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RESEARCH REPORT
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Effect of a New Laminated Microchip Device -3RN21- on The Indigenous Microflora of Fresh Meat Stored at Room Temperature

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Objective

The objective of this study was to determine the antimicrobial efficacy of a new laminated microchip device -3RN21- on the indigenous (natural) microflora of fresh meat stored at room temperature for 24 hours.

Background

Determine the antimicrobial effect of the laminated microchip device -'3RN21- on the indigenous (natural) microflora of fresh meat stored at room temperature for 24 hours.

Materials and Methods

A. Test Product

Laminated microchip devices coded 3RN21 were provided. The laminated microchip device composed of 21 individual microchip units. Two devices were attached together facing opposite directions horizontally according to the manufacturer's instructions.

B. Meat Sample Preparation

Fresh ground beef sample was divided into five portions. Each portion was placed in a sterile Whirl-Pak bag. One portion served as negative control (untreated). The second portion (treatment) was placed in the bag in a rectangular shape with 0.3 cm in thickness, 10 cm in width and 10 cm in length. The third portion (treatment) was placed in the bag in a rectangular shape with 1.0 cm in thickness, 10 cm in width and 10 cm in length. The fourth portion (treatment) was placed in the bag in a rectangular shape with 1.5 cm in thickness, 10 cm in width and 10 cm in length. The fifth portion (treatment) was placed in the bag in a rectangular shape with 2.5 cm in thickness, 10 cm in width and 10 cm in length. The laminated microchip devices were paced on top of the samples. Samples were analyzed for total aerobic counts initially and after 24 hours storage at room temperature. The method of analysis is outlined in the following table.

Test	Medium	Incubation Time/ Temperature/ Atmosphere
Aerobic Plate Count	Tryptose Glucose Yeast agar	48 hours/35°C/aerobic

Results and Discussion

A lean ground beef sample was obtained from a local grocery store. A single 25-g of sample was serially diluted (1:10) from 0 to 8 dilutions. Each serial dilution (1 ml) was then plated using Tryptose Glucose Yeast agar. Plates were

incubated at 35°C for 48 hours under aerobic conditions. After incubation the plates with 25-250 colonies were enumerated. The results were recorded as colony forming units (CFU) per gram. The study was repeated two times.

In the control sample, total aerobic plate counts gradually increased from the initial level of 410,000 to 210,000,000 colony-forming units per gram after 24 hours at room temperature. In the laminated microchip treated meat sample, total aerobic plate counts increased from the initial level of 410,000 to 13,000,000, 7,200,000 and 45,000,000 colony-forming units per gram in 0.3, 1.0 and 1.5 thick samples, respectively, after 24 hours at room temperature. The laminated microchip treated samples had 93.8, 96.6 and 78.6% less total aerobic plate counts in 0.3, 1.0 and 1.5 thick samples, respectively, compared to the control sample after 24 hours at room temperature. No difference was observed between the total aerobic plate counts of the control and the 2.5 cm thick sample treated with the laminated microchip device after 24 hours at room temperature.

Table 1. Total microbiological counts (CFU/g) of ground beef samples (0.3, 1.0, 1.5 and 2.5 cm in thickness, and 10 cm in width and length) initially, and after 24 hours storage at room temperature

Thickness of the sample	Initial counts 0-hours	Control sample after 24-hours	Laminated microchip device treated sample after 24-hours	Difference between control and laminated microchip device treated samples after 24-hours
0.3 cm	410,000	210,000,000	13,000,000	93.8%
1.0 cm	410,000	210,000,000	7,200,000	96.6%
1.5 cm	410,000	210,000,000	45,000,000	78.6%
2.5 cm	410,000	210,000,000	210,000,000	0%