Nucleotide sequence of two toxin genes from *Bacillus sphaericus* IAB59: sequence comparisons between five highly toxinogenic strains

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Submitted August 18, 1989 EMBL accession no X14964

DNA from B. sphaericus strain 2317.3 (WHO reference collection) and a newly isolated strain, IAB59 (from West Africa) was cut with HindIII and fragments of approximately 3.5kb were cloned into the E. coli plasmid pUC18. Clones containing the B. sphaericus toxin genes were identified as previously (1) and by their toxicity to Culex larvae. Sequencing of the cloned DNA showed a high degree of conservation between the toxin genes of the five highly toxic strains so far sequenced (1,2,3,4,5). The table below shows a comparison of the nucleotide and deduced amino acid sequences. Nucleotide numbers in this table refer to the published sequence of Baumann et al. (2). After allowing for correction to our previously published sequence from B. sphaericus 1593 (1), the toxin coding and flanking regions from strains 1593, 2362 and 2317.3 proved identical over a span of 3479 nucleotides. The corresponding sequences from strains IAB59 and 2297 showed six and eight amino acid substitutions respectively. At two positions, nt. 1435-1437 and nt. 2323-2325 the amino acid sequence appears to be highly variable.

Region	Position	Nucleotide in strain			Amino Acid change		
		IAB 59	1593, 2362, 2317.3	2297	IAB 59	1593, 2362, 2317.3	2297
Pre gene	91	C	C	T			
51.4 kDa	700	G	T	T	Ala	Ser	Ser
	705	A	C	C	Lys	Asn	Asn
	824	T	C	C	Ile	Thr	Thr
	1435	C	C	T	} His	Leu	Tyr
	1436	A	T	A			
	1446	G	T	G	Leu	Phe	Leu
	1455	C	T	C	-	-	-
	1660	T	T	A	Leu	Leu	Met
	1677	G	G	A	-	-	-
Space	after 1844	-	-	Insert CT			
	1851	C	C	A			
	1909	T	T	A			
	1994	T	T	A			
41.9 kDa	2139	C	C	T	-	-	-
	2169	T	T	C	-	-	-
	2253	C	C	T	-	-	-
	2308	G	G	T	Val	Val	Phe
	2323	G	G	T	} Glu	Ala	Ser
	2324	A	C	C			
	2386	C	C	A	His	His	Asn
	2412	T	T	C	-	-	-
	2417	A	A	T	Tyr	Tyr	Phe
	2490	A	A	T	-	-	-
	2643	C	C	G	-	-	-
	2745	C	C	T	-	-	-
	2813	G	G	A	Arg	Arg	Lys
Space	after 3336	-	-	Insert A			

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