

Supplementary material for the paper entitled:

Spray-dried nipa palm vinegar powder: Production and evaluation of physicochemical, nutritional, sensory, and storage aspects

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Table S1. The levels of the various factors in experimental design.

Factor	Levels	Coded level		
		−1	0	1
X_1 , Air inlet temperature (°C)	3	150	170	190
X_2 , Maltodextrin concentration (% w/v)	2	15	-	20

Table S2. The factor values used in producing the various powdered NPV products.

Product	X_1 : Inlet temperature (°C)	X_2 : Maltodextrin concentration (%)
NPVp-1	150	15
NPVp-2	150	20
NPVp-3	170	15
NPVp-4	170	20
NPVp-5	190	15
NPVp-6	190	20

Table S3. The constraints used in estimating the overall desirability.

Variable	Target	Lower limit	Upper limit	Weight	Importance coefficient
<i>Input</i>					
Inlet temperature (T)	In range	150	190	1	-
Maltodextrin concentration (MD)	In range	15	20	1	-
<i>Output</i>					
Product yield (Y)	Maximize	46.73	58.32	1	+++++
Bulk density (BD)	Maximize	0.43	0.48	1	+++++
Moisture content (MC)	Minimize	2.05	3.1	1	+++++
Water activity (a_w)	Minimize	0.23	0.36	1	+++++

Table S4. The statistical models and comparison of predictions with the measured values.

Attribute	Statistical model ^a	Predicted value ^b	Measured data for NPVp-3
<i>Y</i> (%)	$Q = 53.22 + 1.62T[1] + 2.73T[2] + 1.88MD - 0.41T[1] MD + 0.45T[2] MD$	53.62	53.62 ± 0.11
<i>BD</i> (g mL ⁻¹)	$Q = 0.46 + 4.2 \times 10^{-3}T[1] + 1.2 \times 10^{-2}T[2] + 7.5 \times 10^{-3}MD - 2.5 \times 10^{-3}T[1] MD - 5.0 \times 10^{-3}T[2] MD$	0.47	0.47 ± 0.00
<i>MC</i> (% w/w)	$Q = 2.73 + 7.8 \times 10^{-2}T[1] - 0.18T[2] + 0.30MD - 6.0 \times 10^{-2}T[1] MD + 0.17T[2] MD$	2.08	2.08 ± 0.04
<i>a_w</i> (-)	$Q = 0.27 + 6.4 \times 10^{-2}T[1] - 3.0 \times 10^{-2}T[2] + 1.1 \times 10^{-2}MD + 1.4 \times 10^{-2}T[1] MD - 5.0 \times 10^{-3}T[2] MD$	0.23	0.23 ± 0.00
<i>TSS</i> (°Bx)	$Q = 21.88 - 8.3 \times 10^{-2}T[1] - 3.3 \times 10^{-2}T[2] + 2.05MD + 0.25T[1] MD - 0.20T[2] MD$	20	20.00 ± 0.00

Y (%), product yield; *BD* (g mL⁻¹), bulk density; *MC* (% w/w), moisture content; *a_w* (-), water activity; *TSS* (°Bx) total soluble solids.

^a *Q* is the predicted response; *T* is the coded value of inlet air temperature; *T*[1] (= 0 at optimal temperature) is the first coefficient (the difference of level 1 from the overall average); *T*[2] (= 1 at optimal temperature) is the second coefficient (the difference of level 2 from the overall average); *MD* (= -1 at optimal concentration) is the coded value of maltodextrin concentration.

^b Predicted for optimal conditions (*X*₁ = 170 °C, *X*₂ = 15% w/v).