Electronic Supplementary Material (ESI) for Sustainable Food Technology.

Formulation of Plant-Based Meat Alternatives and its Optimization by Experimental Design using Response Surface Methodology

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Moisture Analysis

The moisture content of the samples was determined using the Sartorius MA35 model, a moisture analyzer, in accordance with the procedure outlined in AOAC (Association of Official Analytical Chemists, 2005)[1]. Each sample weighing 2 grams was carefully placed in the moisture analyzer. The analysis was conducted for a duration of 1 hour to ensure accurate measurement of the moisture content. Subsequently, an additional 10 minutes run was performed to verify the consistency of the weight difference among the samples, with the aim of keeping the variance within an acceptable range of less than 1 mg. This additional step was implemented to ensure the reliability and consistency of the moisture content measurement. The methodology prescribed in AOAC (2005) provides standardized guidelines for moisture analysis in various food and agricultural products.

Sensory evaluation

The quality of the vegan meat alternative study was assessed through sensory evaluation. The evaluation focused on several sensory parameters, including taste, texture, odor, appearance, and overall acceptability. A panel of 10 trained evaluators (6 male and 4 females, aged between 19 and 30, non-smokers) participated in the assessment. The sensory evaluation was conducted using a 9-point hedonic scale, where the evaluators rated each attribute on a scale ranging from 1 (dislike extremely) to 9 (like extremely). This scale allowed for subjective evaluation of the sensory attributes, providing insights into the evaluators' preferences and

perceptions of the vegan meat alternative. To determine the overall acceptability of the product, the average scores from all the sensory attributes were considered. This involved combining the individual scores for taste, texture, odor, appearance, and overall acceptability to calculate an overall score that reflected the evaluators' overall perception and acceptance of the product. By utilizing sensory evaluation and hedonic scales, valuable information regarding the sensory characteristics and consumer acceptance of the vegan meat alternative was obtained. Considering multiple sensory attributes and overall acceptability allows researchers to assess the overall quality and potential market acceptance of the product[2].

References

1. AOAC (2005). Official Methods of Analysis. 18th Edition, Association of Official Analytical Chemists. Washington D.C., USA.
2. Piggott, J. R., Simpson, S. J., & Williams, S. A. (1998). Sensory analysis. *International journal of food science & technology*, **33**(1), 7-12.

Table S1. ANOVA table for the response: Protein, Energy and Carbohydrates

Source	DF	Protein	Energy	Carbohydrates
		P-Value	P-Value	P-Value
Model	9	0.000	0.000	0.000
Linear	3	0.000	0.000	0.000
Horse gram (gm)	1	0.000	0.000	0.000
Soy flour (gm)	1	0.000	0.000	0.000
Wheat flour (gm)	1	0.000	0.000	0.000

Square	3	0.000	0.000	0.000
Horse gram (gm)*Horse gram (gm)	1	0.000	0.000	0.000
Soy flour (gm)*Soy flour (gm)	1	0.000	0.000	0.000
Wheat flour (gm)*Wheat flour (gm)	1	0.000	0.000	0.000
2-Way Interaction	3	0.000	0.000	0.000
Horse gram (gm)*Soy flour (gm)	1	0.000	0.000	0.000
Horse gram (gm)*Wheat flour (gm)	1	0.000	0.000	0.000
Soy flour (gm)*Wheat flour (gm)	1	0.000	0.000	0.000
Error	10			
Lack-of-Fit	5	-	-	-
Pure Error	5			
Total	19			

Table S2. Proximate analysis for the final product

S.No.	Parameter	Result (%) Kcal/100g
1	Ash	3.91
2	Protein	20.22
3	Fat	0.24
4	Fiber	0.32
5	Carbohydrate	70.52
6	Energy	365.12

Table S3. Sensory analysis for the final product

Taste	Texture	Odour	Appearance	Overall Acceptibility
6	7	7	8	7
6	8	7	8	7.25
6	7	7	5	6.25
5	7	8	7	6.75
6	8	6	9	7.25
6	9	7	5	6.75
6	7	7	6	6.5
6	7	7	8	7
6	6	7	3	5.5
6	7	7	9	7.25

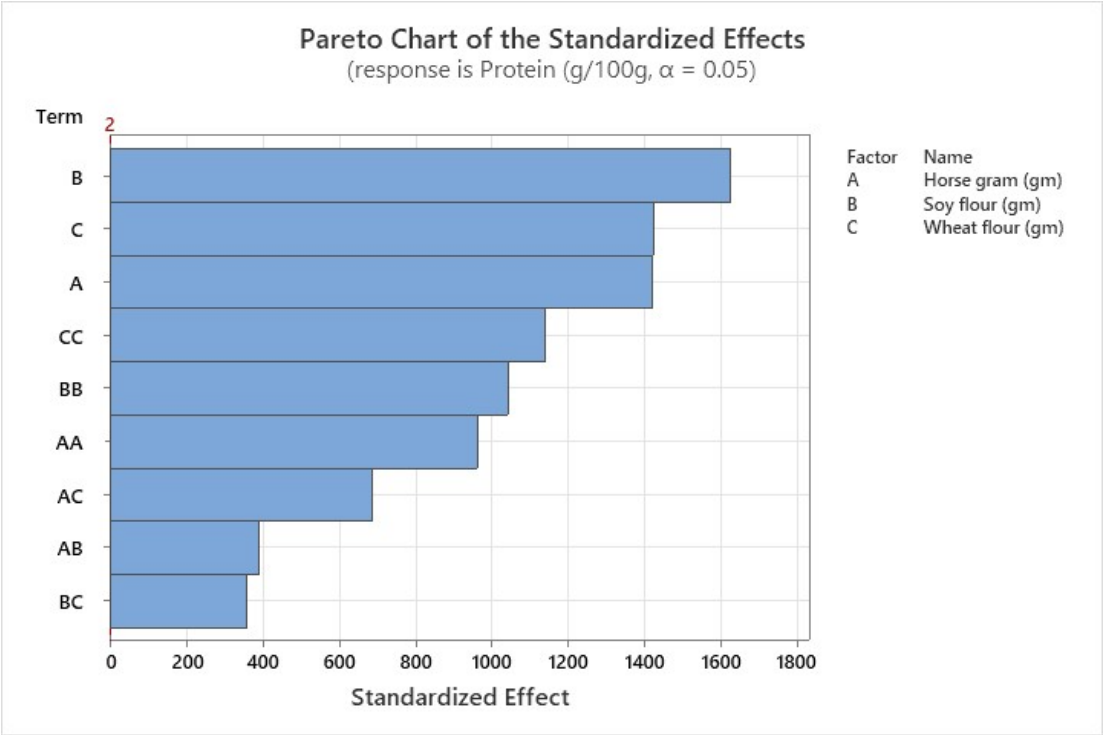

Figure S1. Identification of the highest and lowest interaction between the factors to determine the protein.

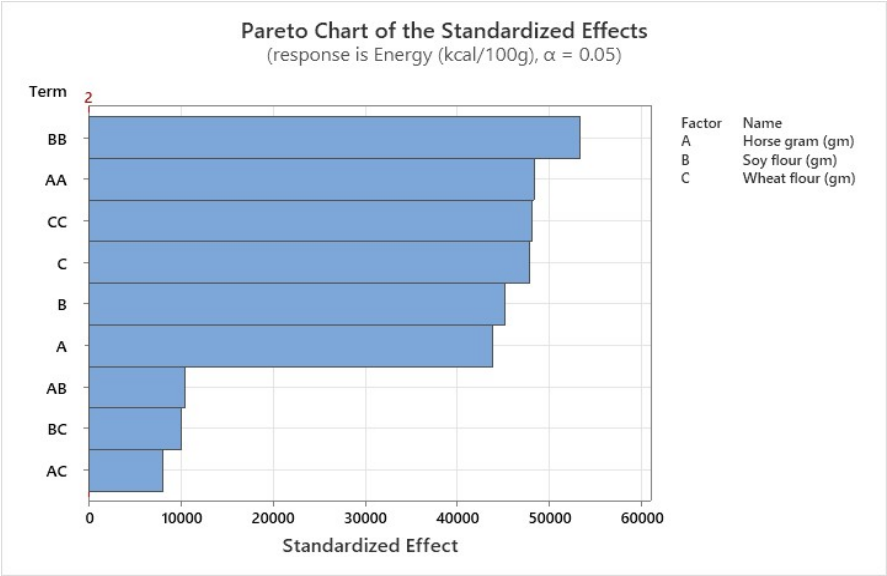

Figure S2. Identification of the highest and lowest interaction between the factors to determine the energy.

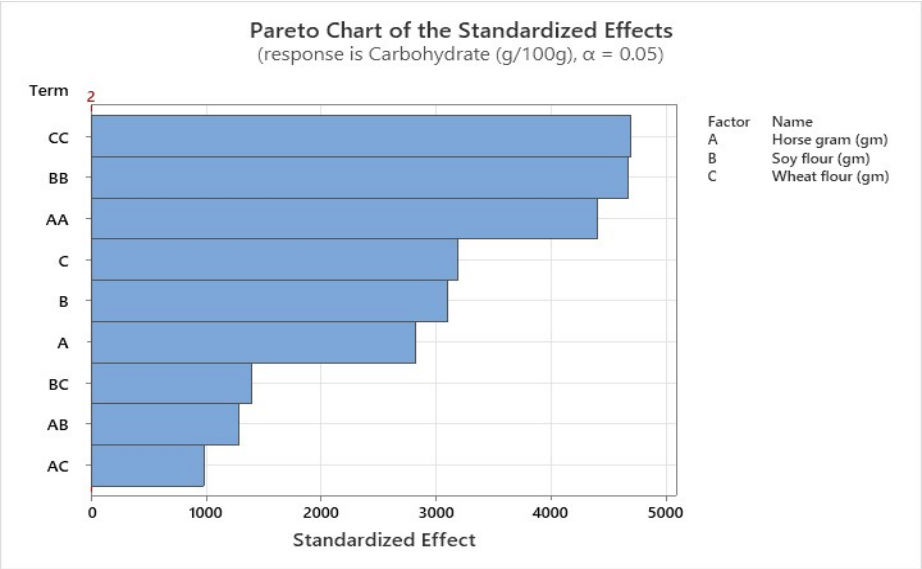

Figure S3. Identification of the highest and lowest interaction between the factors to determine the carbohydrate.