Body composition of broilers consuming forage meal of *Mucuna deeringiana* in the diet. Technical note

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Thirty-two male broilers of the hybrid HE21 were used to determine the body composition of broilers consuming forage meal of *Mucuna deeringiana* (velvet bean) in the diet. The animals were distributed into four treatments (experimental diets) and eight repetitions, according to completely randomized design. The control was based don maize-soybean. In the rest of the treatments, the cereal was substituted by 5, 10 and 15 % of velvet bean forage meal. After 42 d, the animals were weighed, slaughtered and removed their viscera to determine the carcasses weight. Later, they were sectioned in legs and chest. The content of excessive fat was determined. There were no differences between treatments for the body composition, except, for the abdominal fat that decreased, compared to the control, 5.57 units ($P < 0.05$) with the inclusion of 15 % of velvet bean. It is concluded that with the substitution of 15 % of *Mucuna deeringiana* forage meal in the broilers' diet, the carcass fat diminished without affecting the different edible portions.

Key words: *body composition, broilers, Mucuna deeringiana forage meal.*

Forage meals have been traditionally used in poultry diets for their pigments, vitamins, minerals, protein and fiber. They can reduce the contribution of other ingredients more expensive or hardly available, although their inclusion level is limited due to their low ME values, their high CF indexes (Fraga *et al*. 1993) and the presence of anti-nutritional factors (Galindo *et al*. 2008).

Among the legumes forages, Mucuna genus may produce, under the Cuban conditions, from 1.5-4.5 t of grains/ha and up to 9 t of forage/ha, according to the sowing time (Díaz *et al*. 2003). Their contents of CP (15-20 %) (Díaz *et al*. 2004 and Savón *et al*. 2004), ash (3.19-4.16%) and minerals (Ezeagu *et al*. 2003) stand out in its bromatological characteristics, making it more attractive for its inclusion in the poultry diets.

The effect of different forages on the birds' carcass indicators has been referred in the literature (Fraga *et al*. 1993 and Bustamante 2008), with substitution levels up to 15 % in the diet. However, the effect of Mucuna genus forage on this type of study is hardly known. The objective of this study was to determine the body composition of broilers consuming *Mucuna deeringiana* forage meal in the diet.

Thirty-two male broilers of the hybrid HE21 were used. The animals were allocated in individual cages and submitted to experimental diets, from 18 to 42 d of age. The diets were formulated according to the requirements of the NRC (1994) for this category of birds during the growing-fattening periods. The control consisted of a conventional diet of soybean-maize. In the rest of the treatments, 5, 10 and 15 % were substituted with the forage meal of *Mucuna deeringiana*. Tables 1 and 2 present its percent composition and bromatological analysis. During the experiment, the broilers had free access to water and feeds.

The *Mucuna deeringiana* forage meal was elaborated according to the procedure described by Díaz *et al*. (2004). When it was used, the composition was of 89.92 % DM, 22.15 % CP and 64.77 % NDF.

After 42 d, the animals were weighed and slaughtered according to the method of bleeding of the jugular vein described by Sánchez (1990). The carcasses were removed the viscera and the skin and the feathers were separated, the content of excessive fat was determined. Later, the primary (leg and chest) and secondary cuts (wings, neck and carapace) were conducted.

A completely randomized design with four treatments and eight repetitions was used for the statistical analysis. The results were assessed with the statistical software INFOSTAT (Balzarini *et al*. 2001). When necessary, the mean values were compared with the Duncan's test (1955).

In the control treatment, the abdominal fat decreased (table 3) with the inclusion, in the diet, of 15 % of velvet bean forage meal. This was expected, due to the reducing effect of the fiber in the lipids deposition (Marrero 1998). Certain components of the fiber, especially lignin and some soluble components (pectin, glue and mucilage), are capable of retaining the billiard salts and eliminated them through the feces. This increases the excretion of billiard acids and diminishes the fat absorption, as they cannot emulsion or transport up to the intestinal mucosa and as the enterohepatic circulation is interrupted, they form themselves again in the liver. Therefore, the organism needs the cholesterol reserves (Alonso 2000).

The rest of the body composition indicators studied

Tabla 1. Experimental diets of the growing period (21-35 d de edad)

Ingredients	Velvet bean in the diet, %			
	0	5	10	15
Maize	62.90	57.90	52.60	47.30
Soybean	29.30	29.00	29.00	29.00
Velvet bean forage meal	-	5.00	10.00	15.00
Soybean oil	4.00	4.30	4.60	4.90
Dicalcic phosphate	1.20	1.20	1.20	1.20
Mineral and vitamin pre-mixture[1]	0.80	0.80	0.80	0.80
Common salt	0.30	0.30	0.30	0.30
Calcium carbonate	1.50	1.50	1.50	1.50
Bromatological analysis ,%				
DM	88.52	86.76	85.14	86.08
CP	20.90	20.40	20.10	20.00
NDF	18.95	20.87	22.83	25.25
ADF	8.99	12.96	15.10	17.85

[1]Vitaminic supplement: vitamin A, 10 000UI; vitamin D3, 2 000 UI; vitam. E, 10 mg; vitam. K, 2 mg; tiamina, 1 mg; riboflavin, 5 mg; pyridoxin, 2 mg; vitamin B12, 15.4 µg; nicotinic acid, 125 mg; calcium pantothenate, 10 mg; folic acid, 0.25 mg; biotin, 0.02 mg.

Table 2. Experimental diets of the finished period (35-42 d of age).

Ingredientes	Velvet bean in the diet, %			
	0	5	10	15
Maize	65.70	60.90	56.80	51.80
Soybean	26.70	26.30	25.20	25.00
Velvet bean forage meal	-	5.00	10.00	15.00
Soybean oil	3.80	4.00	4.20	4.40
Dicalcic phosphate	1.00	1.00	1.00	1.00
Mineral and vitamin pre-mixture[1]	1.00	1.00	1.00	1.00
Common salt	0.30	0.30	0.30	0.30
Calcium carbonate	1.50	1.50	1.50	1.50
Bromatological analysis ,%				
DM	90.25	89.3	88.45	88.09
CP	18.71	17.19	17.83	17.45
NDF	19.64	21.23	23.97	26.12
ADF	9.75	12.03	15.38	17.54

[1]Vitaminic supplement: vitamin A, 10 000UI; vitamin D3, 2 000 UI; vitam. E, 10 mg; vitam. K, 2 mg; tiamina, 1 mg; riboflavin, 5 mg; pyridoxin, 2 mg; vitamin B12, 15.4 µg; nicotinic acid, 125 mg; calcium pantothenate, 10 mg; folic acid, 0.25 mg; biotin, 0.02 mg.

did not show differences with the substitution, up to 15 %, of velvet bean forage meal. The weights were within the rage reported by Fraga *et al*. (1993) and Bustamante (2008) with the inclusion of forage meal of *Amaranthus cruentus* and *Morus alba* in diets of broilers, respectively.

The results of this study are very useful, considering that the lean carcasses are beneficial for human consumption and can be used in the treatment of some diseases such as diabetes, high blood pressure and the cholesterol deposition.

The velvet bean forage meal may substitute up to 15.6 and 1.7 percent units of maize and soybean, respectively, when including 15 % of this meal in the ration. Besides, it may propitiate a proper live weight and body composition, being an attractive option for reducing costs for feeding concept.

It is concluded that substituting 15 % of *Mucuna deeringiana* forage meal in the diet of broilers diminished the carcass fat, without affecting the weight of the different edible portions. Further studies related with this forage meal in poultry diets are suggested to define if this level affects the productive performance.

Table 3. Body composition of broilers consuming *Mucuna deeringiana* forage meal in the ration

Indicadors (g/kg live weight)	Velvet bean in the diet, %				SE ±
	0	5	10	15	
Live weight (kg)	1.92	1.97	1.84	1.85	0.08
Right carcass	234.21	251.30	238.39	241.55	13.84
Left carcass	244.52	240.43	243.69	232.37	15.83
Breast	131.03	133.82	143.20	141.90	9.86
Right thigh	113.75	132.57	116.34	112.54	10.03
Left thigh	123.56	124.37	123.72	118.48	6.99
Abdominal fat	14.16[a]	13.16[ab]	13.02[ab]	8.59[b]	1.76*
Heart	6.69	6.73	6.56	5.41	0.42

[a,b] different letters within the same row differ significantly ($P < 0.05$) (Duncan 1955) *$P < 0.05$

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