NOTES

Deoxyribonucleic Acid Base Composition of *Bacterionema matruchotii*

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The thermal denaturation profiles (T_m) of six strains of *Bacterionema matruchotii* were determined. The mol% G+C of five of the strains ranged from 55.0 to 58.0. The mol% G+C of the strain referred to as streptococcal variant S_1 fell short of this range (42.5), suggesting that it is substantially different from the others and perhaps improperly identified.

The phylogenetic relationships among oral filamentous microorganisms have not been completely resolved. For a number of years, certain oral, Gram-variable, filamentous, and rod-shaped bacteria have been variously classified as *Leptotrichia*, *Leptothrix*, and *Rasmussenia*. Gilmour et al. (4), after reviewing the morphological and biochemical status of these organisms, proposed that some of them be placed in one of two genera: *Leptotrichia*, family *Lactobacillaceae*; or *Bacterionema*, family *Actinomycetaceae*; with *L. buccalis* and *B. matruchotii* as the respective type species.

Due to the extreme cellular and colonial polymorphism of various strains of *B. matruchotii* and to the variability of their metabolic activities, we decided to investigate their deoxyribonucleic acid (DNA) base composition (guanine + cytosine [G+C] content) and to compare the resulting values to those reported in the literature for the various species of the family *Actinomycetaceae*.

All strains of *B. matruchotii* used in the study were grown in brain heart infusion broth (Difco) supplemented with 0.2% yeast extract (Difco) for 48 h at 37 C. The cells were harvested and lysed, and the DNA was extracted by a method reported earlier (11).

Due to the high melting temperatures (T_m) of DNA reported in the literature for the various species of the family *Actinomycetaceae*, phosphate-ethylenediaminetetraacetic acid (EDTA) buffer (ionic strength = 0.0225) was used to solubilize the DNA instead of the usual saline citrate in order to lower the melting temperature (3, 10). This buffer system was tested with calf thymus DNA (sodium salt, type

V; Sigma), and the results obtained were found to be consistent with those reported in the literature.

To ensure consistency in buffer concentration, both calf thymus and *B. matruchotii* DNA were dialyzed in the same flask against the phosphate-EDTA buffer at 4 C. The thermal denaturation profiles were carried out by using the procedures of Mandel and Marmur (8) on a Gilford 2400 automatic recording spectrophotometer equipped with a model 2417 thermosensor and Haake model FJ constant-temperature circulator. Each thermal melt was carried out at least twice, and calf thymus DNA was used as an internal control for each run. The mol% G+C values derived from the thermal denaturation profiles were also confirmed for one strain of *B. matruchotii* and calf thymus by determining the buoyant densities of their DNA in CsCl as described by Mandel et al. (9).

Table 1 summarizes the results obtained for the six strains of *B. matruchotii*. Note that five of the strains tested were closely related, the mol% G+C values ranging from 55 to 58. However, the strain described by Strekfuss and Smith (12) as the streptococcal variant, S_1 , fell short of this range. This finding tends to support that of Gilmour and Turner (Int. Ass. Dent. Res. Abstr. No. 122, 1973) that the S_1 variant is probably a streptococcal contaminant. The mol% G+C of 42.5 obtained by us for this strain is very close to the G+C values that have been reported for some of the oral streptococci (2).

Table 2 compares the G+C contents of *B. matruchotii* strains with those that have been reported in the literature for various oral

TABLE 1. *Analysis of DNA from various strains of Bacterionema matruchotii*

Strain ^a	$A_{260}/280$	T_m	Mol% G+C	Buoyant densities	Mol% G+C from buoyant densities
ATCC 14265	1.90	92.2	56.4	1.7143	55.4
ATCC 14266	1.90	91.8	56.0		
WHB9A (rough)	1.89	92.5	58.0		
8 MG (smooth)	1.87	91.6	55.5		
8 MG (rough)	1.80	91.3	55.0		
S ₁	1.97	86.7	42.5	1.7004	41.3
Control					
Calf thymus DNA	1.90	86.5	42.5		

^a All strains except S₁ were kindly supplied by Marion N. Gilmour of the Eastman Dental Center, Rochester, N.Y. Strain S₁ was kindly supplied by W. N. Smith of the University of Texas Dental Science Institute, Houston, Tex.

TABLE 2. *G+C content of DNA of certain members of the family Actinomycetaceae*

Species	Mol% G+C	Reference
<i>Actinomyces bovis</i> (2 strains)	63.0	6
<i>Arachnia propionica</i> (10 strains)	64.0-65.0	6
<i>Nocardia asteroides</i>	66.0	7
<i>N. asteroides</i> (2 strains)	67.0-68.0	1
<i>N. erythropolis</i>	62.0-63.0	1
<i>N. corallina</i> (3 strains)	62.0-67.0	1
<i>N. madurae</i>	68.0	1
<i>N. opeca</i>	63.0	1
<i>N. rubra</i>	66.0	1
<i>N. brasiliensis</i>	65.0	7
<i>Rothia dentocariosa</i> (10 strains; filamentous)	65.4-69.7	5
<i>Rothia dentocariosa</i> (1 strain; coccoid)	68.0	5
<i>Bacterionema matruchotii</i>	55.0-58.0	

filamentous species of the family *Actinomycetaceae*. All species of the family *Actinomycetaceae* show G+C values between 62.0 and 69.7, significantly higher than those found for *B. matruchotii* strains. Although the precise taxonomic position of *B. matruchotii* will have to await further work, we feel that, on the basis of the present knowledge, the placement of the genus *Bacterionema* in the family *Actinomycetaceae* should be re-evaluated.

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REPRINT REQUESTS

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