

Supplementary Material

This supplementary material provides additional details on the experimental design and statistical analysis of the carrot and yellow plum jam (JCP) formulations. The full mixture design included twenty-two experimental points, with three replicates of the center point, whose responses are detailed in the included tables. The parameters considered for the formulation include pectin, agar-agar, isomalt, and maltodextrin, with specific objectives to maximize or minimize sensory characteristics such as smoothness, sweetness, and overall liking, allowing for the evaluation of their effects on the final product properties.

Table 1s: Design criteria for the experimentation to obtain carrot and yellow plum jams (JCP). The plus signs (+) indicate the level of consideration given to different parameters.

Formulation		JCP
Parameters	Objective	Importance
Pectin	In the range	–
Agar-agar	In the range	–
Isomalt	In the range	–
Maltodextrin	In the range	–
Texture	In the range	–
Smoothness	Minimize	+++
Sweetness	Maximize	+++
Overall liking	Maximize	+++++

The ANOVA results show that texture fitted a special cubic model, suggesting complex interactions between the ingredients, while unctuousness followed a linear model, indicating a proportional variation with the component proportions. Sweetness and overall acceptability

fitted a quadratic model, highlighting the importance of synergistic interactions among the ingredients in the perception of these sensory characteristics. Additionally, the models presented a good fit to the experimental data, with R^2 values indicating a high predictive capacity for most of the sensory responses evaluated.

Table 2s: ANOVA of the models for the JCP formulation. Pectin (A), Agar-agar (B), Isomalt (C), and Maltodextrin (D).

JCP	Texture		Smoothness		Sweetness		Overall liking	
ANOVA	Special Cubic		Lineal		Quadratic		Quadratic	
Source Model	Value F	Value p	Value F	Value p	Value F	Value p	Value F	Value p
Linear	3.31	0.0597	1.85	0.1769	1.96	0.1449	2.23	0.1046
Mixture	2.46	0.1476	1.85	0.1769	0.0369	0.9900	2.51	0.1129
AB	8.24	0.0247*	-----	-----	1.44	0.2551	0.2227	0.6462
AC	7.67	0.0277*	-----	-----	6.30	0.0290*	1.69	0.2207
AD	7.71	0.0274*	-----	-----	6.33	0.0286*	1.67	0.2224
BC	10.31	0.0148*	-----	-----	0.2561	0.6228	0.2382	0.6351
BD	10.27	0.0150*	-----	-----	0.2409	0.6332	0.2382	0.6422
CD	1.00	0.3501	-----	-----	0.0041	0.9504	0.9350	0.3543
ABC	8.26	0.0238*	-----	-----	-----	-----	-----	-----
ABD	8.30	0.0236*	-----	-----	-----	-----	-----	-----
ACD	7.55	0.0286*	-----	-----	-----	-----	-----	-----
BCD	8.09	0.0249*	-----	-----	-----	-----	-----	-----
Lack of Fit	0.0474	0.8348	0.9741	0.5426	1.58	0.2943	2.46	0.1515
R^2	0.8599		0.2459		0.6163		0.6465	

The F-value of 1.48 implies that the model is not significant relative to the noise. This represents a probability of 29.46% that such a large F-value would occur due to noise. *Values that exhibit significant influence ($p < 0.05$) in the modeling

Figure S1 shows the results of the sensory intensity evaluation conducted by consumers for formulations JCP15 and JCP20. Six sensory attributes were assessed: color, texture, sweetness, bitterness, acidity, and fruity flavor. The results are expressed as the percentage of consumers who rated each attribute within one of three intensity categories: low, just right, and high. This information complements the overall acceptance data, providing a more detailed view of how different levels of propolis affect the sensory perception of the product.

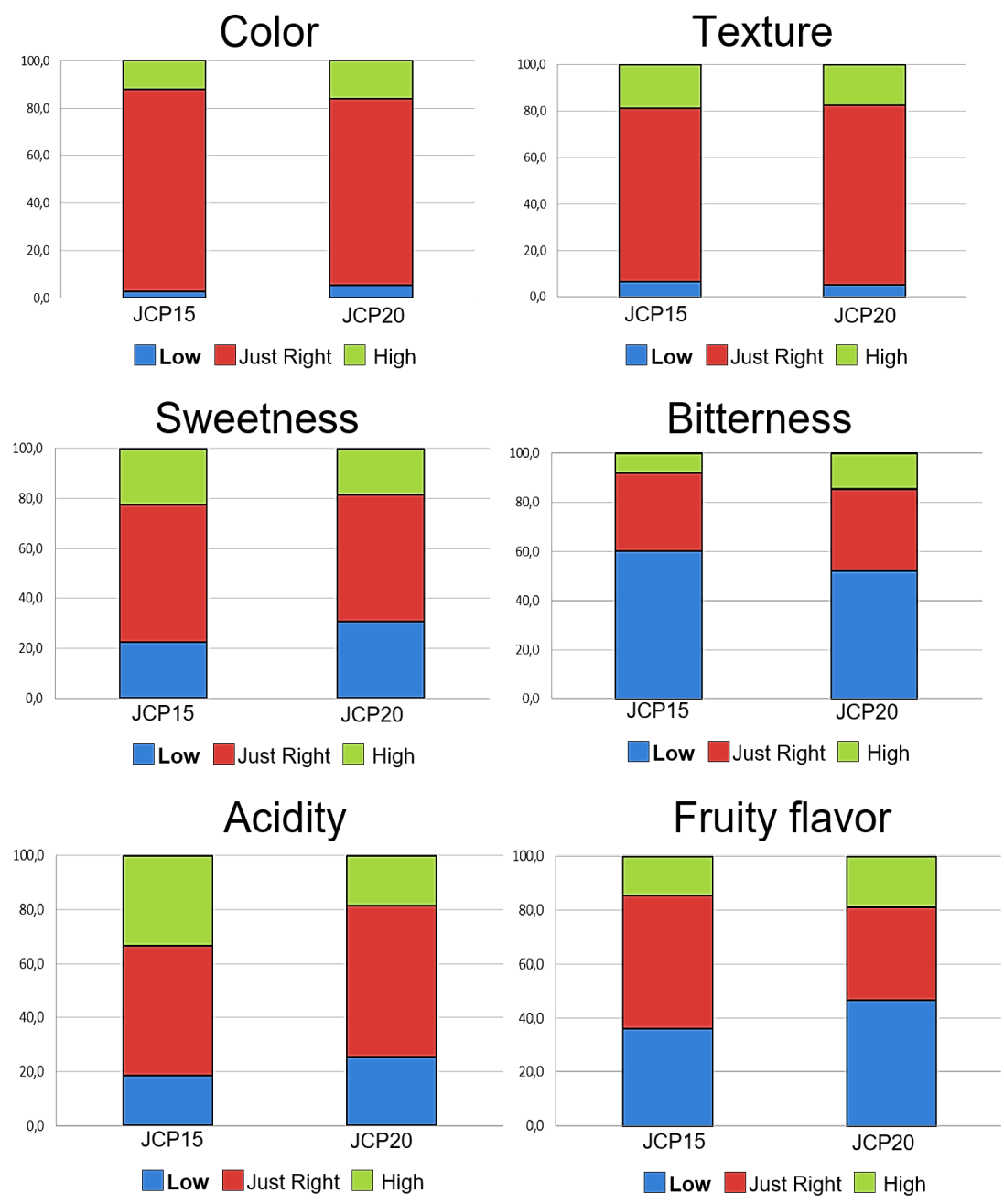


Figure S1: Distribution of consumer responses for the intensity of sensory attributes in jam formulations JCP15 and JCP20. Results are expressed as the percentage of consumers who rated each attribute.