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JACKIE ROEMBKE

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# All change as 2018 is half behind us



The June edition of Poultry International brings you the results of our exclusive annual Nutrition & Feed Survey.

Grain cost and quality were cited as the key challenges by respondents looking to the year ahead, but when asked which trend would have the greatest impact on feed formulation, and ultimately profits, almost half cited restrictions on antibiotics.

Seventeen percent also responded that slower-growing chickens would pose a challenge, while 16 percent reported that they were grappling with cage-free production.

More detail from the survey's findings is available across the following pages, but what comes across clearly from the results is that consumer preferences are changing, that this is affecting how birds are produced, and therefore changing how what they eat is formulated.

We also bring you an outlook for global trade in poultry, which suggests that there are a good few storm clouds on the horizon that may disrupt who is trading with whom and disrupt prices significantly. While predicting the future is never risk-free, forewarned is forearmed.

And speaking of change and relationships, we also look at how the provision of veterinary medicines and veterinary services is changing, and how this change is expected to increase in the future. New working relationships and changing aspirations within the animal health sector will increasingly impact how goods and services are provided to poultry producers.

**@ Follow Mark Clements in his blog**  
[www.WATTAgNet.com/MarkClements.html](http://www.WATTAgNet.com/MarkClements.html)

Change is also evident in our look at new UK player Avara, which through the merger of two existing business has become the UK's third-largest poultry producer, and better placed to respond to the ever changing consumer landscape.

We also welcome a new guest author this month, and look forward over the coming months to bringing you his insights; in this edition Jan Henriksen, CEO of Aviagen, examines why chicken is the sustainable meat.

Continuing with the theme of sustainability theme, we also look at waste water treatment in the USA. ■



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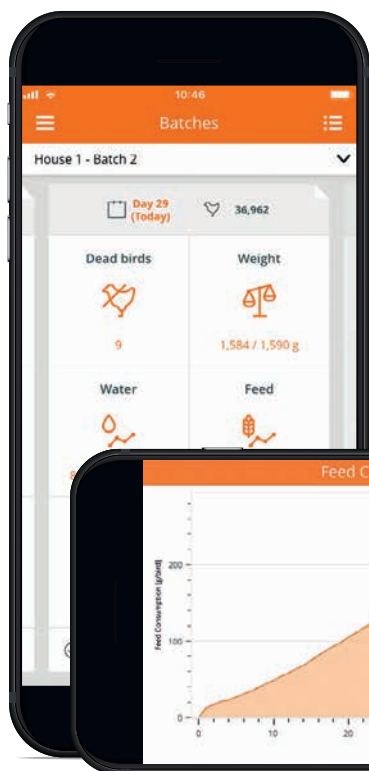
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## 2018 POULTRY NUTRITION & FEED SURVEY



# Poultry feed formulations driven by consumers, market

WATT Global Media's annual report reveals added costs of changing consumer preferences and regulations in poultry feed production.

JACKIE ROEMBKE

Meeting the demands of consumer preferences in poultry production has increasingly affected the way poultry feed is formulated. Whether imposed by regulations or the evolving marketing of chicken meat and eggs, the 2018 Poultry Nutrition & Feed Survey offers a firsthand look at how these changes and challenges have affected poultry feed formulations and, in many cases, the company's bottom line.

The annual survey, conducted in early 2018, includes the input of 399 respondents worldwide:

- Latin America, 43 percent
- Asia-Pacific, 16 percent
- United States/Canada, 15 percent
- Europe, 12 percent
- Africa, 9 percent
- Middle East, 5 percent

More than half of participants were nutrition-

ists, consultants and veterinarians. Seventeen percent work in live production management or as the owner of a poultry farm.

### Poultry profitability challenges

Since 2011, the Poultry Nutrition & Feed survey has asked respondents to rank their profitability. Respondents are very optimistic, with 46 percent reporting improving profitability in 2018 compared with 2017. Thirty-two percent feel business will stay the same and only 21 percent report a negative trend.

More than 80 percent of survey respondents cite grain costs as their No. 1 challenge in 2018. The quality of those grains — including mycotoxin contamination and anti-nutritional factors — ranked No. 2 (72 percent). The cost of feed additives and other micro-ingredients was noted as the No. 3 chal-

## Greatest challenge to your company's 2018 feed formulation program and/or feed costs

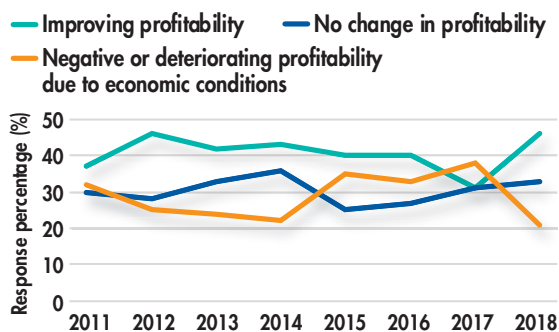


Source: WATT Global Media

Background image: Branex | Dreamstime.com

Poultry producers feel antibiotic reduction and elimination pose the greatest challenges in 2018. While the move toward slow-growing broilers and cage-free production ranked high with participants, disease control and combating the strains of the local economy were also identified.

## Profitability outlook, 2011-18



Source: WATT Global Media

Nearly half of 2018 survey respondents were very optimistic about their company's profitability compared with 2017. For 33 percent of companies, business is expected to remain stable.

## NUTRITION & FEED SURVEY AT A GLANCE

The editors of Feed Strategy, WATT PoultryUSA, Industria Avicola and Poultry International surveyed 399 people producing and using poultry feed worldwide. The survey sought to define the feeding and external trends shaping these businesses during the past 12 months. The survey was conducted in English and Spanish.

### Participants included:

- Nutritionists: 27 percent
- Consultants: 18 percent
- Veterinarians: 9 percent
- General administration: 10 percent
- Poultry farm owner/grower: 10 percent
- Live production management: 7 percent
- Marketing and sales: 9 percent
- Feed mill/plant operations: 2 percent
- Quality control, purchasing agent, other: 8 percent

### Responses from:

- Latin America: 43 percent
- United States/Canada: 16 percent
- Asia/Pacific: 15 percent
- Europe: 12 percent
- Africa: 9 percent
- Middle East: 5 percent

### Sectors:

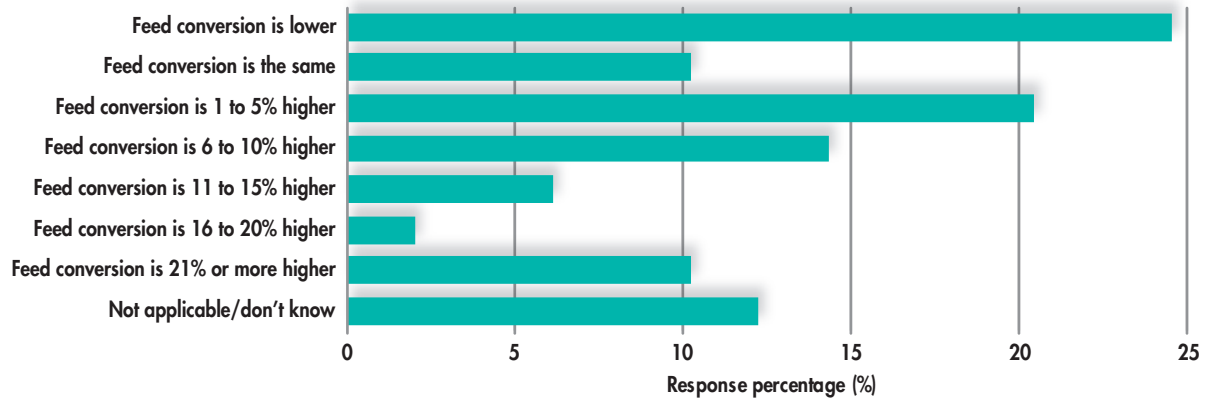
- Consultant/veterinarian/nutritionist: 17 percent
- Broiler production: 20 percent
- Feed manufacturing: 19 percent
- Egg production: 13 percent
- Manufacturing/distributing feed additives: 8 percent
- Breeder farm/hatchery: 7 percent
- Premix manufacturing: 6 percent
- Turkey/duck production: 2 percent
- Poultry processing: 3 percent
- Other: 5 percent

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## POULTRY FEED FORMULATIONS

## Feed conversion ratio of slow-growing broilers vs. modern strains



Source: WATT Global Media

Of the survey respondents (13 percent) who deal with slow-growing broilers, 25 percent report lower feed conversion over modern strains while many others (20 percent) have found theirs 1 to 5 percent higher. Some, however, report feed conversion 21 percent or more higher.

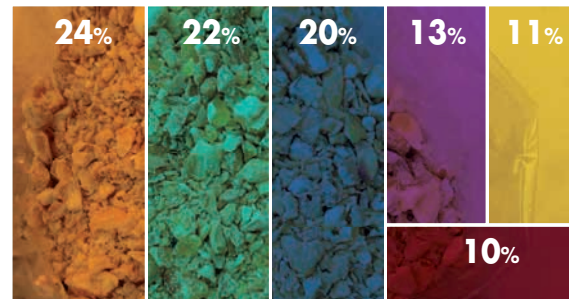
length (62 percent). Manufacturing costs (energy, transportation) and ever-tightening margins also challenge poultry feed producers.

### Costs and challenges of new poultry production changes

When asked which poultry production trend will have the greatest impact on their company's feed formulation program and, in turn, feed costs, 43 percent of respondents cited antibiotic restrictions. Seventeen percent feel slow-growing chickens will pose a challenge; 16 percent are grappling with the move toward cage-free egg production. These three factors did not apply to 23 percent of participants.

Digging a little deeper, 13 percent of survey respondents produce slow-growing broilers. When asked to examine the feed conversion ratios (FCR) of slow-growing broilers against modern strains, 25 percent of respondents cited lower FCR. Twenty percent report 1 to 5 percent higher feed conversion. Ten percent feel it's the same. However, in contrast, 10 percent find their FCR is 21 percent or higher.

### Percentage of antibiotic-free animal feed production



- 100 percent of production is antibiotic free
- Between 50 and 99 percent of production is antibiotic free
- Between 25 and 49 percent of production is antibiotic free
- Between 10 and 24 percent of production is antibiotic free
- Less than 10 percent of production is antibiotic free
- None of production is antibiotic free

Source: WATT Global Media

Eighty percent of survey participants report having at least some degree of ABF production. Compared with 2017 figures, there was an 8 percent increase in respondents working in 100 percent ABF production.

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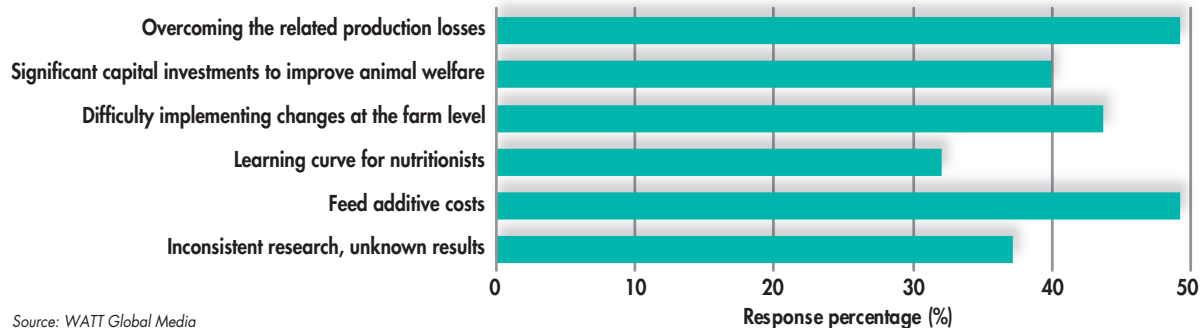


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## POULTRY FEED FORMULATIONS

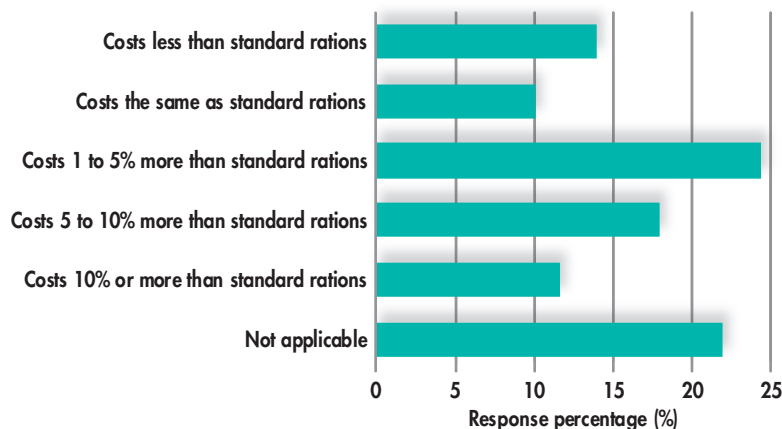
## Greatest challenges faced in antibiotic-free poultry production



Source: WATT Global Media

Survey respondents feel the cost (49 percent) and efficacy (37 percent) of feed additives as antibiotic alternatives complicate the transition to antibiotic-free poultry production. However, implementation of changes on the farm (44 percent) pose further challenges.

## Total cost of antibiotic-free poultry rations



Source: WATT Global Media

While more than 50 percent of respondents have experienced some increases in the cost of the antibiotic-free poultry rations, 14 percent feel they have cost less or stayed the same (10 percent).

Of the respondents who raise and feed cage-free laying hens (27 percent), 21 percent feel their feed conversion is 1 to 3 percent higher than with cage-housed hens; 17 percent feel it's 4 to 7 percent higher. Meanwhile, 16 percent feel their

FCR stayed the same, and 13 percent report it being lower.

### Focus on antibiotic-free production

Eighty percent of survey participants are involved in some level of

antibiotic-free poultry production: 22 percent are 100 percent antibiotic free (ABF); 24 percent report between 50 and 99 percent of their production is ABF; and 24 percent falls between less than 50 percent but more than 10.

Half of survey respondents report that the cost of antibiotic-alternative feed additives and recouping the production gains lost without the use of antibiotic growth promoters (AGPs) are the biggest challenges to antibiotic-free poultry production. Beyond that, 44 percent report that implementing management changes at the farm level further complicates and can negate their efforts. Significant investments in facility upgrades to improve animal welfare (40 percent) and inconsistent additive research and efficacy (37 percent) also complicate the move to ABF production.

Comparing traditional diets with the cost of antibiotic-free poultry rations, 24 percent report costs rising by



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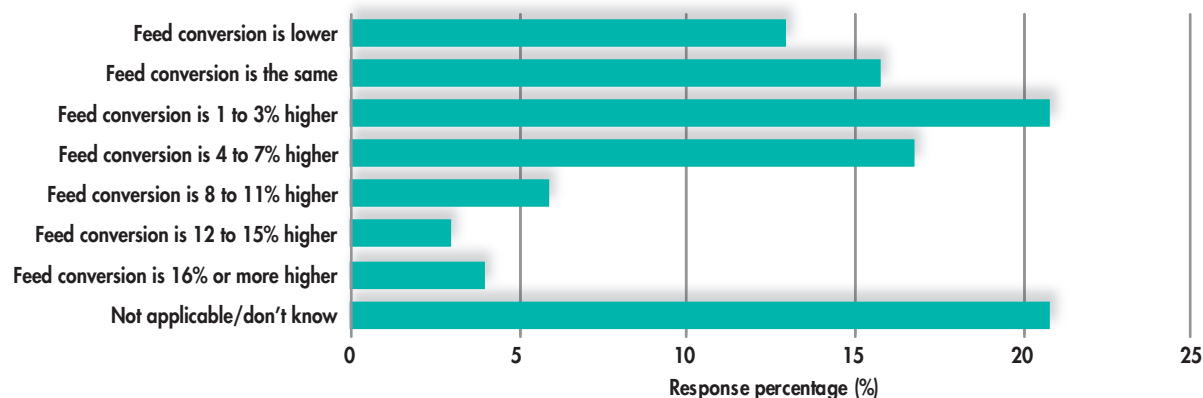
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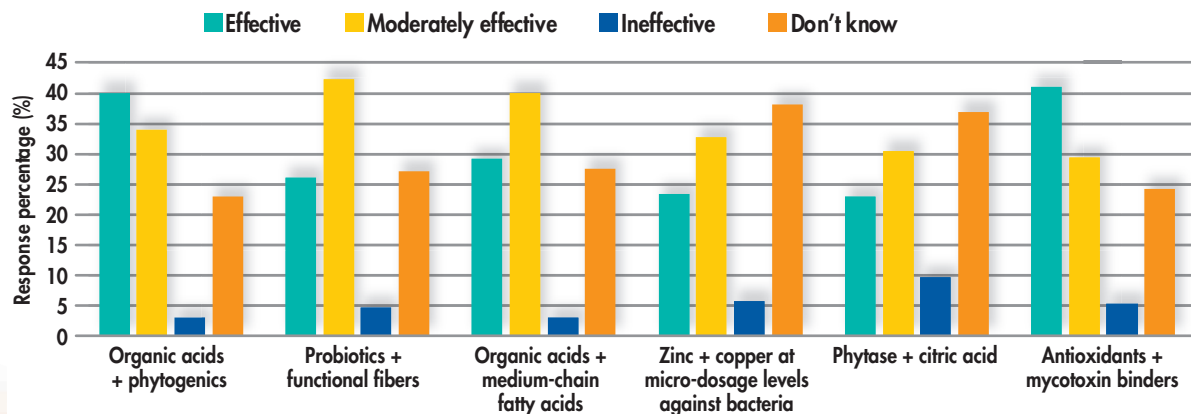
## Feed conversion ratio of cage-free hens vs. caged hens



Source: WATT Global Media

Twenty-one percent of respondents producing cage-free eggs report 1 to 3 percent higher feed conversion than caged hens; 17 percent cite 4 to 7 percent higher feed conversion. Sixteen percent feel their feed conversion ratio has stayed the same after switching from caged hens to cage-free production.

## Effectiveness of additive combinations for AGP replacement



Source: WATT Global Media

Survey respondents report positive experiences with organic acids-phytogenic feed additive (40 percent) and antioxidant-mycotoxin binder (41 percent) combinations.





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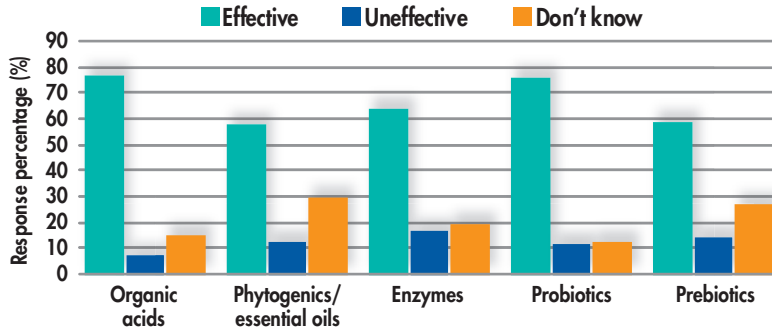
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POULTRY FEED FORMULATIONS

### Efficacy of feed additives used for antibiotic replacement

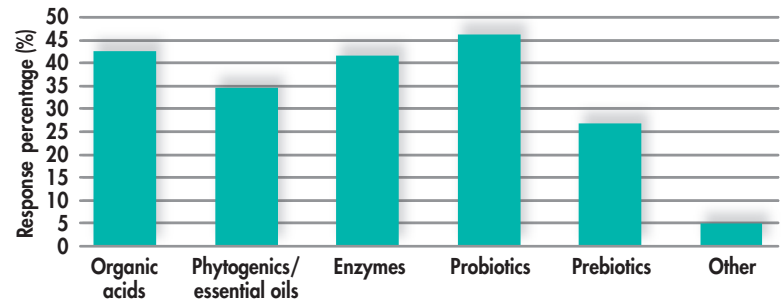


Respondents report positive experiences with organic acids, probiotics and enzymes.

Source: WATT Global Media

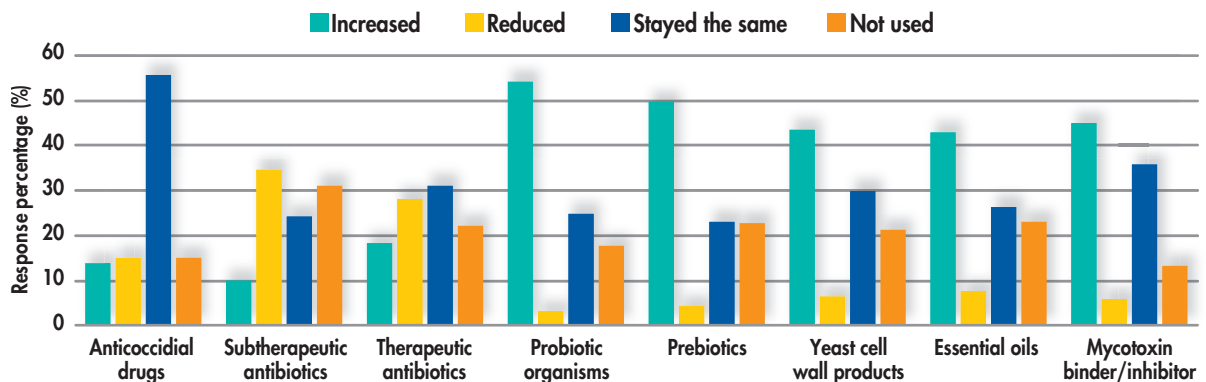
Seventy-one percent of respondents report that they use organic acids in their AGP replacement strategy; probiotics (67 percent) and enzymes (61 percent) are also commonly utilized.

### Additives used to replace AGPs



Source: WATT Global Media

### Characterization of additive inclusions in poultry rations, 2017-18



Source: WATT Global Media

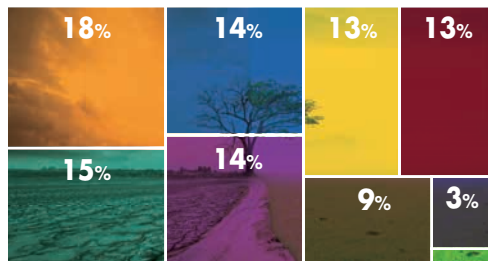
In 2018, respondents report using increased levels of probiotics (54 percent), the same amount of anticoccidial drugs (56 percent) and reduced levels of subtherapeutic antibiotics (35 percent).

## Climate change's effect on feed production

When asked how poultry feed producers and nutritionists feel climate change will influence production in the future, 67 percent of respondents cite fears that inclement weather will affect raw ingredient availability. Others cite concerns about how it will affect animal health and welfare (55 percent), likely driven by temperature extremes and increased instance of mycotoxin contamination (53 percent). Poultry feed producers also noted concerns about maintaining feed quality (52 percent) and the potential volatility in commodity costs (49 percent). In addition, 47 percent of respondents believe that climate change will cause on-farm production challenges.

Meanwhile, 13 percent of respondents feel climate change is hoax.

### Impact of climate change in the future



- Impacts animal health and welfare
- Raw ingredient availability
- Difficulty maintaining feed quality
- High commodity costs
- On-farm production challenges
- Increased instances of mycotoxin contamination
- Exploring new grain sources
- Climate change is hoax
- Not at all

Source: WATT Global Media

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**Poultry producers and nutritionists feel climate change will take the greatest toll on ingredient availability and animal health in the future.**



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## POULTRY FEED FORMULATIONS

1 to 5 percent when formulating ABF diets; 18 percent have experienced 5 to 10 percent higher costs. However, 14 percent find that their formulations cost less and others (10 percent) feel they have stayed the same.

### Additives for AGP replacement

Sixty-eight percent of survey participants report that their company is actively exploring, testing or using feed additives as a replacement for antibiotics in their poultry feed.

Currently, 52 percent of respondents are using several different feed additive combinations in different rations to replace AGPs. Forty-two percent are using multiple additives in combination for this purpose in all their poultry formulations. Some (22 percent) offer these feeds as a premium product.

A sizable percentage of participants (40 percent) have found the combination of organic acids and phytogetic feed additives to produce positive synergistic effects in their ABF feeding programs. Forty-one percent also report positive gains with antioxidant and mycotoxin binder combinations for improved health. Logging moderate successes, they note probiotics with functional fibers (42 percent) and micro-dosed zinc-copper combinations (40 percent) to combat bacteria.

Many have found the highest efficacy in antibiotic replacement with organic acids (77 percent) and probi-

otics (76 percent). While 58 percent support the efficacy of phytogetic feed additives and essential oils, al-

most 30 percent of respondents have no experience or opinion regarding this product category. ■



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# Global poultry trade may become turbulent in 2018

Despite a positive start to the year for the world's poultry industry, several negatives loom on the horizon that could have a serious impact on the global trade in poultry meat.

MARK CLEMENTS

Global trade in poultry meat could be heading toward a series of significant disruptions as 2018 progresses, prompting Rabobank to warn in its "Poultry Quarterly Q2 2018" that the sector could face "its biggest shakeup in decades this year."

Among factors cited by the bank are the repercussions from Brazil's Weak Flesh investigations, including recent restrictions on EU trade; a pending ban on meat from stunned birds in Saudi Arabia; North American Free Trade Agreement (NAFTA) renegotiations; and Chinese dumping investigations of Brazilian product. Avian influenza will also have an ongoing negative impact.

## Brazil will be the most affected

The possibilities of disruption to global trade streams and prices are strong this year and, of all countries, Brazil may be the most affected.

The implementation of a ban on stunning in Saudi Arabia, Brazil's largest export market, could hit the Brazilian industry hard, particularly given that there are limited alternatives for its whole bird exports.

The country is also coping with restrictions in its leading export market for breast meat — the EU — due to



**Difficulties for exporters could be beneficial for local producers as demand and prices rise.**

*NotionPic | Shutterstock and HP30 | Shutterstock*

concerns over *Salmonella*. Countries including Ukraine, Russia and Poland stand to gain if Brazil loses market share, but they will not be able to fully replace Brazil's position in these markets.

Additionally, Brazil is losing the advantage it gained when competitors were hit by avian influenza. The U.S. in particular has been regaining markets with its outbreaks now behind it, and the loss of confidence in Brazilian product.

## Global prices

EU trade restrictions are impacting breast meat prices, the Saudi standard is challenging the whole bird market, and the China-Brazil dispute and NAFTA renegotiations could potentially affect the dark meat market.

If NAFTA renegotiations result in trade restrictions, it may be difficult for the U.S. to find alternative markets for its dark meat, putting downward pressure on dark meat prices. The country exports 3 million tons of

poultry meat each year, with Mexico absorbing 20 percent and Canada a further 5 percent. Any changes to U.S. poultry exports to these markets could affect the industry outlook and indirectly affect global market conditions.

Rising prices may be ahead, however, for local producers and exporters who sell in the EU and Saudi Arabia as imports are restricted, while whole bird and breast meat prices on global markets will decline significantly.

### Avian influenza impact to continue

Pressure from avian influenza remains significant, but the number of cases is lower than in the 2016-17 Northern Hemisphere winter season.

Although China, Japan, the EU, India, Russia and the Middle East have recorded outbreaks, the number of cases so far this year has been lower and, should this continue, the result will be fewer disruptions to global trade in broiler meat, as well as to trade in breeding stock.

China has seen a remarkable recovery from avian influenza, with one of the most profitable winter seasons in years for the industry, due to avian influenza vaccination.

### Local industries will perform well

South Africa and Mexico in particular are performing well, as are Indonesia, India, Japan and the U.S. The EU is also performing relatively well, notes Rabobank, and breast meat prices are likely to rise due to restrictions on Brazilian product.

Russia and Thailand, however, are suffering from oversupply after expansion, and will be looking to capture some of Brazil's lost market share.

The EU industry will benefit from rising breast meat prices, and prices in Saudi Arabia are expected to rise sharply. The country has a self-sufficiency rate of only 45 percent, and



**While in some markets, and for some product types, prices can be expected to increase, for others excess supply could lead to prices falling.** *buhanovskiy / Fotolia.com*

there will be no alternative supplier who can replace Brazil and the EU once new halal standards are implemented.

The weakest-performing countries this year are expected to be Brazil, Thailand and Russia. Thailand and Russia have over-expanded production, resulting in oversupply in their home markets. While both countries are reporting rising exports, this will not be enough to compensate for weak local demand.

### Feed price concerns

Beyond global trade volatility, however, increasing feed prices are a significant concern. Droughts in the Southern Hemisphere have resulted in rising prices. Most of the negative impact should be offset by high global stock levels, but any worsening of the outlook could affect future feed prices. ■



**New poultry market data available to download:**  
[www.WATTAgNet.com/articles/32497](http://www.WATTAgNet.com/articles/32497)



# Newly formed Avara takes third spot in UK poultry sector

Avara Foods, a joint venture between Cargill UK's fresh poultry business and Faccenda Foods, will be the third-biggest producer of chicken in the UK.

MARK CLEMENTS



A new name appeared in the U.K. poultry industry this year: Avara Foods, a joint venture between the chicken, turkey and duck businesses of Faccenda Foods and Cargill U.K.'s fresh chicken business.



**Andy Dawkins, Avara Foods' chief executive, says that through investment, development and growth, the new company will be established as a trusted leader in fresh food.** *Avara Foods*

The 50/50 shared ownership business processes more than 4 million birds per week and is thought to be the U.K.'s third-largest producer of chicken.

Avara brings together Faccenda's laying and breeding farms, hatcheries, two feed mills, grow-out facilities and six poultry processing facilities, employing 3,600 people, along with its duck and turkey business, with Cargill's laying and breeder farms, hatcheries, a feed mill, grow-out facilities and its three poultry processing facilities, employing 2,500 staff.

Faccenda Foods Managing Director Andy Dawkins

6<sup>th</sup> MEDITERRANEAN POULTRY SUMMIT6<sup>th</sup> MEDITERRANEAN  
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Very sincerely,

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## NEWLY FORMED AVARA TAKES THIRD SPOT IN UK POULTRY SECTOR

is the new company's chief executive, while fresh chicken director with Cargill Meats Europe Chris Hall is Avara's chief commercial officer.



### Cargill UK's poultry plant expands capacity, efficiency

[www.WATTAgNet.com/articles/23004](http://www.WATTAgNet.com/articles/23004)

Commenting on the creation of the new company, Dawkins said: "Launching Avara Foods brings together two successful businesses with high standards, shared values and strong reputations for building sustainable partnerships with customers, growers and suppliers. Our first step is to make sure that there is a smooth transition as we bring together the two businesses as Avara Foods, and establish a solid platform for growth."

### Building on investments

Over the past five years, the two companies have invested significantly through their respective supply chains, with a combined value of GBP75 million (US\$107 million) on processing infrastructure. Now, forming Avara is seen as being the best way to expand growth in the local market, drawing on the two partners' complementary customers and offerings.

Dawkins said: "If you look at how the retail sector has consolidated in recent years, and how this has been matched by the supply side, now is an obvious time to bring together two high-performing and well-regarded businesses."

For Faccenda, the joint venture is the latest in a series of changes over recent years. The family-owned company, which reported sales of GBP523 million (US\$735 million) last year, started as a single chicken farm in 1962 and has grown into a major U.K. food business.

In 2012, it bought the turkey producer Cranberry Foods and in 2015 added duck to its portfolio through the acquisition of Cherry Valley Foods, making it the country's only supplier of chicken, duck and turkey.

Similarly, Cargill has been making significant investments in its U.K. poultry business, including expanding its processing facilities and its base of growers.

In late 2013, the company announced a GBP35 million (US\$50 million) expansion and modernization program, which included capacity expansion and the modernization and upgrading of facilities. Most investment was concentrated at its Hereford site and focused on creating "one of the most efficient and competitive processing plants in Europe."

### Growth, not savings

The new company is about growth, Dawkins said, not cost savings, with Avara Foods bringing together two successful businesses with high standards, shared values and strong reputations for building sustainable partnerships with customers, growers and suppliers.

"Our aim as Avara Foods is to grow — there's no doubt about that. But our focus right now is ensuring that high standards are not missed — be it quality, delivery or customer service. Over time, we will integrate the businesses further and learn from each other. That process has already started and it's exciting to see what it leads to," Dawkins said. "Internally, if we can establish a culture that all our people relate to and feel part of, then we'll have overcome the single biggest challenge in integrating any two businesses. What's been great so far is that, culturally, we are already closely aligned."

The new company has a particularly strong position in fresh and added-value product supplied to retail, with a 20 to 30 percent market share, and holds a similar position for these product categories supplied to the catering market.

Where its relationship with growers is concerned, there is a belief that the merged business will provide stability and security for growers for years to come, and the strong relationship with the growing community will be built upon.

It is a stand-alone business, and outside of the new joint venture, Cargill is continuing to process and sell cooked poultry products as well as operate its poultry import, trading and distribution business, along with its European poultry businesses in France, Russia and the Netherlands. Faccenda has retained its shareholding in Dartmouth Foods, entered into in 2016 for cooked poultry products.

Plans to merge the two businesses into Avara were first announced in late September 2017 and approved by the U.K.'s Competition and Markets Authority in December. ■

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# Why chicken is the sustainable meat option

Chicken is the most environmentally friendly of meats, making it well-placed for sustainable intensification.

JAN HENRIKSEN



Jan Henriksen

Our climate is changing, and people and governments around the world are seeking ways to protect our planet. Because food production is a driver of climate change, our challenge will be to feed the world's expanding population with a reliable and quality source of nutrition, while reducing the effects of production.

One promising solution lies with poultry. Chicken production is naturally gentler on the environment than other livestock. On top of that, chicken companies have been working for decades to breed efficiencies that not only produce healthier birds, but also make commercial chicken production environmentally responsible.

## Poultry: the responsible protein

Poultry greenhouse gas emissions are naturally low. A study by the global Organisation for Economic Cooperation and Development (OECD) shows that the chicken, as a species, has a smaller carbon footprint than all other meat-producing animals, emitting one-quarter of the harmful gases. One reason is that other livestock produce greater amounts of methane during their digestive processes.

Another is that chicken production demands far fewer resources. As an example, a 2014 article by Rachel Nuwer in Smithsonian Magazine made the case that beef production requires 28 times more land, six times more fertilizer and 11 times more water than chicken. That adds up to about five times more greenhouse gas emissions.

## Using less land also means less destruction of natural wildlife habitats.

Chickens are also more water-efficient than other livestock. A study by the Bill and Melinda Gates Foundation has found that one half to a full pound (0.22 to 0.51 kilograms) of chicken meat can be produced per 264 gallons (1,000 liters) of water, compared with close to one-sixth of a pound (0.082 kilograms) of beef for the same amount of water. Thus, beef production can use up to six times more water than chicken.

And, it has been proven that chicken production also requires lower amounts of resources, such as electricity and gas, than other livestock.

## Sustainable intensification: breeding a better environment

Sustainable intensification has become a global aspiration in the quest to increase food production from existing farmland while lowering pressure on the environment. Over the past decade, broiler breeding companies have put significant resources and effort into creating efficiencies in chicken production that support sustainable intensification.

One such efficiency is a healthy feed conversion rate (FCR). FCR indicates biological efficiency by measuring the kilograms of feed required for every kilogram of live weight produced.

A concrete example of the benefit is that today's farmers can raise a healthier and more robust 2.4-kilogram chicken in 35 days using 3.6 kilograms of feed and a very efficient 1.5 FCR. That was not so 30 years ago,

**Breeding companies have worked to make chicken production more efficient, reducing demands on resources.** *Aviagen*

when it took 3.2 kilograms of feed for a 1.36-kilogram bird with a 2.35 FCR over the same time span.

Another benefit is in the area of land use. As the global population continues to swell, agricultural land will become more and more limited. With a lower FCR, less land will be needed to grow feed. The grain not used for poultry feed can be used for other purposes, and the land can be repurposed for other crops.

As an example, a breeding gain of 2 points in FCR has translated to land savings of about 1.6 million acres (0.656 million hectares) per year. That is twice the size of Luxembourg.

The important conclusion is that poultry's naturally lower resource consumption, coupled with innovative breeding efficiencies, means fewer



*Courtesy Stream BioEnergy*

**Sustainable poultry production driving industry advances**

[www.WATTAgNet.com/articles/31349](http://www.WATTAgNet.com/articles/31349)

resources are required to produce an increasing volume of high-quality chicken meat.

**Sustainable food for the future**

Through dedicated, consistent and balanced breeding programs, more efficient and healthier birds can now be grown in a responsible way that is less demanding on resources and kinder to the planet. Chicken is the best solution to feed our growing communities with quality protein, and is the sustainable option for the foreseeable future. ■

*Jan Henriksen is CEO of Aviagen*

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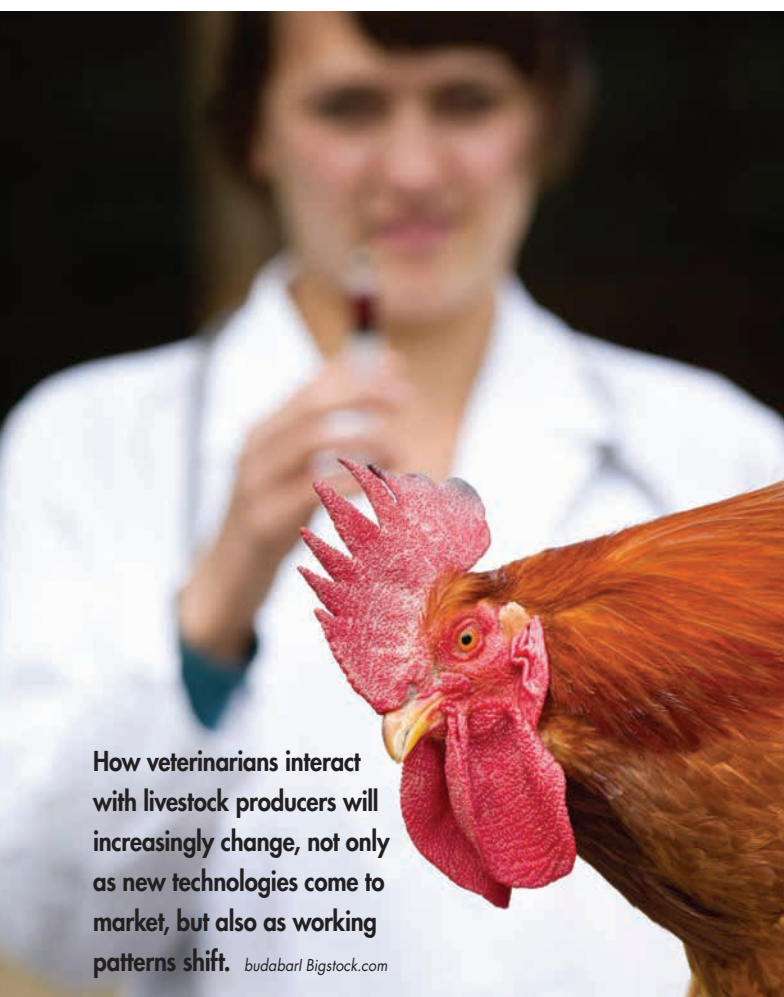


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# Poultry veterinary provision undergoing significant change

Whether through advances in science or changes to working attitudes, what poultry producers can expect from the veterinary sector is undergoing significant change.

MARK CLEMENTS



**How veterinarians interact with livestock producers will increasingly change, not only as new technologies come to market, but also as working patterns shift.** budabarl Bigstock.com

The relationships between poultry producers, veterinarians and animal health companies can be expected to alter significantly over the years ahead as, like animal protein production, veterinary practices and veterinary medicine companies undergo significant change.

New technologies and advances in science may

mean that poultry producers will be able to expect more from veterinarians, while concerns over welfare and antibiotic resistance may alter on-farm practices. Changing attitudes to careers and work/life balance among younger generations may affect how services are sought and delivered.

Innovation in working practices will be accompanied by the products and services offered by animal health companies, which are looking at working in new ways to help boost livestock producers' output.

Despite ongoing changes to how flock and herd health is managed, there remains significant room for improvement, delegates at Animal Health Investment Europe were told, particularly because 20 percent of livestock production is still lost to death and disease.

## Need for closer collaboration

According to Kristin Bloink, global research and external innovation with Elanco Animal Health, all players in the animal food production chain need to work together to ensure animal production is ethical, has high standards of care and uses antibiotics responsibly. Where animal welfare is concerned, it is a key element for success in food animal production systems, which relies on achieving a balance between welfare, productivity and market access.

To help achieve these goals while raising productivity, animal health companies are looking at new ways of innovating, she said, and bringing new products and



services to the farm is drawing on three main resources: new technologies, closer collaborations and the One Health Initiative.

How companies innovate is changing, according to Randolph Seidler, vice president, global head of business development with Boehringer Ingelheim. Ten years ago, veterinary medicine companies were simply looking for new molecules; now they are offering integrated solutions, including information management — anything that makes customers' lives easier.

Innovation leads to differentiated offerings and this leads to value. For example, monetarily smaller services are now being offered if they bring value to the client.

Dr. Tim Schell, nutritional health R&D and regulatory with Elanco Animal Health, noted that, while constant challenges remain in the livestock sector, for example, that nine out of 10 chickens are still exposed to coccidiosis, advances in science mean that new solutions are becoming more likely. It has now become easier to demonstrate the benefits of new approaches, meaning that potential solutions that may have been dismissed only a decade ago are now being taken more seriously.

Change, however, is not only taking place within the veterinary medicines industry; significant changes are also taking place within the veterinary profession.

## Evolving attitudes

Ownership of veterinary practices in some countries is undergoing a significant change with many veterinarians no longer wanting to own their own practice, with the consequent responsibilities of running a business.

Practices are coming under the ownership of corporations, with implications for service offerings and working practices.

This is not the only area of change at the veterinary level and, in some countries, there is a significant shortage of veterinarians. In the U.K., for example, only three out of 10 work full time and, among those that do work full time, many would like to reduce their hours.

**Kristin Bloink, global research and external innovation with Elanco Animal Health, said all players in animal food production need to ensure animal production is ethical, with high standards of care and responsible use of antibiotics.**

*Marc Schlossman Photography*



A desire for a greater work/life balance has resulted in many veterinarians coming under greater time pressure during the hours that they work, and this affects how they interact with livestock and livestock owners, as well as with animal health companies.

The veterinary profession is also evolving in other ways. For example, in 1970, in the U.S., 11 percent of veterinary graduates were female, while in the U.K. this figure was 16 percent. By 2013, 80 percent of veterinary graduates in the U.S. were female, while in the U.K. the figure has risen to 77 percent.

## Working hours and the feminization of the industry are not the only changes.

According to Gudrun Ravetz, senior vice president of the British Veterinary Association, demands on time are resulting in veterinarians increasingly preferring to be contacted via mobile, rather than engaging in face-to-face meetings. Within the younger veterinary profession, corporate social responsibility and One Health have become highly important and, if companies are not able to clearly demonstrate their commitment to these areas, it may be increasingly difficult to engage with the profession. ■



**The future of poultry health: New and old challenges**

[www.WATTAgNet.com/articles/29615](http://www.WATTAgNet.com/articles/29615)

# 8 considerations for cage-free laying hen nutrition

Egg producers must account for more than just housing when changing production practices.

ZOE KAY

The cage-free layer is subject to less controlled conditions and — particularly in the case of free range — is exposed to a variety of weather conditions. Energy levels in the diet will therefore be a key consideration to make sure nutrients are not diverted from egg production. Similarly, any increase in hen feed intake needs to be balanced with protein levels to avoid unwanted increases in egg size.

Outside of a cage, hens are in greater contact with their feces and, if allowed outside, the number of disease challenges can increase. This creates a need for increased gut health and immune support. With any cage-free system, there is greater opportunity for bird interaction, which can lead to an increase in vices; therefore, fiber provision is a key consideration.

This article explores several feeding and production practices to enhance the health and performance of a cage-free flock.

## Cage-free considerations

Beyond the housing investments, cage-free layers require alterations to their feeding programs. Here are eight considerations producers and nutritionists need to keep in mind:

### 1 Energy balance

For the reasons above, the energy requirements of cage-free layers are greater than those kept in cages. Laying hens can compensate for this by eating more to achieve the energy level they need for maintenance and egg production. The level of this increase depends on housing system and country of production and can vary by as much as 30 to 40 grams per bird, per day, between summer and winter.

### 2 Controlling egg size

Knowing what egg sizes your market requires and trying to meet it is paramount for all producers. However, in the case of cage-free layers, it can be harder to achieve. Higher feed intakes mean hens are consuming more protein, which will increase egg size. Therefore, protein, amino acid and energy levels need to be carefully balanced.

Hen body weight also influences egg size. Up to peak lay, it is important to regularly weigh them to know if they are meeting breed targets. The nutritional density of the diet fed can then be increased or decreased accordingly. Similarly,

**CAGE-FREE HENS FACE GREATER DISEASE CHALLENGES**, so producers must emphasize gut health and immune system support.



Courtesy Porters Poultry

to control egg size, diet changes can be moved or specifications adapted. Nutrition companies should work closely with egg producers to capture and monitor production parameters including body weight, egg number, egg weight and feed intake to formulate diets accordingly.

**3** **Trace elements**  
As egg production is assumed to be the same, irrespective

of housing system, vitamin and mineral requirements will also be the same. As cage-free hens have higher feed intakes, it can be argued that levels of calcium and phosphorus could be reduced. However, many free-range egg producers provide supplementary calcium in the form of oyster shell, as an enrichment, as well as supporting egg quality. Ensuring good feather cover is also an important objective.

**4** **More on fiber**

It is understood that poultry have an inherent need for fiber, which is even more important to address for laying hens kept in a cage-free environment. Layer chicks are better able to utilize high-fiber feed ingredients than broiler chicks. Similarly, older birds

## Eight considerations producers and nutritionists need to keep in mind

**ENERGY BALANCE**  
**CONTROLLING EGG SIZE**  
**TRACE ELEMENTS**  
**MORE ON FIBER**  
**GUT HEALTH AND IMMUNITY**  
**PULLET REARING**  
**BREED CONSIDERATION**  
**ENVIRONMENTAL VARIABILITY**



## LAYING HEN NUTRITION

can tolerate higher levels of fiber in the diet than young ones.

Consistent benefits have been achieved using a lignocellulose-type fiber additive. Appropriate fiber provision is also known to improve the digestibility of certain nutrients.

Physical structure of the feed is key to stimulate gut

## 5 Gut health and immunity

Cage-free layers face a greater challenge in terms of gut health, as they are more in contact with the manure.

Bacteria, protozoa and worms all have more opportunity to infect birds. Supporting gut health by nutritional means is therefore even

more important, as are good management and biosecurity.

Improvements in intestinal health can help to help reduce the effect of these disease challenges. As well as suitable fiber provision, probiotics and prebiotics

have given good results in free-range hens. Essential oils and medium-chain fatty acids are also used. These nutritional strategies become even more interesting as the market looks to reduce the use of antibiotics.

## 6 Pullet rearing

When rearing hens for cage-free systems, many different management techniques are employed — including training birds to move between levels. But there are also many nutritional considerations. Robustness and uniformity are important for all pullets but particularly so for those destined for a cage-free system. Making sure the diets are high enough in protein to ensure good growth during the rearing phase is essential. Calcium is

also important to ensure good bone strength — especially in the keel and legs — and can sustain the increased mobility required in an aviary environment.

Due to increased exposure to pathogens and potential disease vectors, pullets destined for free-range housing receive more vaccinations. Some producers will add electrolytes, vitamins and minerals to the water at these times to support their immune systems and reduce stress. Again, ensuring target weights are met will prevent setbacks and mean that, when transferred to the laying house, they are in the best possible condition. As opposed to a cage environment, the birds will need to learn where the feed, water and nest boxes are.

## 7 Breed considerations

In many cases, the breeds used in caged and cage-free systems will be the same — with differences down to country or company preferences. Brown egg layers are more popular in Western European markets and are often associated with free range. While white egg layers are more common in regions where hens are caged, they can also be kept successfully in cage-free systems.

Brown hens are bigger birds, with greater maintenance requirements and poorer feed conversion than white birds. Several breed companies are now offering breeds specifically developed for free-range systems,



Egg producers predict cages won't go away by 2025: [www.WATTAgNet.com/articles/33188](http://www.WATTAgNet.com/articles/33188)

Terrence O'Keefe

physiology and maintain gut health. The diet should supply a mixture of dietary fiber to help the bird find a digestive balance. This will help hens maintain an optimum gut microbiota, as well as helping to prevent vices such as feather pecking. A higher-fiber diet increases the time birds spend eating, satiating their need to peck and reducing time available for negative bird interactions. Beak tipping appears to be less necessary in caged hens. Different countries have different regulations regarding beak tipping and are banned in some. Therefore, other ways to control injurious pecking in cage-free housing are required.

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## LAYING HEN NUTRITION

focusing on robustness and suitable behavioral traits.

### 8 Environmental variability

One of the main differences between caged and cage-free housing systems for laying hens is the variability in environmental conditions. The extent to which external temperatures are of influence will depend on ventilation and heating provision in the house. Free-range birds also must contend with changing weather conditions. Colder temperatures increase the bird's maintenance requirements for energy, while high temperatures can reduce feed intakes. Therefore, the country and area of production will influence a hen's dietary requirements.

### In conclusion

Nutritional guidelines are available for each breed, with specifications linked to feed intakes. It is therefore important to know what the hens are eating on a particular farm to tailor the diet accordingly. These can form the basis of the hen's diet with further amendments related to specific housing systems, egg markets or climatic conditions. Specific management guides for keeping cage-free hens are also produced by genetics companies.

With cage-free production, there is much greater variability, dependent on many environmental factors. Producers need to get to know their houses and flocks — working closely with feed companies to tailor

nutritional specifications. As for all laying hens, production data should be monitored closely, to change diets at the optimal time. In this way, cage-free production can be optimized, egg size controlled and egg quality ensured. ■

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# Taking the extra steps for poultry wastewater reuse

American Proteins' Cumming, Georgia, rendering operation goes above and beyond to conserve resources, use alternative energy sources and protect the environment.

JOHN PIERSON

**An evaporative cooling pond (background) and LAS irrigation pond (foreground) are used to manage waste heat recovery and effluent recycle and disposal.** *Courtesy of American Proteins*

American Proteins Inc.'s operation in Cumming, Georgia, illustrates the mindset of leading poultry companies focused on providing value to customers through improved performance and community relations. In doing so, the American Proteins Cumming Division received an Honorable Mention in the 2017 U.S. Poultry & Egg Association's Clean Water Awards' full treatment category.

## Background

The Cumming Division operates one of the largest rendering plants in the world in the most affluent county in the state. It recovers almost 30 million pounds of inedible poultry offal, feathers and other related materials received six days a week from 13 locations. The facility produces poultry, feather, secondary protein nutrients and blood meal as well as pet-grade products. Production occasionally runs through Sunday morning, leaving less

than 24 hours for a full sanitation and major maintenance. But, down time is not an option as aligning operations with processor schedules is critical to the entire poultry industry.

A daily average of 550,000 gallons of poultry wastewater is reclaimed from cooking, pressing and drying finished products. The division's wastewater treatment system balances the high strength process effluent with a significant volume of product condensate water while employing odor control measures. A land application system (LAS) provides the final treatment and groundwater recharge. As a result, the facility coexists in an area seeing tremendous growth due to its proximity to Lake Lanier, a major recreational destination.

## The treatment system

Screening and dissolved air flotation (DAF) with chemical addition begin the process water treatment with a goal of capturing any residual protein, oil and grease. The condensate waters are then blended in advance of anaerobic digestion, the first biological treatment step. Several advanced treatment ponds centered on a pair of

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sequencing batch reactor basins (SBRs) follow.

“If we operated a conventional activated sludge system with continuous flow into anoxic and aeration basins, we could slip stream our condensate flow to take advantage of its high organic carbon and low organically-bound nitrogen characteristics to achieve better denitrification,” Jonathan Greene, American Proteins Cumming Division’s complex manager, said.

As configured, the facility has a short stage time in the SBRs during the fill cycle with low dissolved oxygen levels. Yet, it does have a variety of other ponds that provide flexibility.

“One of the interesting features we have is the kidney pond, named for its shape,” Greene said. “It operates as a facultative pond and receives the SBRs’ discharge, helping us target and manage our effluent nitrate-nitrite loadings before the land application system.”

“We get tremendous performance out of our covered anaerobic lagoon so we could send the process effluent after dissolved air flotation treatment without chemistry,” Roger Smith, vice president for engineering services at American Proteins Cumming Division, said.

In 2016, about 67 million cubic feet of biogas was captured with about 75 percent of that volume usable for blending with natural gas. However, Smith and Greene said the goal is to

## Wastewater constituents and land application system permit performance

Wastewater constituents	Effluent (mg/L)	Removal efficiency (%)
Chemical oxygen demand	143	99
Biochemical oxygen demand	85	99
Total suspended solids	30	99
Ammonia nitrogen	36	91

Land application system total nitrogen permit	Allowed (#/acre)	% Allowed used
1st and 4th quarters	108	52%
2nd and 3rd quarters	291	21%

Source: Information was taken from the Clean Water Award application submitted by the facility to the US Poultry and Egg Association.

**Table 1: The wastewater treatment system removes more than 99 percent of the chemical oxygen demand, biochemical oxygen demand and total suspended solids.**

maximize raw material recovery for products so DAF with chemistry is used. Achieving an optimum biogas production serving as an alternative energy source is a treatment priority, not a production priority. Currently, the overall natural gas used is reduced by 10 percent with biogas.



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## POULTRY WASTEWATER REUSE



**Division Environmental Manager Leroy Woody discusses aspects of the SCADA system used to balance and manage wastewater treatment operations.** | Courtesy of American Proteins

### Managing the operation

Leroy Woody, American Protein Cumming Division's division environmental manager, leads the team charged with applying its understanding of the system's complexities and flexibility for balancing and managing the daily wastewater treatment operations (see Table 1). Woods said it uses a supervisory control and data acquisition, or SCADA, system that is accessible remotely, "but we stay on top of the overall facility by keeping our eyes on things." That includes monitoring one stormwater outfall even though the majority of stormwater is captured with the first 30 minutes treated before diversion to the ponds.

### Environmental contributions

Woods said agronomic loadings to the land application system's 184 acres address effluent nitrogen loadings. Required testing of the picturesque spray fields, which are surrounded by dedicated wildlife management areas, indicates the LAS soil's capacity for phosphorus capture and monitored surface and groundwater quality remain acceptable.

In a cooling pond the 550,000 gallons of daily treated effluent is blended with a little over 19 million gallons per day in water removed from the incoming raw material coming and cooled before reuse. As a result, a significant portion of the treated effluent is used as makeup



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**Complex Manager Jonathan Greene and Environmental Manager Leroy Wood tour the SBR operation (foreground) that supports the Cumming Division rendering plant (background).**

*Courtesy of American Proteins*

for the cooling pond, which supplies water to the non-contact cooling and condensing processes within the plant. Advanced technologies not traditionally associated with poultry processing — or even some other rendering facilities — are used to apply waste heat recovery with product lines to enhance efficiency as well as water reuse. The

end result is an improved process thermal efficiency of about 30 percent to achieve similar overall product throughput.

The facility operates an aggressive odor abatement strategy to treat room air and unit process vapors. Here, process vapors

are sent to wet scrubbers using chlorine dioxide, condensed and then evenly distributed across a biofilter designed to absorb any residual compounds into natural materials and use bacterial growth to eliminate odors. The biofilter is monitored and media changed every five years.

### Being a good neighbor

Moving forward, the Cumming Division will use a regenerative thermal oxidizer (RTO) to treat the most odoriferous feather process vapors while still upgrading the biofilter for its other air streams. These multimillion-dollar investments are not mandated but instead part of the Cumming Division's desire to provide value to all of its customers and neighbors. Besides its facility investments, American Proteins is a significant benefactor for numerous local charitable organizations and others across the nation.

The Cumming Division consistently works to exceed its treatment permit requirements while keeping a keen eye towards conserving resources, alternative energy sources and protecting the environment. This commitment makes it a 2017 Clean Water Awards full treatment category Honorable Mention. ■

*John Pierson is principal research engineer at the Agricultural Technology Research Program at the Georgia Tech Research Institute. Contact: john.pierson@gtri.gatech.edu.*

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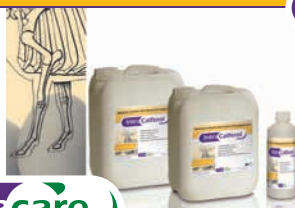
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# 6 poultry processing tips to improve carcass quality

Ensuring that key operations at the poultry plant are performed properly can help to ensure maximum output of high-quality birds.

EDUARDO CERVANTES LÓPEZ



A Grade A chicken should have uniform appearance free from any defects. Eduardo Cervantes López

Good poultry processing operations will keep rejects, partial or complete, to a minimum. There are several procedures at the processing plant where a few simple checks can help to ensure carcasses are produced to the highest possible quality and that downgrades are as few as possible.

## 1 Correct handling

When removing birds from cages for hanging on the overhead conveyor, they need to be handled properly to reduce the number of rejects.

To minimize bruising, birds' legs should be gripped using the middle and index fingers and the thumb, making a circle around the leg and ensuring a 90-degree angle between the leg and the hangers' fingers.



As the quality of processed birds deteriorates, the greater the likelihood of condemnation.

Eduardo Cervantes López

Too often, when workers remove birds from the cages, too much pressure is applied to the joints, resulting in bruising, which then leads to downgrades.

## 2 Ensuring safe transit to stunning

Passage to the stunning bath should last no longer than 30 seconds to prevent excess blood filling the blood vessels due to the forces of gravity.

Birds need to remain calm during this journey and, by having their vision restricted, they will tend to flap less. This can be achieved by shielding them, using plastic or stainless steel sheets with only necessary observation windows. Not only will less flapping help to prevent wings being damaged, it will also reduce additional blood flow.

Monitoring this part of operations will control



the number of birds downgraded or rejected due to bruising and blood accumulation.

### 3 Prevent pre-shock

Should birds become agitated prior to entering the stunning bath, they will flap their wings and, if the entry to the stunning bath is damp, any contact between the bird and the damp surface will result in a pre-shock.

Should this occur, birds will become very excited, flap intensely and lift their heads. If their heads do not enter the water bath, they will leave the stunning area completely conscious. In automatic killing systems, this will result in more work for the team that ensures that all birds are killed, as unstunned birds will have to be killed by hand.

### 4 Slaughter and bleed out

Ensure that no more than 10 to 12 seconds elapse between exiting the water bath and entry to the manual or automatic killer. If this period is shorter or longer, bleed-out quality will be affected and birds may exit the plucker with a reddish appearance, or even enter the plucker still alive.

### 5 Scalding uniformity

Birds must be fully emerged in the scalders and water agitation must be uni-

form across the various tanks to ensure successful plucking.

A failure to ensure this will have consequences when it comes to feather removal.

### 6 Plucking

To ensure successful plucking, birds must arrive at the pluckers with a relatively high surface temperature, par-



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## 6 POULTRY PROCESSING TIPS TO IMPROVE CARCASS QUALITY



Chickens must be completely submerged during scalding.

Eduardo Cervantes López

ticularly on the breast and back, of approximately 45 C.

Depending on atmospheric conditions where the plant is located, the water used in the plucker should be 34 to 40 C to prevent skin from overheating.

Water jets must be directed

toward the plucking fingers to stop feathers accumulating and water pressure should not be above 30 psi, as studies have shown that higher pressure can result in fecal matter and bacteria being forced into the carcass.

Plucking fingers must be checked at the end of each day to ensure they are not broken and that ridges have not been worn away.

Plucking equipment must be correctly angled to achieve the greatest possible effectiveness in wing and tail feather removal.

It is at exit from the plucker that issues with feed withdrawal can be observed. If feed withdrawal

has been too short, during the journey to the stunner, pressure will be placed by any remaining feed on the bird's trachea, making breathing difficult. This sensation of suffocation will cause the birds to flap their wings, risking damage. Should evidence of poor feed withdrawal be evidenced when the birds exit the last plucker, this must be reported back to the farm so that it can be avoided in the future. ■

*Eduardo Cervantes López is an international consultant based in Colombia. He can be contacted at [icproave@hotmail.com](mailto:icproave@hotmail.com) or via [www.icproave.com](http://www.icproave.com).*

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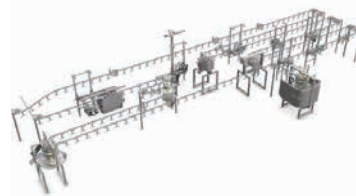
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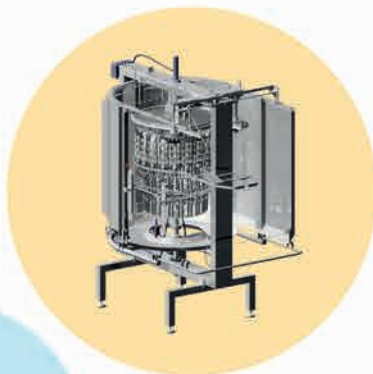
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