Egg, Embryonic Reserves and First Feed for the Broiler  E.T. Moran, Jr.*  Auburn University

Hatching egg studies have been devoted to improving number with the hen and fertility. Likewise, incubation research revolves around maximizing chick placement with minimal examination of their productive potential. Each facet from the hen and egg through to chick and live performance is expected to be related but relative effects generally unknown. Nutritional success of the first feed after emergence from the shell can be of meaningful advantage. Yolk and albumen directly participate in establishing the embryo during the first 14 days with remaining amounts in concert with shell Ca providing nutritional resources until external access is established. Several days are employed by the hen for yolk assembly with lipids and phosphorus. Very low density lipoproteins (VLDL) arriving at the hen’s liver after intestinal formation from dietary fat can be readily altered for acceptance by the ovary while additional other fat with protein and phosphorus (P) forms vitellogenin (vg) which has the same destination. Age of the hen together with feed fat and P modify egg yolk. VLDL is massively removed from the yolk after 14 days with triglycerides expanding subdermal depots for post-hatch energy and essential fatty acids while cholesterol accrues in the liver for membrane expansion. P from dismantled phospholipids marries with Ca removed from the shell for the skeleton. Other Ca combines with vg in the yolk sac that is eventually removed to continue mineralization. Rupture of the albumen sac enables “consumption” of the remaining protein medly that largely enters circulation. Disassembly of these glycoproteins provides amino acids for growth and glucose for glycogen storage which continues after emergence. Yolk sac CaP, depot fat, circulating albumen progressively diminishes through 7 days post-hatch. Early access to a first feed having nutritional contents that complements depletion of reserves maximizes potential. Microbial enzymes from coprophagy, particularly phytase, appear to facilitate nutrient recovery by an immature GI system.

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