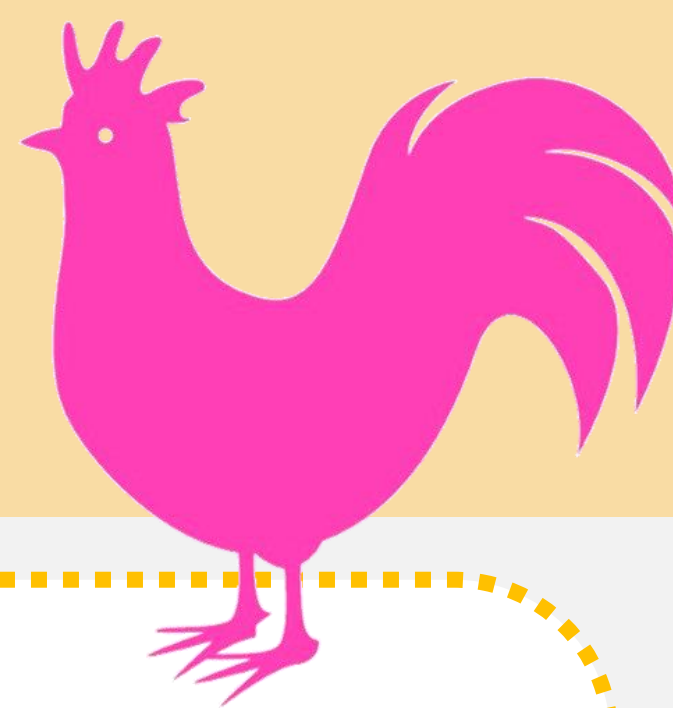


Hector Salgado (1), Frédéric Guay (1), Marie-Pierre Létourneau-Montminy(1*)

(1) Département des sciences animales, Université Laval, Québec, QC, J1V 0A6 Canada *marie-pierre.letourneau@fsaa.ulaval.ca



Introduction

Precise and accurate knowledge of nutritional values of feedstuffs is the basis of efficient formulation system. Apparent ileal digestibility (AID) using an indigestible marker is the most common method to measure amino acid (AA) digestibility in literature in broilers. However, some of the AA found in digesta are from endogenous origin categorized into 1) non-specific or basal losses and 2) specific losses, the latter being dependent of the diet composition. Regardless of apparent or standardized systems, there is considerable variation in AA digestibility within and among feedstuffs that is not taking into account when using fixed average digestibility coefficient per feedstuff. More precise methods of predicting AA digestibility are needed.

Objective

Study the possibility of predicting AA digestibility based on proximal analysis of ingredient (e.g. crude protein (CP), fiber, anti-nutritional factors) through meta-analysis tool taking into account the within and between variations.

Materials and methods

- 49 papers (1999 to 2013) = databases : 1) cereals (n=107), 2) soybean meal (SBM) (n=53), meat and bone meal (MBM) (n=34), 4) cereals + faba beans + peas (n=125)

Model 1 : **DigAA, %** = CP, % (as fed basis) + ingredients (fixed effect) in database 1 and 4

Model 2 : **DigAA g/kg DM** = dietary **total AA content (tAA) g/kg of DM** + ingredients (fixed effect) in database 1 and 4

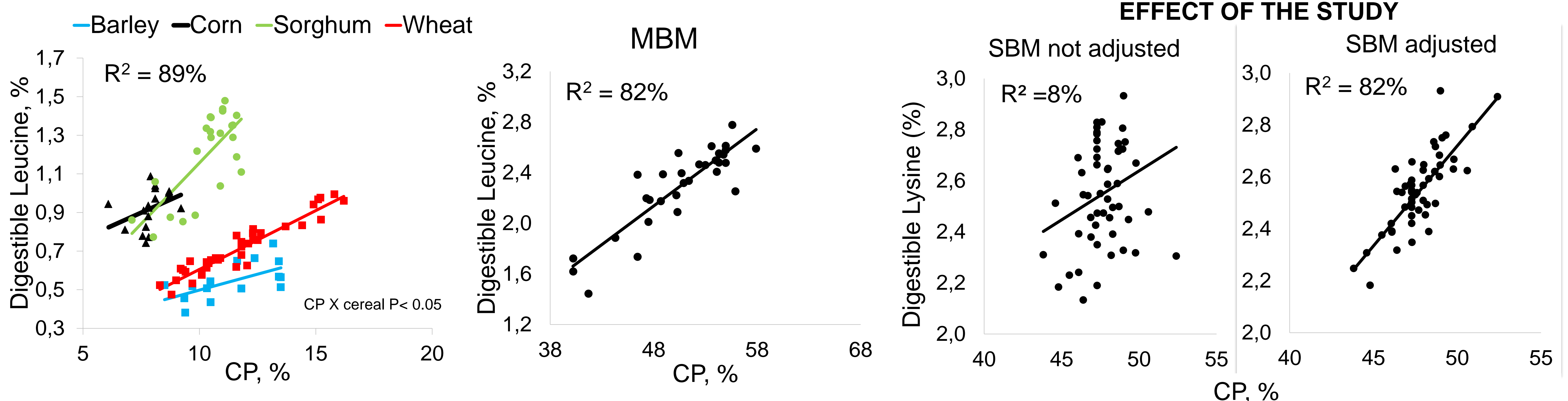
Slope = Deviation of the slope from 1 is caused by non-absorbed AA and from specific endogenous losses

Intercept = Basal endogenous losses

- Random effect of the study was added in all models when significant

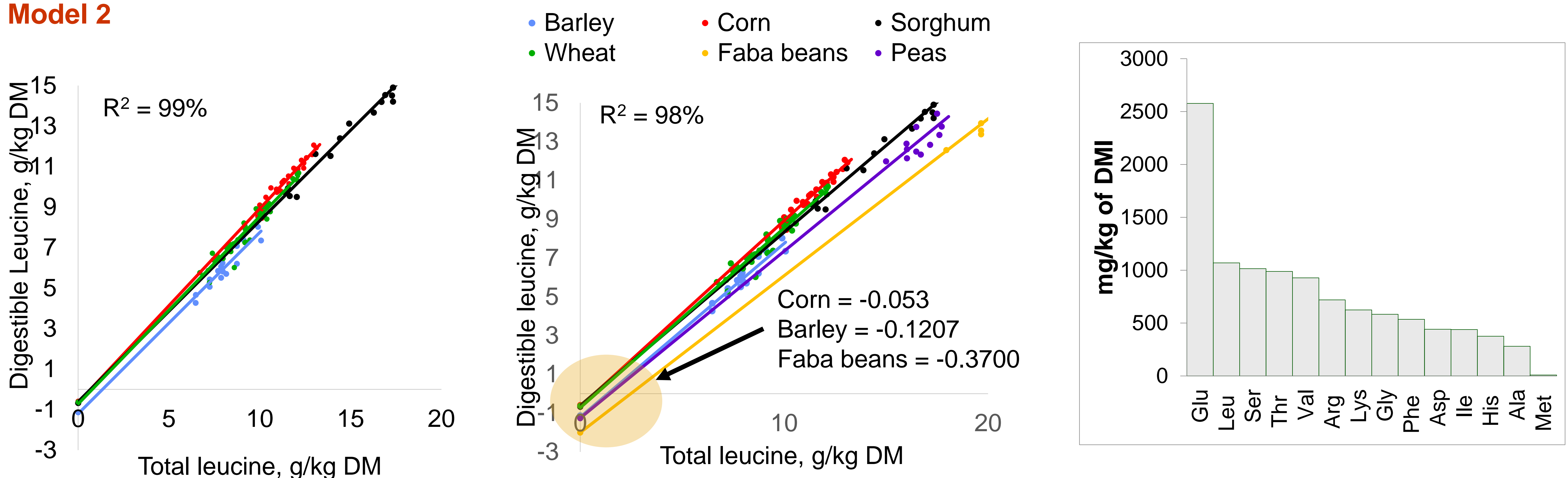
Results and discussion

Model 1



- DigAA responded linearly to CP except for corn in most AA probably due to high temperature during the corn drying process that may result in Maillard reaction (Kil et al., 2014) and also because of the low variability in CP content in corn.
- The high impact of study for SBM and MBM may suggest that other chemical compounds such as fiber content and raw material origin should be considered.
- Unfortunately, and conversely to pigs (e.g. Messad et al., 2016), only CP and AA has been measured in AA digestibility studies

Model 2



- The wide gap between lowest point and theoretical zero can lead to estimation error on intercept and slope
- Endogenous losses (intercept) were higher for faba beans, peas and barley due to their high fiber and anti-nutritional factors content (Adodekun et al., 2011).
- Higher intercepts have been found for Glu, Leu, Ser and Thr which have been reported as predominant AA found in the ileal digesta for chickens except for Leu (Golian et al., 2008). Indeed, Thr, Ser, and Pro are predominant AA of mucin (Lien et al., 2001).

References

Ebadi et al., 2011. Poult. Sci. 90 :2397-2401; Golian et al., 2008. Poult.Sci. 87:706-712; Kil et al., 2014. Anim. Feed Sci. Technol. 196:68-75; Lien et al., 2001. J. Anim. Feed Sci. 10:223-245; Messad et al., 2016. Anim. 10:1635-1644