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Examination of The Efficacy of Glutamal BioActive

Under Laboratory Conditions

The Laboratory Examination of Glutamal BioActive has been conducted at

Precision Laboratories,
Cottonwood, Arizona, USA

by

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This examination was performed using Precision Microslides containing Nutrient Agar and Mac Conkey Agar. An examination of the following Products was conducted:

A. Whole de-boned Chicken Breast
B. Beef Steak.
C. Pork Chop.
D. Fish Filet (Cod).

The materials were tested using standard techniques as described in the attached Protocols. This involved a Pre- and Post- treatment procedure.

The testing was performed in order to detect the presence of potentially pathogenic bacteria, and the efficacy of the Glutamal BioActive product.

This testing was done in order to examine the above listed materials for two particular bacterial genera, specifically Escherichia spp. and Salmonella spp.

The sampling was accomplished and the Precision Microslides were then incubated at 37 degrees centigrade for a 24 hour period, upon which examination of the exposed Microslides was performed, and Gram Stained Microscopic Slides were created for examination of cellular growth.

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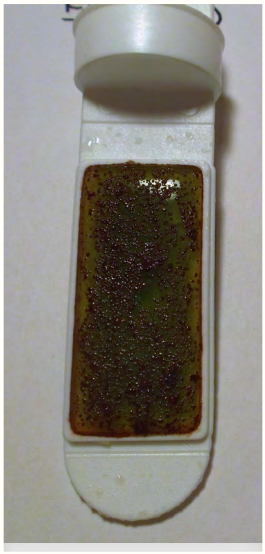
Examples of photographic evidence of growth are shown here in order to substantiate claims provided



Original samples taken from Fish were highly contaminated.

After treatment with Glutamal BioActive, the colony counts were all but eliminated.

Microbiological Sampling Results
Post Treatments

(L to R : Beef - Pork - Chicken)

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The results of this study provide evidence of sanitization of all of the Meat, Poultry and Fish which have been examined.

It further corroborates the value of Glutamal BioActive for use on meat products in processing plants and slaugtherhouses.

This is a valid substitute for the use of oxidizing agents for sanitization, such as chlorine, or lytic bacteriophages.

The use of Lactic Acid with this process replaces more caustic agents such as commonly used oxidizing agents for this purpose with meat products. These oxidizing agents (chlorine bleach) are still recommended for the sanitization of inanimate objects in the Processing Plant (equipment used during the processing).

Lactic Acid is a common naturally occurring by-product of metabolism (incomplete breakdown of sugars during aerobic respiration in animals), hence is less likely to have a deleterious effect upon the meat products being processed.

- Richard Killen, Ph D. NRCM

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POULTRY TESTING PROTOCOL WITH PRECISION MICROSLIDES

NUT-TTC AGAR
S S AGAR
LIS AGAR

This procedure has been developed to allow for the determination of Aerobic Total Viable Counts, and isolation and selection, for Poultry Pathogens (Salmonella spp., Listeria monocytogenes, and Coliform Bacteria.) at 37 C.

Prior to a new Flock being introduced to a facility, this facility should be disinfected to eliminate or reduce the risk of flock to flock transmission of the pathogen. This may be accomplished with an appropriate disinfectant, and its level tested with the test strip designed by Precision Laboratories for this disinfectant. Upon disinfection, it is necessary to test the efficacy of the disinfectant with the Precision Microslides "Dipslide" with the correct microbiological media (NUT-TTC / S – S / LIS Agars). This allows for a Definitive Test of the appropriate Sanitary conditions.

Guidelines for Total Viable Count Limits have been developed by Cargill Meats, and are in accordance with the U.K. Standards: |

a. Assured Chicken Production Act (ACP 2006)
b. Quality British Turkeys Standards Act (QBT 2009)

The procedure developed using Precision Laboratories Test Strips and Precision Microslides Dipslides will confirm the Disinfection Process efficacy, or will confirm the need for remedial action in this area.

PROTOCOL

Random testing of several areas in the facility should be performed. The Microbiological Media on both sides of the Microslide should make full contact with the surface under examination after disinfection. Once exposed, the Microslides should be immediately Incubated at 37 C for 24-48 hours. Colonies are counted on both sides of the Microslide and calculations made should be reported as CFU/10 $(cm)^2$

For the purposes of this Protocol, the Total Number of Colony Forming Units (CFU) pertain to any Bacteria, Yeast, or Mold that develop Aerobically on the Microslide during the testing. Once exposed and incubated, the Microslides should be handled with proper sanitary procedures, as the presence of potential pathogens is indicated.

QUALITY CONTROL

With each sample of Test Microslides incubated, a Positive and a Negative Control Microslide should be incubated alongside the samples. The positive control may be accomplished by testing an area of the facility which has been thoroughly disinfected with a level of disinfectant higher than that recommended for microbicidal activity by the manufacturer.

It is important to maintain a Log of the samples taken:

a. Date/Time
b. Disinfectant Applied to sample area.
c. Disinfectant Level Applied (ppm).
d. Sample Areas tested / number of samples taken.
e. Sampling Technician.
f. General Sanitary Conditions.
g. Incubation Temperature / Length of Time Incubated.

Microslides should be incubated for a period of 24 hours, examined for growth, and replaced for further incubation until 48 hours have elapsed, before declaring "No Growth".

If growth has occurred, it should be reported and Logged as: Number of CFU / 10 (cm)2. / Microslide.

RECORD OF RESULTS

CFU's	GRADE
0	Satisfactory
1 - 10	Satisfactory
11 – 25	Adequate
26 – 50	Needs Improvement
51 – 10	Unsatisfactory
Greater than 100*	Unsanitary/Unsatisfactory

* (Greater than 100 CFU/Confluent Growth indicates an immediate need for complete disinfection of the area tested).

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INTRODUCTION TO SAMPLING RAW MEAT WITH PRECISION MICROSLIDES

The Microbiological monitoring of meat and meat products at critical control points in a processing facility can be used to facilitate Good Commercial Practices (GCP). Precision Microslides may be used for Aerobic Counts, and to assess Hygiene Practices, both of personnel and processing equipment. Raw meats are a source of several pathogenic bacteria incriminated in outbreaks of food-borne illnesses, consequently, this sampling should be on-going.

It should be noted that microbial contamination of carcasses, and/or cuts, is usually on the surface of the meat. Consequently, surface sampling is recommended for Aerobic Counts, and for analysis of microbial types. Processing of meat changes the microbial flora, hence, depending upon the process used, there may be microbicidal activity or micro-bistatic activity occurring, both used to prolong shelf-life. The processing of meats and meat products will also alter the sampling technique to some extent. In the absence of effective control measures, the environmental and process sampling are better than the testing of end-products.

A common source of meat contamination is improper temperature control during meat handling and meat processing. In addition, meat contamination more often occurs due to cross contamination from raw to cooked meat followed by time/temperature abuse.

The type of meat being sampled will determine the microbial contaminants most commonly occurring, and which Precision Microslide should be used in the sampling process. In addition, the source of the contaminant is due more to the presence of the microbe in the live animal than in the meat processing facility. This can be attended to by maintaining the hygiene of the facility and its personnel.

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ADVANTAGES OF USING GLUTAMAL BIOACTIVE IN PLACE OF A CHLORINE BASED DISINFECTANT

The use of a halogen-releasing Biocide (Chlorine, Iodine, etc.) on inanimate objects (such as food processing equipment, floors, tables, etc.) is quite appropriate. The drawbacks develop when these chlorine-based disinfectants are used on meat, poultry, fish, vegetables, etc.

Chlorine-based disinfectants are highly active oxidizing agents and can affect the food products adversely. In addition, it is understood and documented that their use can also facilitate/ induce antibiotic resistance in bacteria if not used properly, and oxidizing agents may also interfere with DNA synthesis (inhibition) and may act as a mutagen.

The ingredients in Glutamal BioActive are generally regarded as safe (GRAS) by the FDA. The mineral salts and sugars are water soluble, and while they act as a disinfectant, they are considered to be food additives. The Phosphate Salts (Calcium, Potassium, and Sodium) are known microbial inhibitors. These have also been used for long periods of time as food preservatives due to their microbicidal activity.

Their effects against many of the gram negative rods such as Escherichia, Salmonella, Listeria, and Campylobacter are shown consistently. They are also moisture retaining agents, anti-browning agents, Neutralizing agents, and Nutritional supplements when needed.

These are some of the key benefits of using Glutamal BioActive as a disinfectant on food products during processing, in place of chlorine based disinfectants.

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