Patricia Landaida R.

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To Whom It May Concern

Ref.: PathogenFocus powered by Oxyion Technology® (MDBD)

From my consideration:

I, Patricia Landaida Rosales, doctor of veterinarian medicine and international food safety consultant, can attest based on my experience to the effectiveness of Oxyion technology, which harnesses the power of Modulated Dielectric Barrier Discharge (MDBD) plasma to combat harmful biological agents without the use of chemicals. Through my participation in various projects and over 20 years of experience within the different stages in major poultry and hog supply chains, I have firsthand witnessed the significant impact of this technology on the livestock industry.

Interventions using Oxyion technology have consistently achieved significant reductions of up to 99.99% in viruses, bacteria and molds in various trials conducted at different stages of the production chain. It is worth noting that the versatility of MDBD technology allows its application in a wide range of processes requiring control and mitigation against biological threats.

I can highlight certain stages of the protein supply chain that have demonstrated satisfactory efficiency results complementing the achievements in biological control, such as

- **Hatchery/incubation: holding stage for the eggs before entering incubation and hatchers**
  a. Better chick quality,
  b. Less umbilical contamination[1],
  c. Greater number of fertile eggs entering incubation ≥ 96% of 100% eggs that enter incubation. (Industry average 92%)
  d. Hatch rate > 85% (Industry average 82%)
  e. Rotten eggs < 1% (Industry average >2%)

- **Support laboratories:** Mold control in different areas, reduction of Aspergillus mold types and environmental contamination down to**:**
  a. AMC <10 CFU
  b. ≤2 - 3 fungal colonies (Aspergillus)

- **In Slaughterhouses and Further Processing Rooms:**
  a. Carcass cooling chambers for poultry and hogs (E. coli ≤ 1 cfu; AMC ≤10 cfu, Absence of salmonella)
  b. Refrigerated product storage chambers (Absence of salmonella)
  c. Cutting and de-boning processing rooms for poultry-hogs (Absence of salmonella)

- **In enclosed poultry houses during weight gain stages:**
  a. ≤ 1% mortality in the first week,
  b. 1.5% mortality in the second week,
  c. Full-term mortality: 43-day period ≤ 3.5% mortality (Industry average > 6%).

[1] Effective umbilical contamination control is crucial to preventing infections in chicks during incubation and hatching. It helps reduce the risk of omphalitis, increase survival rates, improve chick quality and growth, and potentially decrease antibiotic use and early mortality.

Below is a real-world example industrial application in a hatchery, before and during the intervention with MDBD technology. Table 1.

Major protein processor info	Before treatment (Without MDBD)	In-treatment (with MDBD)	Variations
Period	Jan-March	Apr-Jul	
Weekly production	121,800 birds/week		
Weekly mortality (in %) First week	2.5% due to aspergillus	Reduction to ≤1% with MDBD intervention	Mortality reduction (-60%) -1.5%
Weekly mortality (in units) First week	3,045 chicks/week	1,200 chicks/week	Additional surviving chicks + 1,827 chicks/week
Analysis of surviving chicks in Kg (Average weight: 3.2kg/chick) at full term • No treatment/ before: 6% full term mortality. • Treatment with Oxyion: < 3.5% full term mortality.			
Full-term mortality (43 days: full term)	(7,308) chicks (6%) (23,386) kg less at term	(3,654) chicks (3%) (11,693) kg less at term	Increase based on intervention + 11,693 kg Additional to commercialize / additional revenue generated with MDBD intervention.

Beyond its effectiveness in controlling pathogenic microorganisms, the implementation of MDBD technology has led to tangible commercial benefits, such as increased operational efficiency and waste reduction. For example, regarding animal health, notable decreases in chick mortality rates of up to 60% (2,5% to <1%), in the first week, up to 50% reduction in full-term process have been observed, due to larger quantity of healthier, full-term bird populations with higher weight gains.

Furthermore, reductions in total plate counts and AMC achieved through MDBD technology underscore its importance as a highly effective and sustainable environmental intervention. It is important to highlight that its application does not compromise the sensory qualities of products nor disrupt the processes it intervenes in, making it a recommended option for microbiological control treatments in both air and surface environments.

To achieve consistent and reliable results across all critical areas, it is recommended to adopt a holistic approach by integrating MDBD technology throughout all stages where products are exposed to microbial contamination. This includes, but is not limited to, farm coolers, distribution center storage, hatchery short-term receiving areas, egg storage, incubator rooms, hatch rooms, short-term grow areas, sexing areas, inoculation and shipping areas, and client growth farms.

By maintaining this consistent environmental treatment protection alongside standard operating procedures (SOPs), contamination risks can be minimized, chick viability improved, and overall production efficiency optimized.

Without further ado, sincerely

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