A new engineering method for understanding extrusion cooking process

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A new engineering method is proposed to understand extrudate expansion and extrusion

operation parameters for starch based food extrusion cooking process through

dimensional analysis principle, i.e. Buckingham pi theorem. Three dimensionless groups,

i.e. pump efficiency, water content and temperature, are suggested to describe the

extrudate expansion. Using the three dimensionless groups, an equation is derived to

express the extrudate expansion. The model has been used to correlate the experimental

data for whole wheat flour and fish feed extrusion cooking. The average deviations of the

correlation are respectively 5.9% and 9% for the whole wheat flour and the fish feed

extrusion. An alternative 4-coefficient equation is also suggested from the 3

dimensionless groups. The average deviations of the alternative equation are respectively

5.8% and 2.5% in correlation with the same set of experimental data.