

List of Abbreviations

L	Length of seed (mm)
W	Width of seed (mm)
T	Thickness of seed (mm)
S	Sphericity (%)
S_{α}	Surface area (mm^2)
R_{α}	Aspect ratio (%)
ρ_b	Bulk density (g/ml)
ρ_t	True density (g/ml)
ε	Porosity (%)
ϕ	Angle of repose
H	Height of the heap (mm)
D	Diameter of the heap (mm)
cP	centipoise
db	Dry basis
L^*	Lightness
a^*	Redness or greenness
b^*	Yellowness or blueness
UA	Umling ame
LA	Lingkang ame
WR	Pungpo ame
C	Control extrudate sample
O	Optimized extrudate sample
DF	Degree of Freedom
ANOVA	Analysis of variance
CCD	Central composite design
GE	Gross energy
ME	Metabolizable energy
ATP	Adenosine-triphosphate
IRRI	International Rice Research Institute
BHT	Butylated hydroxytoluene
TCA	Trichloroacetic acid

DPPH	2, 2'-diphenyl-1-picrylhydrazyl (%)
FT-IR	Fourier transform infrared
RP-HPLC	Reverse phase- High-performance liquid chromatography
FAO	Food and Agriculture Organization
ICP-MS	Inductively coupled plasma mass spectrometry
AAS	Atomic absorption spectroscopy
PT	pasting temperature
PV	Peak Viscosity
BD	Break down
TVA	Texture profile analyser
SEM	Scanning electron microscopy
	γ Shear rate
σ_0	Yield stress
K_k	Consistency index
n_H	Flow behaviour index
K_c	Slope
K_{0c}	Intercept
K_M	Apparent viscosity
EMC	Equilibrium moisture content
M_o	Monolayer moisture content
ω	frequency
G'	Storage modulus
G''	Loss modulus
η^*	Complex viscosity
DPP-4	Dipeptidyl peptidase-4
GLP-1	Glucagon-like peptide-1
STC-1	Secretin tumour cell line-1