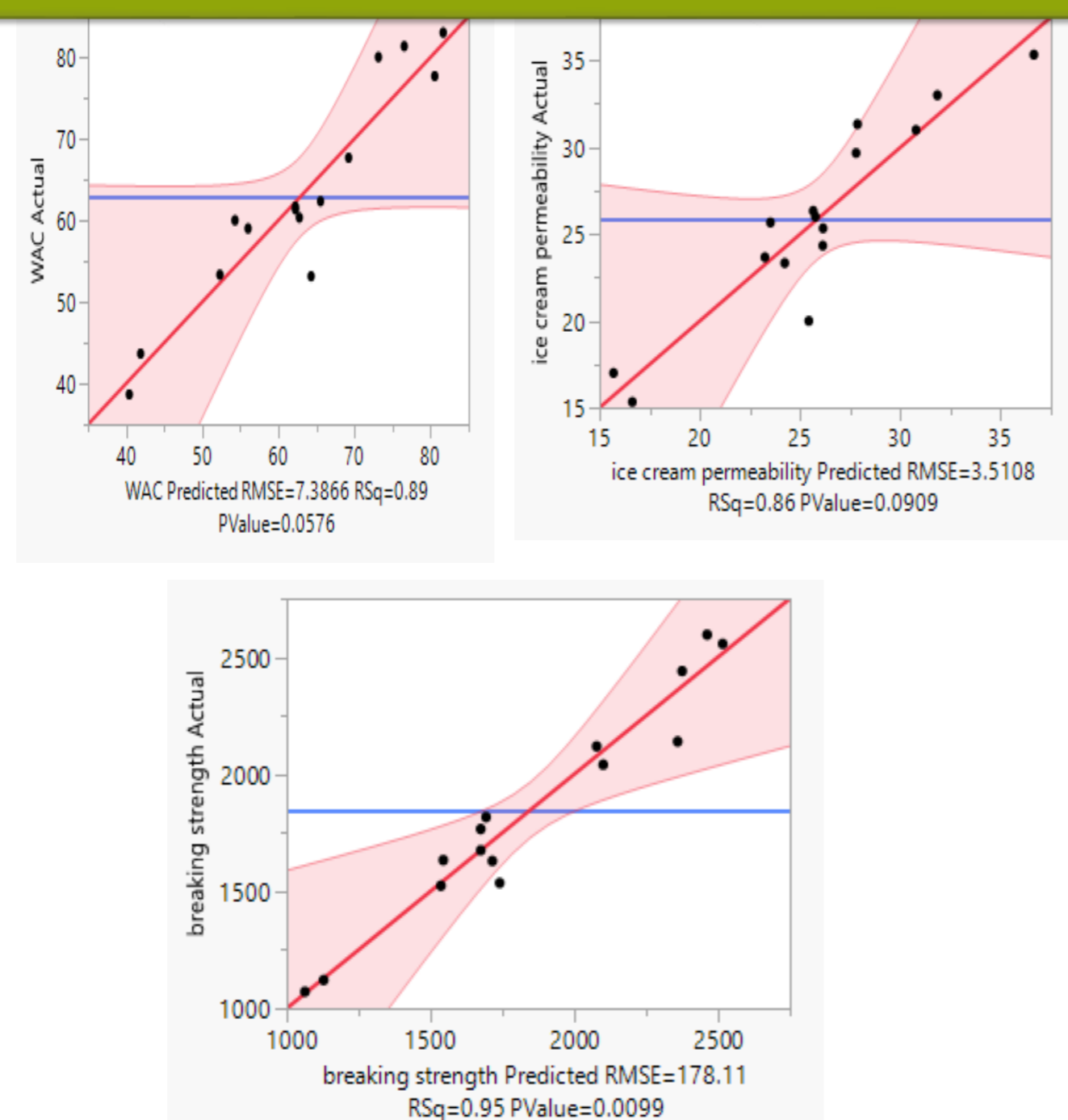
S/N	X1 (°C)	X2 (min)	X3 (blends)
1	100	20	20
2	200	12.5	80
3	100	20	50
4	200	5	50
5	100	5	80
6	200	5	80
7	100	20	80
8	200	20	80
9	100	12.5	50
10	200	12.5	50
11	150	12.5	50
12	150	5	50
13	150	12.5	20
14	150	12.5	80
15	150	20	50

Modelling

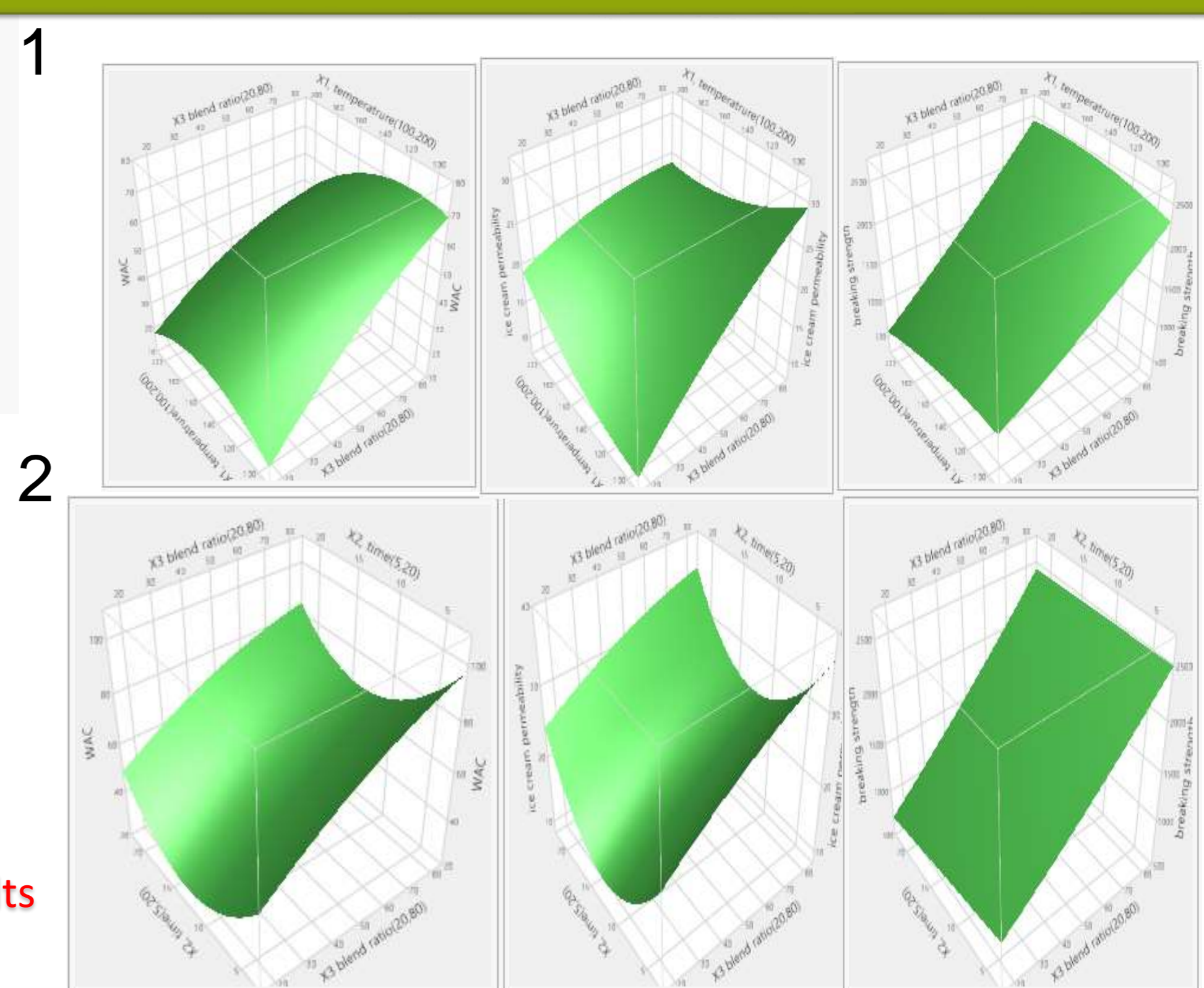
$$Y = b_0 + \sum b_{i_1} (X_i) + \sum b_{ij} X_{ij} + \sum b_{ii} X_i^2 + \epsilon$$

$X_1 = \text{Temperature}, X_2 = \text{Time}, X_3 = \text{cassava flour/starch ratio}.$

RESULTS & DISCUSSION



Good fit of experimental with theoretical results



Surface response curves for the responses studied

RESULTS & DISCUSSION

Regression analysis

	WAC _(Y2)		ICP _(Y3)		Breaking Strength _(Y4)	
	coefficient	P-value	Coefficient	P-value	Coefficient	P-value
b ₀	52.6197	0.0024*	19.8646	0.0065*	1621.8219	0.0008*
b ₁	4.8838	0.3300	0.7553	0.7399	-61.6166	0.5969
b ₂	3.4924	0.4081	0.0079	0.9967	-74.4098	0.4613
b ₃	17.0051	0.0081*	5.2819	0.0392*	680.9648	0.0009*
b ₁₁	7.0738	0.1958	1.3429	0.5771	-69.2335	0.5711
b ₂₂	13.1184	0.2633	6.2689	0.2611	-2.7740	0.9916
b ₃₃	3.7580	0.4378	0.9960	0.6582	36.7727	0.7463
b ₁₂	5.4849	0.1454	2.4819	0.1617	-178.1918	0.0679
b ₁₃	4.2994	0.4777	2.7035	0.3568	102.5869	0.4821
b ₂₃	1.4356	0.7598	0.4486	0.8402	44.9237	0.6925
R ²	0.89		0.86		0.95	
RMSE	7.38		3.51		178.11	
P-value	0.0576		0.0909		0.0099	

- Optimum processing conditions for the cones: **Temperature 180°C, time 11min, and blend ratio 80% to 20% .**
- Optimum WAC, ice cream permeability and breaking strength:
 - ✓ **Optimized sample: 81.67±1.15%, 26.67±1.53min, 2529±13.75N/m²,**
 - ✓ **Commercial sample: 64.67±0.58%, 6.33±0.58min, 1279±2.08N/m².**

CONCLUSION

Cones with better ice cream permeability with no significant difference in sensory profile compared to commercial one was produced from cassava flour

FUTURE WORK / REFERENCES

- **Study cone production in a continuous pilot process**
- Kigozi et al., 2016, JAFSAT
- Rismawanti et al., 2020, J Food Life Sci