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The DNA-binding protein HU from mesophilic and thermophilic bacilli: gene cloning, overproduction and purification.

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The major histone-like bacterial protein (HU)-encoding genes (hup) from five different Bacilli have been cloned, sequenced and overexpressed in Escherichia coli. The five Bacilli selected are closely related, but have different optimum growth temperatures: greater than 70 degrees C for Bacillus caldolyticus and B. caldotenax; 60-65 degrees C for B. stearothermophilus (Bst); 37 degrees C for B. subtilis and 30 degrees C for B. globigii. The deduced amino acid (aa) sequences from the three thermophiles are identical. Those from the two mesophiles are also identical and differ from those of the thermophiles at eleven aa positions. The mesophilic proteins have an extra two aa at the C terminus. Cells harbouring plasmids containing the hup genes can produce HU. An efficient purification scheme using cation-exchange chromatography and fast protein liquid chromatography is presented. This gives approx. 30-40 mg of more than 95% pure Bst HU per litre of E. coli culture.

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