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Evaluating Equations to Predict Organic Matter Digestibility Of tropical Ruminant Diets from Faecal Crude Protein Concentrations

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Abstract

The apparent total tract organic matter digestibility (OMD) is one of the primary parameters to evaluate nutritive value of feed consumed by ruminants. Estimating OMD *in vivo* requires abundant work and the need to collect the totality of faeces voided by the animal. To facilitate

this estimation, equations based on the crude protein concentration in faeces have been developed: 1) Wang equation $= 0.899 - 0.644 \times \exp(-0.5774 \times \text{faecal CP (g/kgOM)}/100)$ (Wang et al., 2009), 2) Peripolli equation $= 0.7326 - 0.3598 \exp[(-0.9052 \text{ CP (g/kgOM)})/100]$ (Peripolli et al., 2011) and 3) Lukas equation $= 79.76 - 107.7e(-0.01515 \times \text{cp})$ (Lukas et al., 2005) have been developed to predict OMD in domestic ruminants fed forage-based diets. Since the equations were developed under specific experimental conditions, the potential of these equations to accurately predict OMD under other settings needs to be verified. Therefore, the potential of all the three equations was evaluated by comparing OMD estimated by these equations with the *in vivo* OMD measured in diets using tropical forages obtained from literature. In total, 224 *in vivo* measured OMD from different experiments conducted in the Tropics with cattle, sheep, and goats were included. Diets were selected so that the forage portion contained either 100 % legume, 50 % legume+50 % grass, or 100 % grass. Calculated OMD were regressed on the measured OMD and the slope, intercept, and R square were estimated to evaluate the performance of the equations using R-studio statistical software. A total of 12 comparisons were conducted, all R square were below 0.23 and slopes and intercepts ranged from 0.21 to 0.58 and from 200.7 to 546.7, respectively. Hence, the ability of all three equations to predict accurately OMD is very limited regardless of the characteristics of the forage in the diet. These results indicate that the equations developed to

predict OMD from faecal N cannot be applied with confidence in a variety of tropical feeding conditions.

Keywords: Digestibility, ruminants ,tropical feedstuffs