

THE EFFECT OF POTASSIUM CYANIDE UPON
AMYLASE ACTIVITY

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Many interesting studies (2) have been reported concerning the effect of cyanides upon various enzymes. Hanes and Barker (3) mention that under suitable conditions they increase the activity of malt amylase. Prompted by certain phenomena occurring as a result of chemical treatment of dormant potatoes, Denney (1) investigated the influence of KCN upon potato amylase. Small amounts of the reagent did markedly increase the activity of the undialyzed juice but after dialysis little or no effect was noted. Denney also observed that the increase due to cyanide decreased as the pH of the medium increased.

These experiments were of particular interest in connection with some work in progress in this laboratory upon barley amylase. This enzyme shows its optimum activity at a much lower pH than potato amylase and it seemed desirable to establish the effect of KCN under varying conditions upon the former. Both ungerminated barley and barley malt were used as sources of the enzyme. The materials were finely ground and sieved. Portions were then allowed to soak in distilled water over night and the clear liquid introduced into the substrate material. The substrate was prepared from soluble starch according to the general procedure of Sherman and Thomas (5). The control and treated solutions were prepared separately. In the case of the treated samples the appropriate amount of KCN solution, previously adjusted to the desired pH, was introduced into the substrate before making up to volume.

In selecting conditions for experimentation a pH of 4.56 was selected as being near the optimum for barley amylase and pH of 7 as one less favorable to the action of the enzyme. The solutions were buffered to maintain the desired pH. The substrate was first brought to a temperature of 40° C. and the amylase introduced and the mixture held at 40° C. during the progress of the reaction. At regular intervals portions of the mixture were withdrawn and the rate of saccharification determined by the method of Lane and Eynon (4). With undialyzed enzyme preparations containing 10 mg. of KCN per 100 cc. of substrate in the treated sample very little difference in rate of reaction was noted between treated and control when the pH was maintained at 4.56. When the pH was increased to 7 the rate of saccharification was much greater for the KCN treated samples. However, the rate for the latter was practically identical with that observed for a pH of 4.56. This seems to indicate that the cyanide tends to make the enzyme less subject to change in activity due to change in pH. Reduction in normal activity by increase in pH from 4.56 to 7 seems to be prevented by addition of the KCN.

LITERATURE CITED

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