Limited information available on the microbiology of cocoa powders used for the manufacture of chocolate-flavored milk indicates that the microflora is mainly aerobic sporeforming bacilli and micrococci (2). The microflora of the cocoa powders apparently results from contamination of the cocoa beans after fermentation (4). This note confirms the earlier reports on the bacteria isolated from cocoa powders.

Thirty-six cocoa powders were obtained from 10 different manufacturers and were analyzed for coliforms and total aerobic plate counts by using Violet Red Bile Agar and Standard Plate Count Agar, respectively. In general, plating procedures outlined in Standard Methods for the Examination of Dairy Products were used (1).

Isolates were obtained randomly from the total aerobic count plates by the method of Harrison (3). The isolates were cultured routinely in Brain Heart Infusion broth and agar slants. The tests carried out to aid in the identification of each isolate are presented in Table 1. A total of 37 features were recorded, coded, and transferred to IBM data cards. The computer used was the IBM 360-50 with a program of a simple ratio determination prepared to determine the similarity between a pair of cultures (6). Characteristics of each species from the genera Micrococcus and Bacillus were taken from Bergey's Manual and placed on IBM cards. Similarity values were then determined between these known species, and the unknown isolates having the greater similarity of characteristics to those of the known species were classified as being the same species.

The total aerobic plate counts ranged from 100 to 27,000 per g and can be divided into three distinct groups as shown in Table 2. The results show that 31 samples (86.1%) had counts of less than 9,300 per g. Of these, 12 (39%) had counts of less than 1,500 per g. The five samples with

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2. Present address: Department of Food Science, North Carolina State University at Raleigh, N.C.
number of isolates for each are given in Table 3. *M. freudenreichii* represented one-half of the *Micrococcus* species, and the remaining micrococci were identified as *M. luteus*, *M. colpogenes*, and *M. agilis*. The small number of micrococci isolates confirms the report of Fuller et al. (2).

*B. licheniformis* comprised 45% of the total bacilli population. This species plus *B. cereus*, *B. megaterium*, and *B. subtilis* made up about 85% of the bacilli isolates. Fuller et al. (2) reported that *B. subtilis* was the predominant species in the cocoa powders they examined. Sneath (5) states that *B. subtilis* and *B. licheniformis* are closely related and subject to misclassification on a monothetic basis. It is also quite possible that the microflora of cocoa powders may change slightly over the years.

In conclusion, total numbers of aerobic bacteria added to chocolate-flavored milk by cocoa powders would be insignificant, cocoa powders are not generally a source of coliform contamination, the genera found in cocoa powders plated at 32 C are *Micrococcus* and *Bacillus* as determined by numerical taxonomy, and bacilli are the predominant type of bacteria found in cocoa powders.

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