CAFOs and Public Health:
Risks associated with welfare friendly farming

PUBLIC HEALTH

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Introduction

In response to consumer demand, the European Union has adopted several animal welfare friendly agricultural regulations. Many U.S. companies, including several large fast food corporations, are following suit by setting strict welfare guidelines to which all of their suppliers must adhere[1]. However, concerns have arisen as to the safety of these new husbandry practices.

The costs and benefits of alternative agricultural practices are rarely explained in a context that serves the best interests of both the consumers and the producers. Here, we explore some safety aspects of these practices in the poultry industry, as well as their potential impacts on both the producer and consumer.

In-feed Antibiotics

Conventional poultry farming systems often include subtherapeutic amounts of antibiotics in the feed to prevent disease and improve production performance. In contrast, organic poultry producers cannot, by law, include antibiotics in the feed. Interestingly, advocates for both organic and conventionally raised poultry have each claimed that the absence or presence of in-feed antibiotics results in reductions in foodborne pathogens such as *E. coli* and *Salmonella*.

A recent study, however, found that about 25% of birds in both systems tested positive for *Salmonella*, finding no discernible difference in the incidence of *Salmonella*

infection between these two production systems[2].

The issue of antibiotic resistance is more controversial. While it is widely accepted that including antibiotics in feeds results in the generation of antibiotic resistant bacteria, it is unclear as to whether these organisms make their way to human bacterial populations and, if so, whether they do any harm.

In 1996, a National Antimicrobial Resistance Monitoring Program was established as a collaborative effort between the Food and Drug Administration (FDA), Centers for Disease Control and Prevention

(CDC), and the U.S. Department of Agriculture (USDA) in order to track the increasing number of resistant strains of bacteria found in agricultural species.[3] Proponents of free-range farming maintain that the absence of in-feed antibiotics reduces the number of antibiotic resistant strains of bacteria in these birds to be passed on to humans. Although this remains a divisive subject, many studies have found evidence of transmission of resistant strains of *Campylobacter* found in antibiotic-fed birds to human consumers.[4, 5, 6] The FDA also supported this claim when they withdrew approval of the use of the Flouroquinolones as antibiotics in poultry production in 2001 due to increased incidents of Flouroquinoline-resistant infections of *Campylobacter* in humans.[7]

In terms of disease transmission, proponents of preventative antibiotics cite two major outbreaks of bacterial fowl cholera in free-range farms in 1994 and 2002 as evidence of the danger of free-range/organic systems.[8] Advocates suggest that regularly administered antibiotics would have prevented these outbreaks. While neither situation posed human health risks, both were very costly to the producers in production losses. Regardless, these outbreaks highlight the need for uniform biosecurity measures to fit the unique needs of the free-range systems.

Free-range Production and Parasites

Chickens raised in free-range/organic systems have higher prevalence and a more diverse population of gastrointestinal parasites than birds raised in conventional housing facilities, such as deep litter or battery cage systems.[9] Whether these differences translate to increases in the number of zoonotic (animal to human) parasitic infections is unknown, since these infections are rarely reported and are difficult to trace to a single source. However, 73% of cats fed muscle tissue from ground fed birds infected with parasites were found to show signs of infection through fecal shedding.[10]

It should be noted that the gastrointestinal parasite population of ground-fed or free-range birds is a good indicator of the local environmental population. Thus, both the local parasite population and the farmers' ability to maintain a clean and hygienic outdoor environment contribute in large part to the direct infection of live birds in both conventionally housed and free-range products.[11] Moreover, proper transport, handling, storage, and preparation of poultry can reduce or prevent human transmission of most parasitic infections.[11]

Free-range Poultry and Avian Influenza

Perhaps the biggest concern with free-range poultry production is the possible role these production systems could have in the spread of avian influenza (avian flu). The influenza strain of most concern, pathogenic avian influenza strain H_5N_1, was first isolated in 1959 and mutated from its original form infecting humans for the first time in 1997, with additional outbreaks in 2003 and 2006 resulting in several human deaths.[12, 13] Currently, this strain is not easily transmitted from human to human. However, public health officials suggest that a mutation of this virus into a form that transmits readily between humans is imminent. Ensuring that biosecurity measures designed to prevent the transmission of avian flu are met is a vital responsibility of the poultry industry.

There are two prevailing theories on how avian influenza has been transmitted in the past. The wild bird theory of avian flu transmission is one of the most popular explanations. This theory states that birds become infected through direct contact with either wild, migratory birds that carry the avian influenza virus or the feces of the infected birds.[12] According to this theory, birds housed outside in backyard farms and free-range housing systems are most at risk of contracting avian flu.

In response to this theory, public health officials world-wide, including the UN's Food and Agriculture Organization (FAO), have denounced the practice of backyard and free range poultry farming as a potential source of a pandemic outbreak. It follows that many countries, including China, France, and Germany, have outlawed the practice of backyard farming of poultry.[13] The wild bird theory, however, may not be able to explain all of the avian influenza outbreaks to date.

A second theory states that the avian flu may also be transmitted through commercial husbandry practices including contact with humans who have been in contact with infected birds. This theory does not discriminate between farming methods; all are equally at risk. However, farmers can reduce their risks by maintaining strict biosecurity measures. Proponents of this theory also admit that there is still a risk of transmission of avian flu through wild, migratory birds.

From a public health perspective, both regulatory agencies (such as the USDA) and poultry corporations have established biosecurity measures in order to reduce the risk of an avian flu outbreak as well as to control the spread of disease should an outbreak occur.[13,14] In response to elevated biosecurity and the vertical integration of the poultry industry, influenza infections in production reared chickens in the United States have been relatively rare in the past 50 years compared to that seen in other domestically reared birds.[12,15] However, the 1983-1984 outbreak of the H_5N_2 influenza virus proved difficult to control, resulting in the slaughter of more than 17 million birds.[15]

It is of vital importance that the agriculture industry rigidly and consistently adhere to biosecurity measures already in place and that it continue research into improving biosecurity protocols to better prevent, identify, and quarantine birds with avian flu, especially in alternative farming systems.[12,13,14,15]

Conclusions

Welfare friendly farming practices are more popular than ever before, with consumers around the world willing to pay a premium to ensure the compassionate treatment of food animals. The information presented in this report shows a need for improved biosecurity standards in free-range and organic systems as well as in conventional systems. This report also suggests, based on the current limited state of knowledge, that the personal and public health risks presented by products from free-range farms are similar to those of the conventional housing systems. Differences in biosecurity challenges and incidences of antibiotic resistance do exist, however, and may be taken into account by consumers when making an informed decision at the super market.

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