PRODUCTION OF NICOTINAMIDE FROM 3-CYANOPYRIDINE BY NITRILE HYDRATASE OF RHODOCOCCUS SPECIES STRAIN J-1

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Nitrile hydratase catalyses the hydration of nitrile to amide. We have optimized the conditions for the production of the vitamin Nicotinamide from 3-cyanopyridine. The catalyst used was the resting cells of Rhodococcus species strain J-1 having high nitrile hydratase activity.

The optimum pH for conversion of 3-cyanopyridine to nicotinamide was between pH 7 to 9. The maximum activity was at pH 8.0. At pH 8.0, there was no significant difference in enzyme activity in the presence of different buffers. Maximum activity was observed at 50°C and the enzyme was stable up to 30°C with a sharp decrease in stability from 40° to 60°C. Enzyme activity was inhibited at a 3-Cyanopyridine concentration of 5.12M. Under optimum conditions at 25°C the reaction mixture containing 1.98 mg/ml resting cells produce 5.58M of Nicotinamide in 18h. The conversion rate is 99.5%. Initial feeding of 3-cyanopyridine was 4.57 M and two subsequent feedings of 0.55M and 0.49M were added at 3h intervals. The produced nicotinamide was recrystallized and identified by IR, NMR and Mass spectroscopy.