

Feeding micro-pellets to newly hatched chicks to improve growth rate

by J. Michard, Hubbard, Mauguérand, 22800 Le Foeil, France and L. Rouxel, ARC, Crenan – 22800 Le Foeil, France.

Early nutrition for newly hatched chicks is of the highest interest because it ultimately influences animal performance, whether they are future broilers, layers or breeders.

However, most commercial feed for young chicks comes from solutions that are not specifically tailored to this early stage. Thus, crumbs are most often suggested for young chicks, but it is only the result of a compromise reached to optimise the feed mill's pelleting processes and capacity.

The experiments presented here intend to highlight the link between feed presentation and homogeneity of the flocks of breeder chicks during their first 7-10 days of life.

Post hatch feeding

Several studies establish that the initial period of access to feed and the conditions of early development may delay future



Sieved crumb (left) and 2mm micro-pellets (right).

growth of all types of poultry. The immediate post-hatch feeding of chicks will also affect sensitivity and resistance to pathogens.

Immediately after hatch, birds need to explore their environment (tactile capabilities of their beak) and learn to associate

nutritional effects with the sensorial characteristics of feed particles. Thus, nutritional value, sensorial detection and experience interact at the three critical phases of early feed intake behaviour: identification, prehension of particles and intake of the feed.

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Table 1. Results for Test 1 and Test 2.

		Body weight (g)		CV%		Intake	FCR	Livability
		Day 1	Day 7	Day 1	Day 7	1-7 days	1-7 days	day 7 (%)
Test 1 – Fast growth breeders								
Male	Micro-pellet	37.3	157.5	8.1	9.2	154.3	0.98	97.0
	Crumbs	36.7	137.7	8.2	12.9	141.5	1.03	94.5
Female	Micro-pellet	36.8	153.8	8.2	11.5	152.1	0.99	96.5
	Crumbs	36.7	138.4	8.9	11.2	146.3	1.06	94.5
Test 1 average	Micro-pellet	37.7	155.7	8.2	10.4	153.2	0.98	96.8
	Crumbs	36.7	138.1	8.6	12.1	143.9	1.04	94.5
		VHS (p<0.001)		p=0.135*				
Test 2 – Intermediate growth breeders								
Male	Micro-pellet	37.3	112.9	8.5	12.8	142.0	1.26	100.0
	Crumbs	37.7	89.3	8.4	14.6	132.0	1.48	98.5
Female	Micro-pellet	38.0	120.8	8.5	13.5	154.8	1.28	99.0
	Crumbs	37.9	89.9	8.7	15.8	139.8	1.56	98.5
Test 2 average	Micro-pellet	37.7	116.9	8.5	13.2	148.4	1.27	99.5
	Crumbs	37.8	89.6	8.6	15.2	135.9	1.52	98.5
		VHS (p<0.001)		p=0.478*				
Average of Test 1 and 2	Micro-pellet	18.9	136.3	8.3	11.8	150.8	1.13	98.1
	Crumbs	18.7	113.8	8.6	13.6	139.9	1.28	96.5

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Selection of feed particles is fast and accurate. However, eating rate depends on the size and hardness of the pecked particles.

Day old chicks consume particles large enough to be pecked effectively by the beak. Thus, a 40g young chick will have a preference for particles of a diameter greater than 0.8mm and most preferably close to 1.5-2.0mm in diameter. These preferences correspond to an energy optimisation (cost/benefit) of eating behaviour.

Several studies also indicate that poultry select their feed intake according to the relative size of particles at beak level, whatever the composition of the diet, which may lead to an imbalance of feed intake if a strong particle sorting takes place.

Pelleting, by its compacting action, improves the efficiency of feed intake by the beak of fast growing broilers. However, the pelleting process and 2.8-3.5mm diameter pellets produced by most modern plants are not suitable for the needs of young chicks.

It is therefore usually necessary to produce crumbs from big pellets to reach the desired 2mm particles suitable for a starter feed. As few experiments have been done on poultry breeders, our work has focused on broiler breeders and, in particular, on the effect of feed presentation on the growth and homogeneity of flocks during the first week of life.

Materials and methods

● **First two trials:** A similar experimental feed formulation, with corn, wheat, soybean meal and wheat bran, was distributed ad lib to the birds from day one in two forms: sieved crumb or 2mm pellets. Using eight pens with 50 breeder males and eight pens with 50 breeder females (50/m²), we followed individual growth from 1-7 days of age. Test 1 involved fast growth breeder lines while Test 2 involved birds with intermediate growth. Before placement, all birds in the protocol were subjected to the usual stress applied to breeders: sexing, vaccination and 24 hours in delivery boxes.

● **Additional trial:** The same protocol was used for an additional test. Performed on females only, it also compared the two forms, pellet and crumbs, but with the following two modifications:



Chicks eating sieved crumb (left) and 2mm micro-pellets (right).

- Half of the birds received 3g broken corn during the first 24 hours in the delivery box.
- The test continued for an additional four days (7-10 days) with crumb feed for all. This was to record growth and uniformity after the change from the 2mm pellet to the crumbs.

Results and discussion

The results of the first two tests are shown in Table 1. The weight gain at seven days is significantly higher when using the uniform 2mm micro-pellets, with a more marked effect on the intermediate growth of breeders: an additional 17.6g body weight gain at day seven with the pellet on Test 1 and +27.3g for Test 2.

No difference was observed between males and females.

Such a gain in growth is achieved with a better intake (Test 1: +9.3g feed; Test 2: +12.5g) and a better feed efficiency (Test 1: -60g/kg; Test 2: -250g/kg).

The aim of breeder management being more oriented towards the search for optimal uniformity of the flock, results in terms of CV were carefully monitored.

Data show that the decrease in flock uniformity in the very first days is less with the starter diet in pellet form: 8.6% to 13.6% CV from day one to day seven with the crumbs, 8.3% at day one and 11.8% CV at day seven with micro-pellets (average of the two tests).

Lower mortality was also observed with the pre-starter pellets during both tests (1.9% versus 3.5% for the average of the two tests).

The additional trial (Table 2) confirms the

above observations on weight gain and uniformity when using 2mm pellets.

It is especially interesting to note that pellet benefits are maintained and even accentuated, when birds return to the crumb form after seven days: +16.2g weight gain with pellet at day seven and still +21.3g at day 10; and -1.9% CV (day seven) to -2.3% CV (day 10). This additional test also demonstrates that the 2mm pellet is of interest regardless of the type of treatment received by the birds in the first 24 hours (feed or not in the boxes).

Conclusion

This work confirms, on breeding stock, that not only the aspect and particle size of the starter feed has an impact on early selection of feed, feed intake and growth rate during the first days of life (+16 to 27g for live weight at seven days), but also that a homogeneous and suitable feed form for young chicks is a valuable aid to the farmer in his search to give the best start to all chicks.

The implementation of this solution on a large number of breeders must demonstrate that improvement obtained at the start will help management in rearing and will improve laying performances.

Such initial gain in growth with a 2mm pellet is also of interest for the production of broilers, especially for those with less than 2kg final live weight for which the seven days weight is critical to optimise technical and economic performance. ■

References are available from the author on request

Table 2. Additional test results.

		Bodyweight (g)				CV%		FCR
		Day 1	Day 7	Day 10	Day 1	Day 7	Day 10	1-10 days
No corn at day 0	Micro-pellet	45.0	143.8	211.1	7.9	10.9	11.0	1.05
	Crumbs	45.4	125.2	185.9	8.2	13.7	14.1	1.05
3g corn at day 0	Micro-pellet	44.7	144.0	212.5	6.7	9.8	10.0	0.97
	Crumbs	44.5	130.1	195.1	7.3	11.9	12.4	1.08
Average	Micro-pellet	44.9	143.9	211.8	7.3	10.4	10.5	1.01
	Crumbs	45.0	127.7	190.5	7.8	12.8	13.3	1.07
			VHS (p<0.001)	VHS (p<0.001)		p<0.001*	p<0.002*	

* We separate each data in two weight groups (0 = individual weight = flock bodyweight average ± 10%, 1 = individual weight above or below flock bodyweight average ± 10%). Then, this allows us to do a khi² test.