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Title: Thermal energy application on extrusion and nutritional characteristics of dog foods

Authors: Peterson D.G. Pacheco, Thaila C. Putarov, Mayara A. Baller, Francine M. Peres, Bruna A. Loureiro, Aulus C. Carciofi



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1 **Thermal energy application on extrusion and nutritional characteristics of dog**
2 **foods**

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5 **Highlights**

- 6 • Specific thermal energy application reduced the mechanical energy required to cook and
7 extrude
8 • Kibble expansion and starch gelatinization increased with higher specific thermal energy
9 application.
10 • The *in vitro* digestibility of the organic matter increased with higher specific thermal
11 energy application.
12 • Total tract apparent nutrient digestibility and feces traits were unaffected by increasing
13 thermal energy application.
14 • Food palatability by dogs did not change by thermal energy application.

15 Universidade Estadual Paulista (UNESP), Faculdade de Ciências Agrárias e Veterinárias,
16 Jaboticabal, Sao Paulo, Brazil.

17 **Abstract**

18 The aim of this study was to evaluate the effects of specific thermal energy (STE)
19 application at the extrusion preconditioning stage on the processing parameters, starch

Abbreviations: BCFA, branched-chain fatty acids; CP, crude protein; DM, dry matter; GE, gross energy; OM, organic matter; RT, residency time of the mass at the preconditioner; SCFA, short-chain fatty acids; SG, starch gelatinization; SME, specific mechanical energy; STE, specific thermal energy; TSE, total specific energy; Temp, preconditioner temperature; T45, treatment with preconditioner mass temperature of 45°C; T55, treatment with preconditioner mass temperature of 55°C; T65, treatment with preconditioner mass temperature of 65°C; T75, treatment with preconditioner mass temperature of 75°C; T85, treatment with preconditioner mass temperature of 85°C; T95, treatment with preconditioner mass temperature of 95°C; T95_{flow}, treatment with preconditioner mass temperature of 95°C and extruder mass flow corrected to achieve the same motor amperage of the treatment T45.

¹ Corresponding author: Tel.: +55 16 3209-7228; Fax.: +55 16 3203-1226.

E-mail address: aulus.carciofi@gmail.com (Aulus C. Carciofi).

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