SUMMARY

BIOCHEMICAL PROFILES IN THE HEALTHY OR DIARRHOEIC CALF

The purpose of the kinetic determination of the biochemical profiles in the calf, from birth and during the monogastric stage, is to define more accurately the causes of diarrhoea, associated with various pathological syndromes frequently observed in this animal.

Using automatic analysers, the measurement of various substances present in the blood, intestinal contents and faeces etc. revealed the following facts :

a) the *faecal excretion* of water and nitrogenous substances (free amino acids and biological amines) is extremely low at the normal state. During diarrhoea, this excretion is 10 to 100 times higher. The consequence is a decrease of the biological value of the diet, particularly because of the intestinal degradation of amino acids such as lysine. The important synthesis of biological amines in the intestine (volatile amines, cadaverine, putrescine etc.) seems to be the consequence of the diarrhoea without any toxicity for the host.

b) a defavourable *bacterial environment* seems only to have an aggravating effect in the case of previously stressed animals. The mechanism of the stress effect and the tolerable level of bacterial contamination remain to be determined.

c) Various *blood parameters* have been measured in the calf, from birth and until 3 weeks of age, and then in the adult animal.

1. The *uremia* and *phosphatemia* which are perfectly regulated since birth, increase after the starting of the diarrhoea (from 7.5 mg/100 ml to > 20 for the mineral phosphorus and from 18.9 mg/100 ml to > 250 for urea).

2. The *glycemia*, the regulation of which is made in the hours following the birth, is significantly increased two or three days before the beginning of diarrhoea. According to the severity of the latter, one may observe either a return to the normal state or, in serious cases, an hypoglycemia (normal values 109 mg/100 ml-hyperglycemia 250 mg — hypoglycemia from 20 to 80 mg/100 ml).

These first results show that diarrhoea is associated with various metabolic troubles, the sequence and causes of which must be determined. The aim of the present studies is to find and carry out in practice other representative tests such as the distribution of plasma proteins.

INFLUENCE DE LA SUPPLÉMENTATION PROTÉIQUE BI-HEBDOMADAIRE D'UN RÉGIME A BAS NIVEAU AZOTÉ SUR LA DIGESTIBILITÉ DES CONSTITUANTS DU RÉGIME TOTAL

Geneviève CHARLET-LERY

Laboratoire de Recherches sur la Conservation et l'Efficacité des Aliments, Centre national de Recherches zootechniques, I. N. R. A., 78 - Jouy-en-Josas

---

Des observations précédentes nous ont montré les faits suivants : chez le porc en croissance (25-65 kg), l'extra-chaleur consécutive à un repas très riche en azote (HN) est plus faible que celle due au repas pauvre (BN) qu'il consomme habituellement et s'accompagne d'un abaissement systématique des quotients respiratoires (15 à 20 p. 100). Ceci suppose puisque certains

quotients respiratoires sont nettement inférieurs à 1 qu'il y a un arrêt momentané de la lipogenèse et même de la lipolyse (CHARLET-LERY, 1970).

Cet arrêt de la lipogenèse, bien que de faible durée, pourrait être utilisé pour produire des carcasses maigres à condition que cette supplémentation bi-hebdomadaire d'un régime à bas niveau azoté (rythme utilisé au cours de nos mesures énergétiques) ne modifie ni la digestibilité des constituants de la ration, ni l'utilisation des protéines.

C'est ce que nous avons vérifié au cours de 2 bilans de 21 jours consécutifs sur 2 × 3 animaux recevant hebdomadairement les mêmes quantités d'énergie et de protéines en 13 repas identiques ou en 11 repas BN et 2 repas HN représentant 40 p. 100 des protéines hebdomadaires et distribués alternativement toutes les 72 ou 96 h. Les résultats sont résumés dans le tableau 1.

L'identité des CUD et des bilans pour les deux régimes explique que les sujets en alimentation alternée durant toute leur croissance ont présenté des croissances très voisines des animaux alimentés classiquement, le moindre état de gras des premiers vérifiant l'hypothèse initiale d'une moindre lipogenèse, conduit à supposer une adaptation immédiate des systèmes enzymatiques à la ration ingérée puisque l'apport des repas HN n'a lieu que toutes les 72 ou 96 h. Cet espacement des repas azotés dépasse nettement ceux essayés par les auteurs précédents : 24 h (YEO et CHAMBERLAIN, 1966 ; MENKE *et al.*, 1969), 48 h (EGGERT *et al.*, 1953) qui avaient observé la même régularité des CUD.

SUMMARY

BI-WEEKLY PROTEIN SUPPLEMENTATION OF A LOW PROTEIN DIET AND ITS INFLUENCE UPON THE DIGESTIBILITY OF THE CONSTITUENTS OF THE TOTAL DIET

Previous observations have shown the following facts : in growing pigs (25-65 kg) the loss of extra heat after a meal rich in nitrogen (HN) is smaller than after the normal equienergetic meal poor in nitrogen (BN) ; it is accompanied by a 15-20 p. 100 fall in the respiratory quotients. As certain respiratory quotients are definitely lower than 1, this supposes that there is a momentary pause in lipogenesis and even in lipolysis (CHARLET-LERY, 1970).

This short pause in lipogenesis could be used to produce lean carcasses on condition that the bi-weekly supplementation of the low protein diet (rhythm used during our energy measurements) does not change either the digestibility of the constituents of the diet or the utilization of the proteins.

These questions were studied during two balance trials carried out for 21 consecutive days with 2 × 3 animals. The animals received the same amounts of energy and protein per week in 13 identical meals, or in 11 BN meals and 2 HN meals constituting 40 p. 100 of the weekly amount of protein and distributed alternatively every 72 or 96 hr. The results obtained are shown in the table 1.

The CUD (Digestive Utilization Coefficient) and the balances of the two diets were identical and showed that the growth of the animals submitted to alternated feeding during the whole growth period was very similar to that of the normally fed animals. The fact that the first mentioned animals were leaner supports the initial hypothesis of a lower lipogenesis and seems to show that the enzymatic systems are immediately adapted to the diet ingested since the HN meals are only supplied every 72 or 96 h. This interval between the protein meals is much higher than that used by other authors i. e. 24 h (YEO and CHAMBERLAIN, 1966 ; MENKE *et al.*, 1969), 48 h (EGGERT *et al.*, 1953), who noticed the same regularity of the CUD.

RÉFÉRENCES BIBLIOGRAPHIQUES

CHARLET-LERY G., 1970. *Ann. Biol. anim. Bioch. Biophys.*, **10**, 123-143.

YEO M. L., CHAMBERLAIN A. G., 1966. *Proc. Nutr. Soc.*, **25**, XII.

MENKE K. H., LANTZSCH H. J., EHRENSVARD V., SCHNEIDER W., 1969. *Landrvirtsch. Forsch. Dst. ch.*, **22**, 173-181.

EGGERT R. G., BRINEGAR M. J., ANDERSON C. R., 1953. *J. Nutr.* **50**, 469-477.

TABLEAU I

TABLE I

Régime	MSi (g)	Ni (g)	CUD MS	CUD MO	CUD Cell. W	CUD N	Bilan N (g)	CR	Diet
Bilan I (40 kg)									Balance I (40 kg)
Classique	1 419	37	80,4	83,6	32,1	77,0	17,2	59,9	Normal
Alterné	1 451	38	83,0	85,5	35,8	76,7	17,5	60,2	Alternated
Bilan II (74,4 kg)									Balance II (74,4 kg)
Classique	2 443	57	80,6	83,3	31,3	78,3	24,9	55,8	Normal
Alterné	2 536	58	81,8	84,6	34,0	78,2	25,5	56,2	Alternated
	Dry matter intake (g)	N intake (g)	Dry matter Digestibility (%)	Organic matter Digestibility (%)	Fiber (Weende) Digestibility (%)	Nitrogen Digestibility (%)	Nitrogen balance (g)	Nitrogen retention (%)	

MSi : matière sèche ingérée.
Ni : azote ingéré.
CUD : coefficient d'utilisation digestive.
MO : matière organique.
CR : coefficient de rétention.