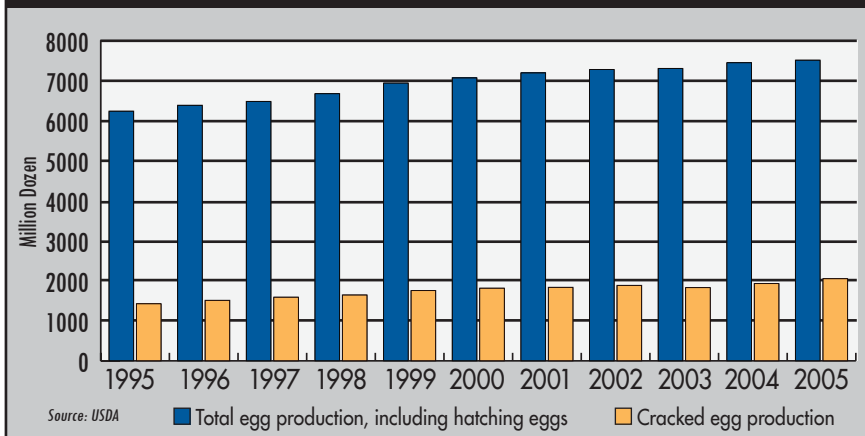


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Breakfast Meals on the Go Spark Further Processing Growth

Table Egg vs. Cracked Egg Production, 1995-2005



By Edward Clark, Editor

Nearly one-third of U.S. table eggs are sold as cracked eggs or processed, and that could reach 40% to 50% in the years ahead, experts say, as consumers continue to eat more of their eggs in processed form.

“In 15 to 20 years, we’ll be 50-50 (fresh eggs vs. processed),” says Marcus Rust, an owner of Rose Acre Farms, Seymour, Ind. Reasons

why, he says, will be the continued growth of breakfasts from the fast food industry, and new products developed by food companies. One key factor in the growth of processed eggs reaching 32% of use in 2005 from 27% in 1995 has been McDonald’s breakfasts, Rust says, and now other fast food chains are doing the same.

In further potential good news for egg consumption, McDonald’s announced in late September that it is considering selling its breakfast menu all day long (see article in

Industry News), following the implementation of a new restaurant operating system that would make the food preparation process more transparent and allow for more variety. Other fast food chains are ratcheting up their breakfast offerings as well. Wendy’s has recently introduced a breakfast menu, and Jack in the Box has begun serving its full breakfast menu all day. Rust says of McDonald’s: “breakfast is what they make their money on.”

Starbucks Serving Up Eggs

Additional proof of the boom in morning egg sales is coffee giant Starbucks’ recent entree into the market with a product designed to be a premium quality warmed breakfast sandwich, according to a source within the company. Such items have proven popular among customers in the five markets in which they have been introduced—600 of the 5,500 company-operated U.S. stores. The options include: egg, sausage, and cheddar cheese; peppered bacon, egg and cheddar; Egg Florentine with baby spinach; Black Forest ham, egg, and cheddar, and one non-egg item, reduced fat turkey bacon. The company has removed the Egg Florentine option temporarily due to the recent spinach recall.

The breakfast items were successfully tested in Seattle, offered in Washington, D.C., early last year, and rolled out in Portland, Ore., San Francisco, and Chicago in 2006. Based on the product’s success in those markets, it will likely add additional markets, the Starbucks official says. Starbucks’ entree “will sell more eggs,” Rust says, “this is great news.”

Toby Catherman, vice president, procurement, Michael Foods, Minnetonka, Minn., the nation’s largest producer of processed egg products,



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Breakfast Meals on the Go

expects “processed eggs to show a slow creep up to 40% of the market over the next 10 years.” The big growth in processed egg use will come from new products, he says. Catherman adds, however, that while processed egg products are increasing, consumption of them is not increasing at the rate statistics suggest, because U.S. exports are increasing, and nearly all exports are processed egg products.

More than Breakfast

Catherman is aware of several new products food companies plan to introduce within three years, but he is not at liberty to talk about them. One reason behind adding egg items, he says, is their relative ease of assembly. Some of these products will be targeting egg use at other parts of the day besides breakfast, where he and others see ripe for growth. The foods will offer “more convenience.” This growth will increase total per capita consumption of eggs, even though these new products “will cannibalize some” from the use of fresh eggs, he says.

Catherman also notes that food companies continue to expand their breakfast lines, such as Sarah Lee’s recent announcement that it plans to increase its offering of its Jimmy Dean line of breakfast items, which includes egg sandwiches.

He says there would have to be huge shifts per year for the processed egg share to be as high as 50%. A decade ago, he thought that could be possible by 2010, but he did not factor in consumer resistance to purchasing liquid egg products in grocery stores. “I didn’t expect that,” he says. “It will take more of a generational shift.” One additional reason why he sees further growth in processed egg products is the excellent track record the industry has on food safety, which also bodes well for exports.

40% of Market within 5 Years

Dan Meagher, vice president of business

development for MoArk, St. Louis, Mo., thinks that egg products will comprise 40% of all eggs consumed within five years, although it will require an education of consumers. Meagher, who was head of MoArk’s liquid egg business before it was sold to Golden Oval earlier this year, says, “the only way to get there is through product development of new consumer items.”

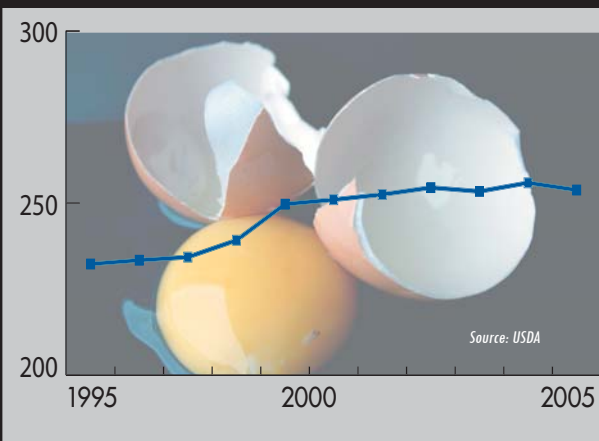
Some products he sees coming are finger food items for food service and school lunches. “There is only so much you can do with a breakfast sandwich,” he says. He says major egg industry players are investing R & D in new products. Meagher says that a major source of additional liquid egg consumption is going to be through food service venues outside the home. Convincing people to pour liquid egg products in their own kitchens is going to be more of a challenge, he says, and will take some “creative marketing.”

But while use of processed egg products is increasing, and in turn will increase total egg consumption, not all is good news for liquid egg producers, Meagher says. He notes that when dried egg whites reached \$6 to \$7 per pound in 2003-05, a number of food companies altered their recipes with non-egg substitutes, changed their labels, and it’s going to be tough to convince them to switch back, even if eggs are better ingredients. Eggs offer functionality for a variety of food products but must “have good value,” he says.

Rose Acre’s Rust says another area where the processed egg industry has lost sales is shelf stable products, because large global food companies have sometimes switched to less costly alternatives, even if taste is lost. “It’s happening as we speak.” He doesn’t want to specifically mention the products, but “they are center isle products in grocery

stores—shelf stable products, canned and baked products in jars.” In addition, Rust says, some companies are taking out eggs of products in which eggs are only a minor

Per Capita Egg Consumption, 1995-2005



ingredient that some people have allergic reactions to, so they don’t have to list eggs on the label. Such products include baked goods, noodles, and dressings.

Removing the Stigma

One area Meagher sees for the industry to work on and be more innovative in is microwaveable entrees. “The market has to be viewed as snacks, for lunch, dinner.” But to move the consumption needle in a big way, “we have to remove the stigma that eggs are bad for you. We have to communicate that eggs are nothing to worry about.”

In the future, egg opportunities may exist in unlikely areas. The industry can take a lesson from the pages of the juice industry, Meagher says. “Look at the line-up of juices,” he says, each with different health benefits, such as vitamin D. “This is an opportunity for the egg industry to boost per capita consumption of liquid eggs and thus eggs overall,” although, he acknowledges, “it would not be an inexpensive proposal.”

EI

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AGRIFOOD GROUP PUBLISHER

Roy Leidahl: RLeidahl@wattnet.net

EDITOR

Edward Clark: Clark@edclarkcommunications.com

EDITORIAL CONSULTANT

John Todd: Jgtodd1@earthlink.net

NEWS EDITOR

Lisa Thornton: LisaThornton55@aol.com

ART DIRECTOR

Tess Stukenberg: TStukenberg@wattnet.net

TO ADVERTISE CONTACT:

Pam Ballard: PBallard@wattnet.net

Sue Snyder: SSnyder@wattnet.net

Travis Lucas: travislucas@bellsouth.net

CHANGE OF ADDRESS:

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➤ Dennis Ankeny Dies, Vice President of FPS

Dennis C. Ankeny, a vice president of Food Processing Service (FPS), died late last month, following a brief illness. Ankeny, 60, of Lancaster, Pa., had worked at FPS for more than 29 years. FPS handles egg processing equipment. Ankeny is survived by his wife Kay, of Lancaster, Pa., and his son, Christopher, of State College, Pa. Memorial contributions may be made to the American Cancer Society.

➤ Ben & Jerry's Will Transition to Cage-Free Over 4 Years

After saying it would change egg product suppliers a month ago, Ben and Jerry's Homemade Inc. said in late September that it would switch to cage-free eggs over a four-year transition period. The move will make Vermont-based Ben and Jerry's the first national food manufacturer to require that its eggs be cage-free, the company and the Humane Society of the United States said.

The Humane Society had launched a campaign dubbed "A Scoop of Lies: Ben and Jerry's Factory Farm Cruelty." The ice cream maker said in late August that it would drop Michael Foods as a supplier while evaluating options, but would not at that time commit to only buying cage-free eggs.

In related news, Andronico's Market, a 10-store chain in the San Francisco Bay Area, said it would shift to selling only cage-free eggs in October.

➤ Eggs Boost Eye Health, But Not Cholesterol

A new study shows that eating an egg a day improves eye health but does not increase cholesterol levels. Researchers at the University of New Hampshire and the University of Massachusetts examined the antioxidants lutein and zeaxanthin—part of the carotenoid family—which people cannot manufacture on their own and must be obtained from egg yolks, fruit, and leafy green vegetables, such as spinach.

Lutein and zeaxanthin accumulate in the macular retina where they may reduce photostress. Increases in serum lutein and zeaxanthin have been observed in

previous egg studies, but no study had measured macular carotenoids. In the study, published in the October issue of *The Journal of Nutrition*, eye pigments that help protect the retina by blocking out harmful light increased significantly for the women in the study who consumed an egg per day. The researchers said that although the aggregate concentration of carotenoid in one egg yolk may be modest relative to other sources, their bioavailability to the retina appears to be high.

➤ Egg McMuffin All Day Long? Maybe, McDonald's Says



McDonald's Egg McMuffin

In what could be a boost to egg sales, McDonald's announced late last month that it is considering offering breakfast entrees all day long. As a result, consumers may be able to order Egg McMuffins and breakfast burritos morning, noon and night.

At a San Francisco conference of investment bankers, McDonald's CEO Jim Skinner said the company is in the process of developing a new operating system that would be flexible enough to meet different needs at various times during the day.

"There are a number of people that I know, friends of mine, and others, who say, 'Why can't I get breakfast any time during the day,'" Skinner said. "Well, it's not compatible with our current operating system. It's too complicated to deliver the high-quality product that we deliver at breakfast [all day]. But with this system that could be possible." He added, the flexible operating platform could ease the concern of franchises that they would need more workers to be efficient. It would make employee jobs easier, he told the bankers, by tailoring the flow of the kitchen and prep areas to be more efficient and easier to use.

Breakfast has become an important sales area for McDonald's and is more profitable than lunches and dinners; in part, because it rarely discounts breakfast items. Experts say breakfast has enabled McDonald's to turn around the loss-making period that started in 2003. Last month, McDonald's said its U.S. sales were up 3.5% in August compared to the same month a year earlier, and credited the successful launch of the new Snack Wrap "and the continuing popularity of McDonald's breakfast menu" as contributing to those positive results.

➤ USDA Expands National Poultry Improvement Program

USDA has drafted an interim rule expanding the National Poultry Improvement Program (NPPI), a voluntary cooperative federal, state, and industry program designed to prevent the spread of poultry diseases in commercial poultry operations. The expansion of the program is in harmony with international animal health guidelines.

Under the new plan, USDA will provide 100% indemnity for specified costs associated with eradication of H5 and H7 low-pathogenic avian influenza at commercial poultry operations that participate in the NPPI program as prescribed. USDA will only offer 25% indemnity for costs associated with eradication at commercial facilities that choose not to participate in the active surveillance portion of this program. In previous H5 and H7 detections, indemnification was often handled by states and the provisions varied.

"This program expansion strengthens U.S. protections against poultry diseases such as avian influenza," says Ron DeHaven, administrator of USDA's Animal Plant and Health Inspection Service. "These changes also help us to ensure we are following international animal health guidelines, which is a long-standing commitment of the United States."

While low-pathogenic avian influenza poses no risk to human health, USDA's policy is to eradicate H5 and H7 subtypes because of their potential to mutate into highly pathogenic avian influenza, which has a high mortality rate among birds. **EI**

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New Technologies Offer Egg Processors More ESL Options

By Santiago Gomez, Diamond Systems

As the demand for liquid egg products increases, new processing technologies are being developed for the production of Extended Shelf Life (ESL) egg products. Until now, the most popular technology available for the production of ESL egg products has been “standard” time-temperature pasteurization processes. Using different time-temperature combinations, processing plants can achieve as much as 14 to 16 weeks of shelf life when storing the product at 4°C (40°F) or below. Today, it is still impossible to aseptically process natural liquid egg products due to the low coagulation temperature. By the time the required time and temperature minimums are achieved for the aseptic process, the egg products would be cooked.

Now, however, processes are under evaluation that not only rely on a time and temperature combination, but on additional non-temperature related factors that increase the kill rates achieved. These new technologies will offer different options for egg processors such as longer shelf life or the same shelf life with lower temperature-time combinations.

But it is—and it will always be—extremely important, regardless of the process, to use fresh, clean, washed, and sanitized eggs and to filter and chill them immediately after breaking in order to produce ESL products consistently. An egg in the shell can be considered sterile, which means that the bacteria we are trying to eliminate through the ESL processes come from egg breaking and collection.

The ideal ESL process would be to sterilize the shell before breaking it, and to break the egg under a tightly control-



The standard pasteurization system consists of four main components: liquid handling system of balance tanks, product, and CIP pumps and valves; heat exchanger; holding tubes where the pasteurization process takes place; and the control and recording systems.

led environment to produce a raw product as close to sterile as possible. This will allow plants to process ESL egg products at less severe processing conditions, with reduced energy consumption and with minimal changes to product flavor and functionality.

What follows is a review of the different ESL processes, and new technologies.

Traditional Time and Temperature Process

A pasteurizer operates on a percentage basis: a 4 log means 99.99% reduction in bacteria, a 5 log 99.999%, a 6 log 99.9999%, etc. Egg processing plants have concentrated on finding ways to

process egg products at the highest temperature possible and holding it for longer than the required minimum pasteurization time to achieve a longer shelf life.

The standard pasteurization system consists of four main components: a liquid handling system consisting of balance tanks, product and CIP pumps and valves; a heat exchanger, whether plate, tubular or a combination of both; holding tubes, where the pasteurization process takes place; and the control and recording systems. Through time, these components have been redesigned to allow the processing plant to achieve higher processing temperatures and a more uniform holding time.

Different combinations of heat exchangers have been tested to be able to process egg products at the required ESL temperatures for extended periods of time. The most efficient heat exchanger for food processing is the plate and frame system, but if not designed correctly, the product will start to coagulate on the plate surface, fouling the heat exchanger. Once the heat exchanger is fouled, it requires complete CIP (Clean-In-Place) cycle with the added time, energy, and chemical costs. This is the reason why some companies have installed either tubular heat exchangers or a combination of plate and tubular heat exchangers.

The tubular heat exchanger has a wider “opening” for the product, increasing the time the system can operate at an

extended temperature before it has to be cleaned. But this same principle makes the heat transfer less efficient and the increased volume of the system more than doubles the chemical costs for cleaning.

The best option is a well designed plate heat exchanger that will allow plants to achieve the benefits of the tubular heat exchanger with higher heat transfer efficiency and reduced operating costs. A carefully designed heat exchanger will force the product to move at higher speeds on the critical sections of the system, maximizing product turbulence and reducing fouling, while at the same time protecting flavor and functional properties.

The holding tube is the most critical component of the system, and this is where efforts should be made to maximize its effectiveness and efficiency. This is the part of the system where the pasteurization process takes place and where the bacteria are killed by holding every particle of product for the required amount of time. Even if it sounds simple, the engineering of a holding tube can be rather complex.

➤ New technologies will offer different options for egg processors such as longer shelf life or the same shelf life with lower temperature-time combinations.

There are two ways to guarantee that every particle of product is held for the required amount of time: Design the holding tube to be twice as long as re-

quired, or design a holding tube that eliminates the possibility of a laminar flow condition. Knowing that the fastest particle in laminar flow condition moves at twice the speed of the average flow speed, and designing a holding tube twice as long as required will guarantee that even the fastest particle will receive the required treatment. But doing so will also keep the majority of the product at process temperature longer than required, generating additional flavor changes and damage to functional properties.

The other option is to design a holding tube that guarantees turbulent flow, but it is easier said than done. The amount of “turbulence” in a liquid can be measured using the Reynolds number. This number takes into account the cinematic viscosity and the speed of the liquid. The problem is that even though there is a threshold under which we know for sure the flow is laminar, there is no upper limit that guarantees turbulence. This means

that when designing a holding tube, it is extremely important to consider the cinematic viscosities of all products to be processed as well as the speeds inside the tube. In some cases it might not be possible to use the same holding tube for all egg products.

One of the main limitations of the time-temperature process is that egg products have a time and temperature limit before the process damages functional properties, generates off-flavors, or coagulates portions of the product.

Shockwave Technology

A new process technology that harnesses the destructive forces of cavitation and converts them into heating and homogenizing energy is currently under evaluation. This system applies direct heat to liquids without the use of a heat transfer surface; and, because there is no heat transfer surface, the system can operate at high temperatures for extended periods of time.

As a liquid egg product passes through the system, it is subjected to “controlled cavitation.” Hundreds of thousands of microscopic cavitation bubbles are produced, and as they implode, energy is given off into the liquid egg products. This energy is harnessed for scale-free heating and microscopic mixing. The egg particles are mixed at the micro-



When designing a holding tube, it is important to consider the cinematic viscosities of all products to be processed as well as the speeds inside the tube.

| New Technologies Offer Egg Processors More ESL Options |

scopic level, which increases the mass transfer rate for perfect homogenization.

This technology will allow processing plants to pasteurize egg products at the highest possible temperature without fouling the heat exchanger. And it will eliminate the need for tubular heat exchangers with the corresponding energy, water, and chemical savings.

Preliminary tests have shown that the

microscopic shockwaves have also had an effect of bacterial reduction on dairy products not related to process temperature. It was found that they have an effect on the bacterial cell wall, without interfering with the carbon bonds of the proteins. This could benefit processing plants in more than one way: obtaining additional shelf life when processing at their current time and temperature

combinations, or to reduce the time and temperature combination to achieve the same level of shelf life. This will reduce the operational costs as well as produce a product with better flavor and better functional properties.

Infusion

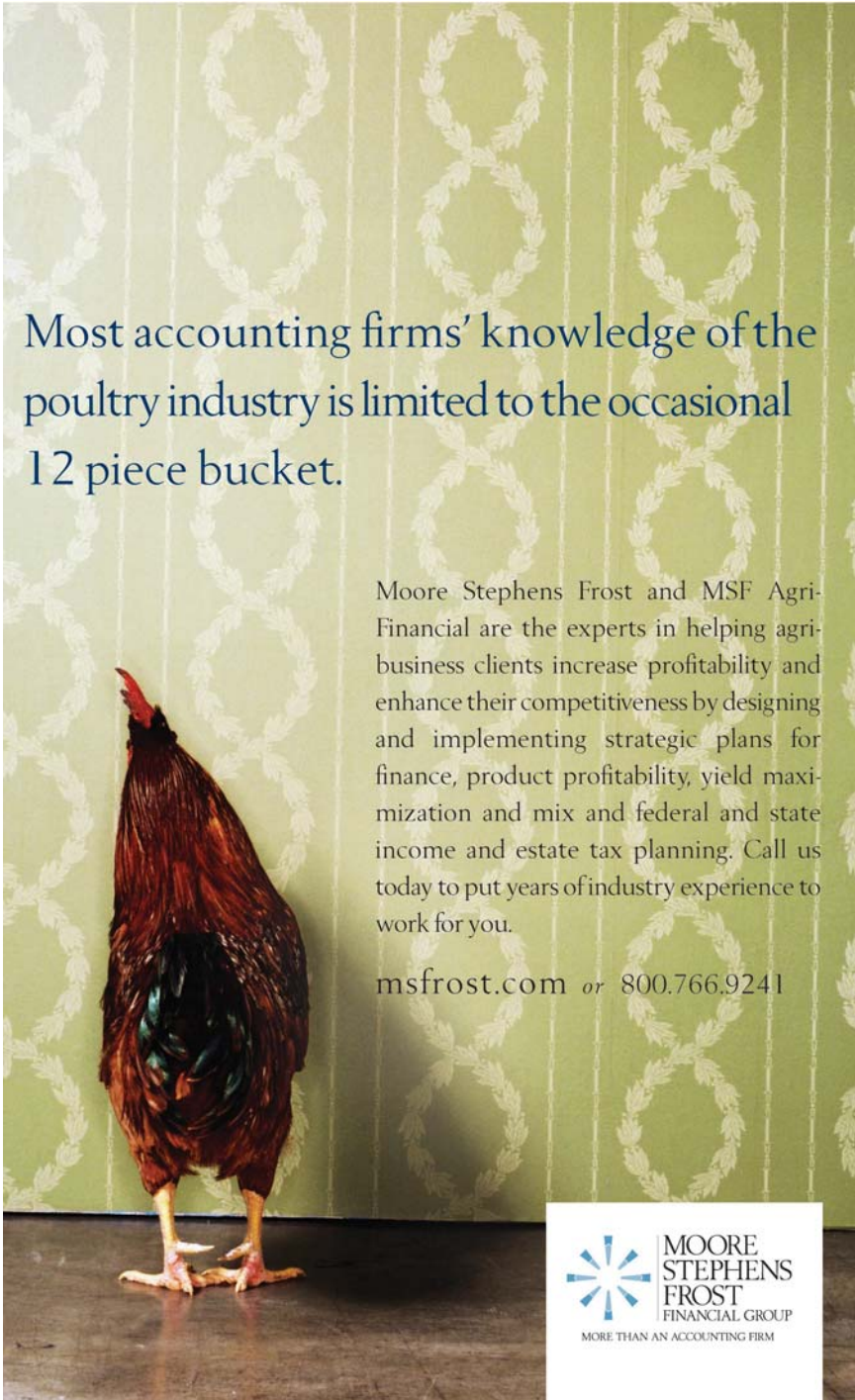
This system operates by holding products for a fraction of a second at very high temperatures before flash cooling. The product is preheated before entering the top of the infusion chamber where it is mixed with steam. Less than 0.2 seconds later, the product reaches the required UHT temperature and it's held for a fraction of a second. Product is chilled as it reaches the bottom of the chamber. As a last step, the system uses a vacuum chamber to eliminate the water added when the product mixes with the steam.

The process of infusion has had a limited use on egg products and has been used on milk for about 10 years or maybe a little longer. The infusion systems were introduced for the aseptic milk processing industry, and the product processed with this system has the best flavor when compared to other aseptic processors. The reason that it has not been more widely used is the cost of the equipment, maintenance requirements, and operational cost.

Hot Pack

After processing, it is extremely important to pay close attention to the packaging since everything that was eliminated during pasteurization can be added back to the product during packaging, except the hot-pack process. This process has been widely used in other food processing industries and consists of packaging the food products at pasteurization temperature and holding the product packages in a water bath at process temperature for the required amount of time.

This process has proven to have exceptional shelf life with reduced operational costs, but it only works with a very limited size and type of packaging materials. The process has been used with egg products that have been concentrated and/or large amounts (up to 50%) of salt or sugar have been added. When these products are processed under specific time and temperature conditions, the product can be held up to 12 months at room temperature. **EI**



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Advances in the Control of Diseases of Egg-Producing Flocks

Dr. Simon M. Shane

Colibacillosis

Dr. Hugo Medina of Sparboe Companies has reported previously on the serious problem of peritonitis and airsacculitis in flocks. This condition occurs extensively throughout the Midwest and appears sporadically in other areas of the U.S.

from lesions is *E. coli*; however, *Pasteurella* spp., *Salmonella* spp., and *Staphylococcus* spp. may be isolated from affected birds. In previous presentations, Dr. Medina has indicated that when confronted with outbreaks, mortality declined following a combination of terminating routine dust removal using air blowers, chlorination of drinking water, and administration

of antibiotics including neoterramycin. In discussion with colleagues, it is apparent that peritonitis occurs in flocks which are predisposed to infection by immunosuppression. This is, in turn, due to early exposure to IBD and possibly chicken anemia virus or Marek's disease, subclinical mycotoxicosis, and the stress associated with molting.

A detailed epidemiologic survey will be conducted in the near future to ascertain the prevalence of the condition, risk factors, and other details which would quantify the extent and severity of infection. Studies conducted at Iowa State University have shown that pathogenic *E. coli* possess large plasmids, apparently associated with virulence. A study on stored isolates applying modern molecular biological assays confirms that more virulent types of *E. coli* are now isolated from commercial flocks. This will require new approaches to diagnosis and control which will inevitably include reduction of environmental stress, manipulation of the immune system, and possibly the application of autogenous vaccines. Simply administering antibiotics is not cost-effective and will lead to drug resistance.

An intriguing result from molecular biological assays conducted at Iowa State University confirms that pathogenic coliforms possess a specific gene, which is infrequently encountered in commensal (non-pathogenic) *E. coli*. It is now possible to develop a polymerase chain reaction-based diagnostic procedure to differentiate between pathogenic and innocuous isolates based on the presence of the *tia* gene. This will be significant in performing epidemiologic investigations of colibacillosis including peritonitis.

Similar studies have shown the presence of the *iss* gene which is frequently associated with pathogenicity in *E. coli* isolates. This gene encodes for an 11-

Peritonitis is most obvious in second cycle hens and may result in flock mortality of up to 10% over four weeks. Characteristic post-mortem lesions include purulent caseous deposits on viscera including the intestines, ovary, and liver. Involvement of air sacs and the oviduct (salpingitis) are frequently observed.

The predominant bacteria isolated

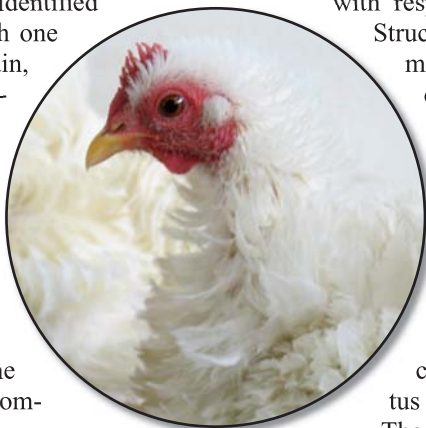
A detailed epidemiologic survey will



kDa protein. The gene can be detected using monoclonal antibody immunofluorescent microscopy. There is an obvious correlation between wild-type *E. coli*—which possess the gene—and modified mutant strains which are non-pathogenic.

Mycoplasmosis

Turkeys which are extremely sensitive to mycoplasmosis were used as biological sentinels to investigate the strains of *Mycoplasma gallisepticum* (MG) in commercial flocks. Isolates were subjected to polymorphic DNA analysis and gene-targeted sequencing. Isolates were identified as field MG but with one isolate each of F-strain, ts-11 and a ts-11-derived strain. In controlled protection studies both ts-11 and 6/85 strain live vaccines were effective against the ts-11-like isolate, but provided less protection against the field strains of MG compared to F-strain.



Trials conducted at Mississippi State University evaluated administration of 6/85 strain MG vaccine at 10 weeks of age with and without overlay of F-strain at either 22 or 44 weeks of age. Non-vaccinated, non-infected hens served as controls. No significant differences were noted in egg weight, shell quality, or internal quality including blood spots or protein inclusions in the albumen as a result of the combinations of vaccines evaluated.

Avian Influenza

A study conducted at the University of Delaware evaluated the diagnosis of low-pathogenicity AI following administration of live vaccines against IB and ND. Detection was impaired three days following vaccination applying real time polymerase chain reaction assay. After 7 days there was no effect of concurrent infection with respiratory viruses on isolation. Serologic tests to detect antibody including ELISA, HI and AGID were not affected adversely during the 7 to 14 day period following IB and ND vaccination. Although this presentation related to broilers, it is ex-

pected that similar results would be obtained with commercial laying flocks. The only possible problem that might be encountered in egg production is interference in diagnosis following periodic boosting of laying hens with live ND and IB vaccines.

Salmonellosis

Field studies have highlighted the epidemiologic deficiencies inherent in low-intensity surveillance systems for SE. Insensitivity associated with drag swab samples coupled with routine microbiological assay of variable accuracy may provide false negative results with respect to a complex. Structured sampling of manure at intervals during the life cycle of flocks and using additional sites such as fan louvers, egg belts, and samples of rodent droppings will provide a more accurate indication of the SE status of a flock or farm.

The proposed FDA sampling protocol which will be mandated for 2007 will displace the current 5-star UEP program and similar state systems and will approximate the ages and frequency currently required under the PA-EQAP. Progressive sampling coupled with PCR assay will clearly differentiate between complexes with and without SE infection. This distinction is absolute. It is axiomatic that farms and complexes with a high rodent population or with deficient biosecurity are at risk of infection or will yield persistent positive samples. Once SE is introduced to an in-line complex, eradication requires diligent and thorough, long-term decontamination together with effective vaccination of flocks using both live attenuated ST priming vaccines and an inactivated emulsion SE vaccine at the time of transfer. **EI**

Editor's note: This article is based on presentations at the 2006 meeting of the American Association of Avian Pathologists held concurrently with the American Veterinary Medical Association Annual Congress in Hawaii.

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EMERGING EGG TECHNOLOGY

WITH DR. GLENN W. FRONING

Ultrasound-Assisted Solvent Method Improves Extraction of Lutein

Egg yolk is known as an excellent source of lutein. Previous research has also shown that lutein in egg yolk is highly bio-available compared to other sources. Lutein—as well as other carotenoids—has been reported to be important in preventing age-related macular degeneration. Lutein and zeaxanthin have also been found to have potential for preventing heart disease and stroke.

Lutein-enhanced eggs are now being marketed by the egg industry. With the importance of lutein in egg yolk, accurate analysis is also a

consideration. Yue *et al.*, 2006 (*Journal of Food Science* 71(4):(239-241) has investigated ultrasonic assisted solvent extraction of lutein from egg yolk. The researchers postulated that high frequency ultrasound breaks down the fat matrix, thereby improving efficiency of the extraction of lutein from egg yolk. They thought this approach could be superior to the present saponification method. In their study, they compared extraction yields of lutein from egg yolk using the hexane solvent (SOL) and ultrasonic assisted-solvent extraction (UA-SOL) methods at various levels

of alkaline saponification (0, 0.2, 0.4 or 0.6 ml) of alkaline solution (10% w/v NaOH in water). An ultrasound probe (Dismembrator Fisher Scientific Inc., Fair Lawn, N.J.) was used. The extracted lutein was analyzed using a HPLC system.

Saponification had a significant effect on the yield of lutein. As the level of saponification increased from 0.2 to 0.6 ml, the yield of lutein extracted decreased from 63.9 µg/g to 6.3 µg/g. The highest yield was obtained with the UA-SOL method without an alkaline solution which was 89.9 µg/g. Previous research has reported a range of lutein contents in egg yolk ranging from 150 to 435 µg/yolk using saponification. (Handelman *et al.*, 1999, *Am. Journal of Clinical Nutrition* 70:247-251). If one assumes a yolk weight of about 20g, the lutein content ranged from 7 to 21 µg using the saponification method. These authors concluded that saponification caused degradation of lutein. Their work indicates that ultrasound assists the recovery of lutein by physically breaking down the sample matrix without negatively affecting the extraction of lutein.

This research is of real importance to our egg industry. It's likely that previous research has greatly underestimated the amount of lutein in the egg yolk. As the egg industry continues to fortify the lutein content of the egg through the diet of the hen, this ultrasound method should be considered to determine the lutein content of the egg yolk. **EI**

Dr. Glenn W. Froning, Professor Emeritus, Department of Food Science and Technology, University of Nebraska-Lincoln, NE 68583-0919

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November

2 – 3: American Egg Board Annual Meeting

Charleston, South Carolina USA. This is AEB's 30th anniversary, and there will be a birthday bash for the Incredible Edible Egg. Contact: AEB, 1460 Renaissance Drive, Park Ridge, Illinois 60068 USA. Tel: 847-296-7043. FAX: 847-296-7007.

2007

January

22 – 23: International Poultry Scientific Forum

Georgia World Congress Center, Atlanta, Georgia USA. Contact: International Poultry Scientific Forum. Tel: 770-493-9401. FAX: 770-493-9257. E-mail: poultryscientificforum@poultryegg.org. Website: www.poultryegg.org.

24 – 26: International Poultry Expo

Georgia World Congress Center, Atlanta, Georgia USA. Contact: US Poultry & Egg Assn., 1530 Cooledge Road, Tucker, Georgia 30084 USA. Tel: 770-493-9401. FAX: 770-493-9257. E-mail: expogeneralinfo@poultryegg.org. Website: www.poultryegg.org.

February

21 – 22: Nebraska Poultry Industries Annual Convention

New World Inn & Conference Center, Columbus, Nebraska USA. This meeting has been rescheduled from its original March date. Contact: Nebraska Poultry Industries, Inc., University of Nebraska, A103 Animal Sciences, P.O. Box 830908, Lincoln, Nebraska 68583 USA. Tel: 402-472-2051.

March

12 – 15: Pacific Egg & Poultry Association (PEPA) Convention

Coronado, California USA. Contact: Pacific Egg & Poultry Association, 1521 I Street, Sacramento, California 95814 USA. Tel: 916-441-0801. FAX: 916-446-1063.

American Egg Board Chooses New President

Joanne Ivy, the American Egg Board's (AEB) senior vice president, will succeed Lou Raffel, as president and chief executive officer of the AEB, Chicago, the organization announced in early October. Ivy has been with the AEB for 20 years. Raffel retires the end of this year.

Ivy was chosen by the AEB's executive committee, which will present its recommendation to the full board for approval at its November meeting. Prior to joining AEB, Ivy was executive director of the North Carolina Egg Association. Ivy "is well known and respected in the egg industry both in the U.S. and internationally," Raffel says. "I look forward to the challenge of moving AEB forward," Ivy says, "to further increase the demand for eggs."

Raffel has been the only president and CEO of the American Egg Board checkoff since it began 30 years ago. He considers providing leadership in changing consumer attitudes about eggs and increasing demand for eggs to be his greatest accomplishments. When the American Egg Board was started, he says, some medical professionals were calling eggs a "poison bill," but now people are seeing their health benefits. While not the only reason why attitudes have changed, the American Egg Board has played a role, he says.

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