A combined quasi-elastic light scattering & electron microscopic study on the stability of Bacillus cereus spores. NAVID JAN, STEPHEN E. HARDING, ANTONIO MOLINA-GARCIA & WILLIAM. M. WAITES*

The utility of quasi-elastic light scattering (QLS) procedures as a non-destructive probe for bacterial spore morphology has been well-established (see. e.g. S.E. Harding & Johnson, P., Biochem. J. 220, 117-123, 1984 & S.E. Harding, Biotechnology & Applied Biochemistry, 8, 489-509, 1987). Previous studies have been on spores which lack exosporia, because of the potential anomalous hydrodynamic properties the latter induces. We have now examined the exosporium-possessing B. cereus to compare the relative stability of three cultures grown at different temperature (20.0°C, 30.0°C & 40.0°C) - henceforth referred to as BC20, BC30 & BC40 respectively. The cultures were compared for (i) their effective hydrodynamic radius, as determined from the z-average translational diffusion coefficient, D_z determined from QLS (all experiments performed at 25.0°C) (ii) their gross morphology (as determined by scanning electron microscopy, SEM) and the effects of autoclaving at 121.1°C on these properties

All spore suspensions prior to QLS analysis were mildly ultrasonicated for periods up to 2 minutes to reduce the effects of aggregation. Although BC20 & BC40 showed no appreciable effect, with BC30 ultrasonication was found to be necessary.

We observe 1. cultures BC20 & BC30 appear to have similar values for D_z but BC40 appears some 50% larger (and hence has a corresponding smaller Stokes radius); these differences were confirmed by SEM. 2. BC40 appeared to have a correspondingly much lower heat resistance (structural integrity lost after 20 min autoclaving at 121.1°C, whereas that of BC20 & BC30 appeared to have been retained even after 80 minutes).