Effect of maturity stage on rumen degradable and undegradable subfractions of protein and carbohydrate of intercropping whole plant oat (*Avena sativa* cv. CDC Haymaker) with whole plant faba bean (*Vicia faba* cv. CDC Snowbird) as hay in ruminant livestock systems, evaluated with the updated CNCPS system

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The objectives of this study were to determine effect of maturity stage at harvesting on rumen degradable and undegradable subfractions of protein and carbohydrate of intercropping whole plant oat (*Avena sativa* cv. CDC Haymaker) with whole plant faba bean (*Vicia faba* cv. CDC Snowbird) as hay in ruminant livestock systems, evaluated with the updated CNCPS System. The oat and faba bean plant were intercropped and grown in three fields with a seeding ratio of 0.5 bushel of oat grain to 4 bushels of faba bean seeds per acre (or 18 kg of oat seed to 269 kg of faba bean seed per hectare). The intercropped forages were harvested at three growth stages: maturity stage 1 was harvested when the oat plants were in the inflorescence stage and the faba bean plants were in the flat pod stage; maturity stage 2 was harvested when the oat plants were in the milk development stage and the faba bean plants were in the milk pod stage; and maturity stage 3 was harvested when the oat plants were at the soft dough stage and the faba bean plants were in the late pod stage. In terms of protein subfractions, the results showed that the maturity stage affected ($P<0.05$) PA2 and PC fractions and but did not affect PB1 and PB2 ($P>0.05$). With increasing maturity stage, the PA2 reduced from 63.4 to 56.0 %CP. As to carbohydrate subfractions, the maturity stage only affected ($P<0.05$) CB1 and CA4 subfractions on %DM basis and but did not affect CB2, CB3 and CC subfractions. With increasing maturity stage, both CA4 and CB1 were increased from 10.4 to 18.2 % CHO and CB1 from 0.5 to 9.9% CHO respectively. In the CNCPS rumen degradable and undegradable fractions study, the results showed that the maturity stage affected ($P<0.05$) total TRDP and total TRDC without affecting total TRUP and total TRUC. With increasing maturity stage, total TRDP was reduced from 14.8 to 11.9 %DM, but total TRDC was increased from 23.3 to 30.7 %DM.

Effect of maturity stage on true protein supply to dairy cows and feed milk value of intercropping whole- plant oat (*Avena sativa* cv. CDC Haymaker) with whole plant faba bean (*Vicia faba* cv. CDC Snowbird) as hay in ruminant livestock systems, evaluated with the DVE/OEB system

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The objectives of this study were to determine effect of maturity stage at harvesting on true protein supply to dairy cows and feed milk value of intercropping whole plant oat (Avena sativa L. cv. CDC Haymaker) with whole plant faba bean (Vicia faba cv. CDC Snowbird) as hay in ruminant livestock systems, evaluated with the DVE/OEB system. The oat and faba bean plant were intercropped and grown in three fields with a seeding ratio of 0.5 bushel of oat grain to 4 bushels of faba bean seeds per acre (or 18 kg of oat seed to 269 kg of faba bean seed per hectare). The intercropped forages were harvested at three growth stages: maturity stage 1 was harvested when the oat plants were in the inflorescence stage and the faba bean plants were in the flat pod stage; maturity stage 2 was harvested when the oat plants were in the milk development stage and the faba bean plants were in the milk pod stage; and maturity stage 3 was harvested when the oat plants were at the soft dough stage and the faba bean plants were in the late pod stage. The results showed that the maturity stage did not significantly affect truly absorbed rumen synthesised microbial protein in small intestine (with an average of 48 g/kg DM), truly absorbed rumen undegraded feed protein in small intestine (with an average of 23 g/kg DM), and endogenous protein loss in small intestine (with an average of 26 g/kg DM). However, the maturity stage significantly affected ($P<0.05$) total truly digested protein in the small intestine (DVE) and degraded protein balance (OEB) as well as Feed Milk Value (FMV). The maturity stage 1 had higher ($P<0.05$) DVE value and OEB value than the maturity stages 2 and 3. The maturity stage 1 also had higher ($P<0.05$) FMV value than the maturity stages 2 and 3.