

Effects of pH Shock on the Transcription of Various Sigma Factors and Heat/Cold Shock Proteins in *S. Coelicolor*A3(2)

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In our previous study, it was observed that an acidic pH shock promoted cell growth and caused a phase shift in cell growth, and that it greatly enhance actinorhodin production. In this study a transcriptional analysis was performed by RT-PCR for various shock proteins and sigma factors. Twenty different genes were considered: sigma factor genes (σ R, σ H, σ W, σ X, σ Y, σ Z, σ 32, σ 33, σ 34, σ 35, σ 36, σ 37, σ 38, σ 39, σ 40, σ 41, σ 42, σ 43, σ 44, σ 45, σ 46, σ 47, σ 48, σ 49, σ 50); heat shock protein genes (DnaK, DnaJ, grpE, groEL2, HtpX, hrcA, and htpG); cold shock protein genes (f40, cspB, ScoF, scoF2, scoF3, and scoF4). The expression of most sigma factors (σ R, σ H, σ W, and hrdD) was enhanced by the pH shock. Most heat shock proteins were expressed earlier, 1 day after the application of pH shock, than the controls (positive control with no buffer and negative control with buffer), while the expressions of cold shock proteins showed no significant differences. In particular, the enhancement of σ R and σ H expression by the pH shock suggested that pH shock-related proteins might be overlapped with oxidative stress-related proteins and heat shock proteins since σ R and σ H are oxidative stress response sigma factor and heat shock response sigma factor, respectively.