tion (100μg./ml.) that prevented growth of the organism. Washed cells of the organism grown in a 2mM-thiophen-2-carboxylate–mineral-salts medium or in a succinate medium to which 2mM-thiophen-2-carboxylate had been added during growth were able to oxidize thiophen-2-carboxylate at rates up to fifteen times the corresponding rate of oxidation of the substrate by cells grown in the absence of thiophen-2-carboxylate, suggesting the operation of an inducible enzyme system. Whole cells of the organism grown in the presence of thiophen-2-carboxylate also showed corresponding increases in their ability to oxidize furan-2-carboxylate and pyrrole-2-carboxylate, and the three heterocyclic acids were also oxidized at increased rates by whole cells grown in a succinate medium in the presence of thiophen-3-carboxylate, which was not itself oxidized by induced or non-induced cells of the organism.

Washed cells of the *Flavobacterium* sp. grown in the presence of thiophen-2-carboxylate oxidized furan-2-carboxylate in the presence of 1mM-arsenite with the accumulation of 2-oxoglutarate, which did not accumulate during the arsenite-inhibited oxidation of thiophen-2-carboxylate, and thiophen-2-carboxylate (but not thiophen-3-carboxylate) was shown to prevent the accumulation of 2-oxoglutarate during the arsenite-inhibited oxidation of furan-2-carboxylate.

The failure of 2-oxoglutarate to accumulate during the arsenite-inhibited oxidation of thiophen-2-carboxylate was shown probably to result from the intracellular formation of a non-inhibitory compound (possibly As_4S_6) from the arsenite and sulphide, the latter previously having been shown to be a product of the degradation of thiophen-2-carboxylate by the *Flavobacterium* sp.

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The Competence-Inducing Factor of *Bacillus subtilis*

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A competence-inducing factor, which promoted the uptake of transforming DNA by certain strains of bacteria, was found in culture supernatants and aqueous extracts of competent cells of *Bacillus subtilis* strain 168 I$^-$ (Charpak & Dedonder, 1965; Akrigg, Atkinson, Ayad & Barker, 1967). The competence-inducing factor appeared to be polypeptide in nature, since its activity was abolished by treatment with trypsin.

Aqueous extracts of competent cells of *B. subtilis* were fractionated by DEAE-cellulose chromatography (Akrigg, Ayad & Barker, 1967). Five peaks showing extinction at 280mμ were obtained. Of these, only peak 2 had the property of provoking competence in non-competent cells.

Young & Spizizen (1963) found an autolytic enzyme associated with the cell walls of a highly transformable strain of *B. subtilis*. Cell walls from poorly transformable strains showed a lower activity of the enzyme.

In our recent work, cell walls of *B. subtilis* strain 168 I$^-$ were prepared by the ultrasonic treatment of cells grown for 4hr. in medium I (Akrigg, Ayad & Barker, 1967). Cell walls were separated from the remaining whole cells by centrifugation at 1000*g* for 10min. The native autolytic enzyme associated with the purified cell walls was inactivated by heating the cell-wall suspension at 80° for 30min. Heat-inactivated cell walls could be lysed by incubation at 37° at pH 8·3, with a sample of a crude autolysate of cell walls containing the active autolytic enzyme [a modification of the method of Young & Spizizen (1963)].

Aqueous extracts of competent cells of *B. subtilis* strain 168 I$^-$ were fractionated on DEAE-cellulose, with either linear or convex gradients of NaCl for elution. Samples of each of the five ultraviolet-absorbing peaks obtained were incubated with heat-inactivated cell walls as described above.

It was observed that when heat-inactivated cell walls were incubated with peak 2, lysis occured. No lytic activity was exhibited by any of the other peaks.

The results suggest that, the polypeptide material present in peak 2, which can induce competence in non-competent cells, may also be the lytic enzyme described above.

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