Estimation of Microbial Count in Ground Pork Using Small Columnar Agar Medium (SCAM) and Microbial Calorimetry

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Abstract: For self-food-hygiene-management in food business, simple method for the estimation of microbial count is desired by the operators. In this study, a new system using small columnar agar medium (SCAM) and microbial calorimetric methods were developed for the estimation of aerobic and coliform bacterial population in ground pork. For the growth of microorganisms, authors developed a novel medium: SCAM, which is composed of 10 agar blocks ($\phi 10 \text{ mm} \times 8 \text{ mm}$) containing medium constituent. Ground pork was purchased from local market and used for the study. Emulsified ground pork (200 μL) was inoculated to the surface of SCAM medium in a screw cap glass vial ($\phi 30 \text{ mm} \times 65 \text{ mm}$). The vials were then kept in micro-calorimeter at constant temperature, and the heat radiated from microorganisms was chased sequentially. The microbial count was determined by plotting a standard curve, with the ground pork exposed to enrich microbial count for 24 h at 20 °C, and the serial dilution of the emulsified samples to prepare a variety of initial microbial counts. In our tested food, adequate correlation between the time required for achieving specific voltage output of the apparatus and initial microbial count in the ground pork deduced from the surface plate method was obtained. To assess the validity of the standard curve, three other ground pork samples were purchased from markets and tested. In the three samples, the ratio of the microbial counts from the colony counting method to those from microbial calorimetry with the standard curves previously obtained from other sample were in the range of 1.3 to 2.5 in aerobic bacteria count and 2.1 to 3.1 in coliform bacteria count, which is in line with the permissible range for the estimation of microbial count.

Key words: Small columnar agar medium (SCAM), microbial calorimetric methods aerobic bacteria, coliform bacteria, ground pork.