

Semi-moist diets to improve d.o.c. performance



The earlier birds have access to water and feed, the better their health and growth.

Early access to semi-moist diets for day-old chicks stimulates gastrointestinal tract development and prevents dehydration during transport.

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It normally takes 24-48 hours before newly hatched chicks receive their first exogenous feed and water. Incubators are opened when all chicks of a batch have been hatched, while in

some cases the chicks have to be sexed, vaccinated etc., which may extend the off-feed time. Although it is believed that residual yolk can cover some hours, it may not be enough for those birds that hatched early. This is expressed most clearly during transport of chicks from the hatchery to the farm.

Chicks are precocial and therefore capable of moving around on their own soon after hatching and will forage for feed and water before growth begins. Keeping birds from feed results in loss of weight till at least 24 hours after birds are fed. Water is one of the most essential nutrients in this period. Chicks may dehydrate when the time between hatching and first water intake is too

long. This results in a loss of bodily functions, including temperature regulation, metabolism, transport of nutrients, and elimination of body wastes.

Several publications suggest that during the first days of post-hatch, yolk is being used for maintenance whereas exogenous energy is utilised for growth; however, deutectomy (yolk sac removal) studies contradict this theory. Recent studies demonstrate that the early provision of nutrients and water stimulates feed intake and the absorption for nutrients from the yolk sac, resulting in improved gastrointestinal tract (GIT) development and investment in the chick's immune system. Israeli researchers Noy and Sklan concluded

Table 1 - Chemical composition (%) and other characteristics of the experimental diets

Parameter:	Semi-moist feed	Dry feed
Moisture	> 30.0	< 12.0
Crude protein	16.0	23.0
Crude fat	6.3	10.0
Crude ash	4.8	5.5
Crude fibre	2.1	3.3
Starch (Ewers)	23.4	33.0
Lysine	1.1	1.7
Calcium	6.5	8.0
Phosphorus	4.4	6.0
Sodium	0.13	0.25
AME broiler (MJ, calculated)	9.60	?
Product appearance	Red 'sandy' crumble	Red extruded particles < 2 mm

Table 2 - Effect of starter diet on length and weight development, yolk weight and GIT development

	No feed	Semi-moist feed	Dry feed	SEM
after 24 hours:				
Length (cm)	21,7	21,9	21,6	0,05
Weight (g)	39,5	39,6	39,5	0,18
after 48 hours:				
Length (cm)	22,1	22,3	22,0	0,06
Weight (g)	37,2	37,6	37,5	0,17
Yolk weight (g)	1,24	1,18	1,15	0,092
Yolk-free body mass (g)	35,9	36,4	36,4	0,21
Length of the intestinal tract (cm)	45,4 ^b	48,1 ^a	46,0 ^b	0,46

^{ab} significant differences (P < 0.05)

Figure 1 - Relative feed intake of the different diets

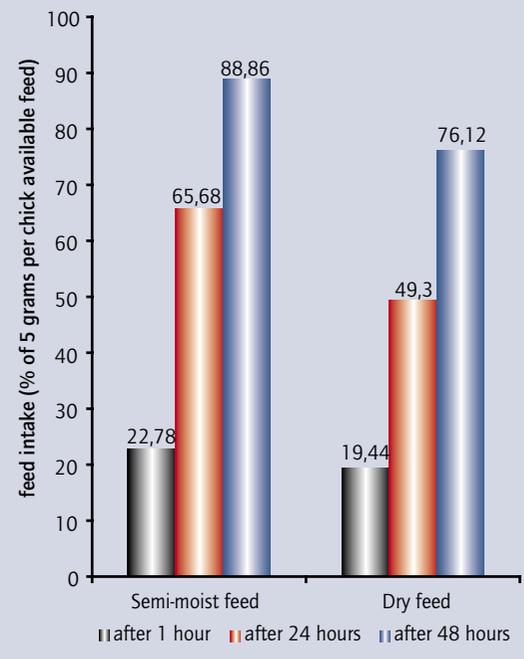


Figure 2 - Effect of diet on relative chick weight decrease

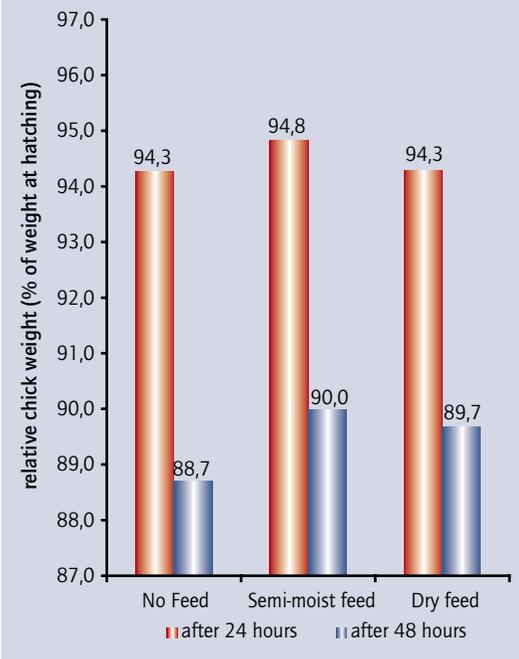
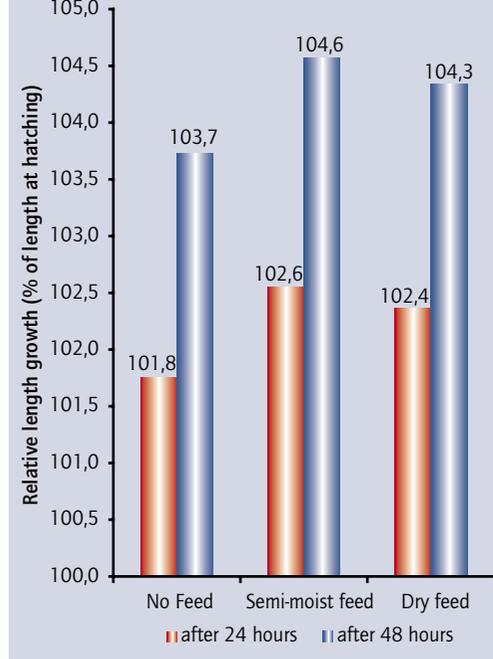


Figure 3 - Effect of diet on chick length increase



in 1999 that early protein intake might stimulate protein satellite cells, which are myogenic precursor cells and instrumental in determining later stage muscle development.

Early provision with both energy and water supports the chick in its thermoregulation, so the newly hatched chick can adapt from a poikilothermic to a homeothermic animal. Based on these findings, Twilmij, in collaboration with broiler breeding company Hybro BV, developed a specific semi-moist starter diet for the day-old chick. Besides the favourable properties this nutrient can have for chicks, it may also provide a solution for hatcheries in case the European Council implements a new legislation considering the water supply of day-old chicks during transport!

Comparing methods

Research trials and field studies confirm advantages of using a semi-moist starter diet in comparison with no feed access and conventional dry feed in the first days of life.

An experiment with 216 broiler breeder chicks (Hybro PN+ males) from 0-48 hours 'post-hatch' conducted at Torsius Hatchery BV in the Netherlands is one of these trials. The chicks originated from a 44-week old parent stock with excellent health. At the start of the experiment all individual chick weights and chick lengths were determined. The batch was divided into three treatment groups: chicks receiving no feed (control group); semi-moist diet (After-Egg-Food, Twilmij BV); and dry (extruded) feed

(Nutriful, Trouw Nutrition BV). After sexing and weighing, 72 chicks per treatment were placed in cardboard transport boxes with a constant climate and lighting regimen.

The chemical analyses (according to the suppliers) and other properties of the experimental diets are summarised in Table 1. The semi-moist diet is composed of partly precooked cereals and easily digestible protein and lipid sources. In order to prevent water evaporation and microbial contamination, preservatives were added. The dry feed used is an extruded product with cereals, soybean and fish products as the main feed ingredients.

Per transport box (= treatment), 350 g of the experimental diet (5 g per chick) was dosed and uniformly spread over

the bottom. After 1 hour the residual feed was weighed in order to determine feed acceptance and palatability. After 24 and 48 hours, 20 chicks per treatment were randomly selected for body weight and length measurements, while at both times the residual feed was weighed.

At the end of the experiment, from 20 chicks the length of the intestinal tract (from duodenum to the end of colon) was determined. Yolk weight and bursa weight (pooled per treatment) were also measured as indicator for immune status.

Weight and length

The experiment succeeded. Mortality was negligible since only one chick in the whole experiment died. In addition, there were no considerable differences in faecal consistency and chick vitality between treatments.

The results of the experiment are represented in *Table 2* and the *Figures 1, 2 and 3*. *Table 2* demonstrates the absolute effects of feeding on chick length, body weight, yolk weight and intestinal length. The figures show the relative feed intakes, weight decreases and length increases affected by the feeding treatment.

All chicks of the fed treatments showed good feed intakes (*Figure 1*).

Although it was not easy to determine feed residue (due to feather and faecal contamination), it seemed that semi-moist feed stimulates feed intake, which is in accordance with previous scientific conclusions.

Chick length is a well described parameter for chick development post-hatch; for broiler chicks one extra centimetre at hatching will already explain 100 g extra body weight at slaughter! *Table 2* and *Figure 2* show that fed chicks lose less weight due to dehydration after both 24 and 48 hours, compared to those that do not receive feed. After 24 hours, chicks with access to the semi-moist diet showed a higher increase in length (*Figure 3*) than those of the 'dry feed' and the no-feed treatment ($P < 0.10$). After 48 hours, however, these effects proved to be less pronounced.

Chicks with access to a semi-moist diet for 48 hours showed significantly longer intestines ($P < 0.05$) compared with both the non-fed chicks and the chicks fed dry feed. These results are in line with the findings of Croatian researchers (Mikec, WPSJ, March 2006). They concluded that access to water and feed immediately post-hatch (compared with 12 or 24 hours withdrawal) do not only affect the GIT development positively, but also results in higher body weights 5 days post-hatch.

Bursa and yolk weights

Measuring the bursa weight provided little information. Bursa weights appeared to be very low (45-50 mg) and did not differ between treatments. This is in line with the theory of the Californian professor Kirk C. Klasing, who pointed out that normally bursa weight increments can only be detected when the birds are a few days old.

Yolk weight is a different story. Fed chicks developed (not significant) lower yolk weights and, subsequently, higher yolk-free body mass after 48 hours. This is in line with the findings of the Israeli researcher Noy, 10 years ago, found higher rates of yolk utilisation in chicks with access to feed. Yolk is utilised for preferential early growth of the small intestine indicating the high priority (energy and protein) for the GIT post-hatch. Birds that do not receive feed show a lower relative intestinal growth, compared to immediately fed birds. This contrasts with the findings of Croat Mikec, who found no differences in yolk sac nutrient absorption between fed and non-fed chicks. He concluded that when energy requirements are not satisfied (no exogenous feed), the chick probably utilises yolk antibodies for maintenance purposes instead of immunity. ■