

Feeding embryos to reduce mortality and stimulate health

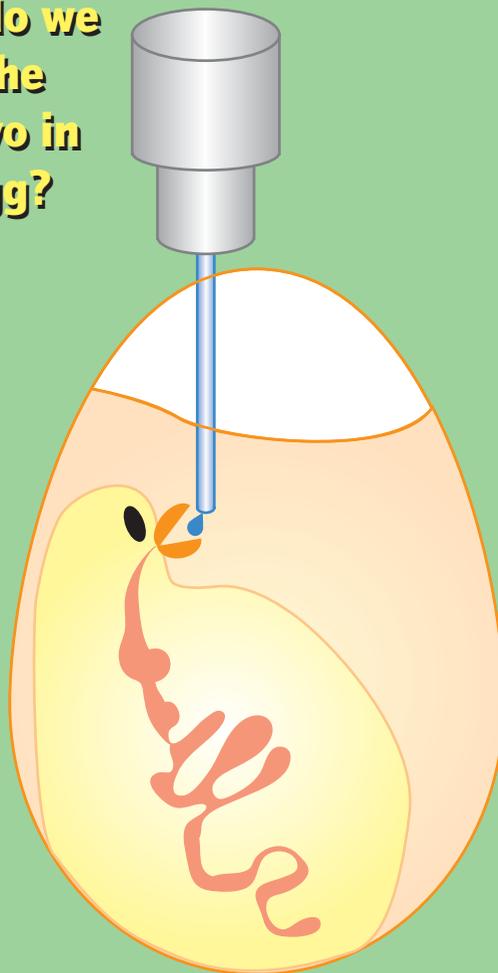
Giving the day-old chick a better start may have a tremendous effect on early mortality as well as health and feed efficiency during the whole growing period. That was the aim of an Israeli and an American researcher when looking for opportunities to provide nutrients to unhatched chicks.

By Aaron Priel

The rapid and healthy growth of broilers has a very significant economic impact on the global poultry industry. Scientists worldwide are constantly searching for ways and means to hasten the rate of growth of broilers, thus cutting down on production costs while generating higher income for the growers. In the last few decades the rate of weight gain of broiler chickens has increased substantially: In 1960, a commercial broiler chicken attained a 2-kg market weight at 12 weeks of age, whereas today's broilers attain the same market weight in just 6 weeks (42 days).

This progress has been achieved by genetic selection and by improvements in feed formulations aimed at optimising growth production. The trend for producing heavier birds in a shorter period reflects the improvements in production efficiency and the competitive costs per unit of meat yield, compared with other meat sources. This in turn reflects the scientific achievements resulting from research projects that started in the early 1960s. In the course of years this development reached almost the upper limits due to genetic selection, improvement in feed formulation to optimise growth production, and advanced farm-management procedures," according to Dr Zehava Uni, researcher in poultry nutrition, at the department of animal science, The Hebrew University of Jerusalem's Faculty of Agriculture in Rehovot (Israel). The term "almost upper limits," she explained in an exclusive in-

How do we feed the embryo in the egg?



"Deliver a suspension of nutrients and enteric modulators into the amnion of the late-term embryo"

Nutrients are provided by in-ovo technology.

terview with *World Poultry*, was a challenge that prompted a joint research project carried out by Dr Uni and Dr Peter Ferket, of the department of poultry science, North Carolina State University (USA). Using a novel idea initiated by Dr Uni, the team embarked on a project with the notion that the "upper limit" can be altered.

Feeding before pipping

The novel idea – and in retrospect a very simple one – is based on feeding the still unhatched chicks (*in ovo* feeding). The hatching period, Dr Uni says, is a critical stage in the chick's life: while still in the egg, the chick invests much of its energy resources to hatch when the time is ripe. The demand for glucose is very high in the last days prior to hatching, with the

chick's 'pipping muscle' requirement. Therefore, supplying liquid nutrition adds the extra energy to the chick. Thus, the optimal liquid feeding formula, provided at the right time and at a prescribed dosage, enables the still unhatched chick to emerge bigger, stronger and livelier, with the capacity to better challenge the new environment into which it has been exposed," Dr Uni explained.

The research was started three years ago in cooperation with Dr Ferket, and culminated successfully with a patent obtained at the end of February 2003 that is now allowed in the USA and pending in the EU, Israel, China and Brazil.

"As birds are generally selected for their potential for increased growth rate and meat yield, the early development of the chicks plays a critical factor pertaining to the productivity aspect of the poultry meat industry worldwide. The aim is to grow heavier birds in the shortest period possible, realizing that the industry is currently close to the upper limits in live broiler weight, Dr Uni commented. The experiments that were carried out during the past 3 years have shown that a nutrient supplement consisting, *inter alia*, of carbohydrates and proteins, given to the chick embryo several days before it hatches, improved broiler production by short-

ening the current 42-day period needed to attain the optimal commercial weight of 2 kg.

Reducing post hatch mortality

By placing the feeding supplement into the embryonic amnion, the embryo can naturally consume it orally before pipping and can start its growth earlier, compared with unhatched embryos that were not supplied with the nutrient solution. "Moreover, supplying natural nutrients by *in ovo* feeding, sustains and accelerates enteric development and improves the chicks' nutritional starting-point in food utilization, reduces post-hatching mortality and morbidity, and leads to an improved immune response to enteric antigens, reduced skeletal disorders, increased muscle development and breast meat yield, all of which factors ultimately reduce production costs of consumable poultry meat," the Israeli scientist explained.

"The application of *in ovo* feeding called for close cooperation between science and industry. The research team through 'Yissum' (The Hebrew University of Jerusalem's Technology Transfer Company), and the North Carolina Technology Transfer Office, are currently negotiating with several reputable companies "that can produce and supply our

patented liquid feeding formula, which is part of the 'secret' of the novel technology." The Embrex company from the United States is considered to be a major potential partner for future commercialisation of the new technology. This company operates an exclusive technology for injecting chicken eggs with immunological material.

The consumption of poultry meat worldwide has increased steadily over the past two decades, in view of the fact that the production costs of this high-quality protein have been more competitive, compared with other meat sources. It is estimated that by the year 2010, 37 billion 2-kg broilers will be required to meet the global demand for poultry meat. The current major production centers of poultry meat are the Americas – notably the United States and Brazil; Europe; and Asia – especially China and Thailand. Shortening the period to attaining the 2-kg optimum weight for broilers has highly significant economic repercussions for the global poultry industry, in view of the continuous decline of profits to the growers: "Just imagine the huge savings to American growers by reducing the growing period by 1-2 days for each of the 8 billion chicks raised in the United States each year," Dr Uni concluded. ■