A study of a-aminobutyronitrile in Rhizoctonia solani
by Francis Hing Soon Liu

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in Chemistry
Montana State University

Abstract:
α-aminobutyronitrile was found in Rhizoctonia solani as a product of potassium cyanide assimilation. Labeled potassium cyanide (KC*N) was used to study the pathways.

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Date Aug 8, 1972

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TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

Figure | Page

ABSTRACT

α-aminobutyronitrile was found in Rhizoctonia solani as a product of potassium cyanide assimilation. Labeled potassium cyanide (KC*N) was used to study the pathways.

INTRODUCTION

Cyanide assimilation occurs in various living systems. Some species of insects are known to be able to assimilate hydrogen cyanide and transform it into aspartic acid.[1] In some higher plants, it has been observed with feeding experiments that hydrogen cyanide was incorporated into asparagine to a considerable extent.[2] Other investigations have concluded that β-cyanoalanine is the intermediate of cyanide assimilation.[3] It has been proposed that hydrogen cyanide condenses with cysteine in the presence of an enzyme, cyanoalanine synthetase,[4] to produce β-cyanoalanine and hydrogen sulfide. This β-cyanoalanine can then be hydrolyzed into asparagine with a nitrilase or

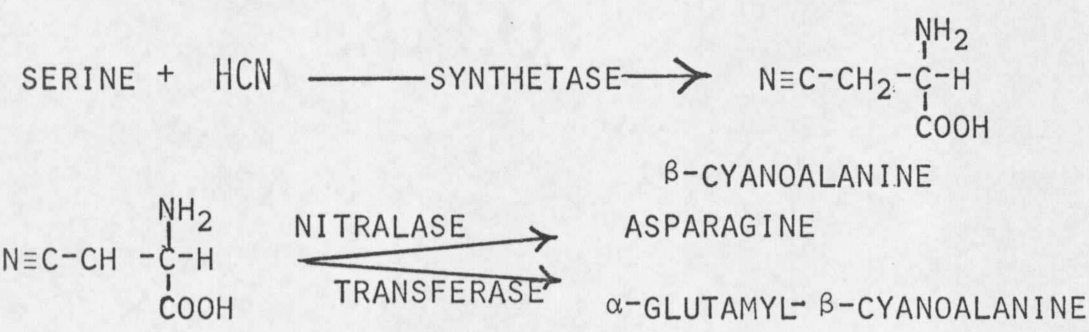

Fig. 1

Proposed Scheme of HCN Assimilation

condenses with γ-glutamyl moiety by means of a γ-glutamyl transferring enzyme to produce γ-glutamyl-β-cyanoalanine.[5]

Castric and Strobel[6] reported, in a similar study, evidence of the formation of asparagine and aspartic acid from cyanide and serine by a bacterium.

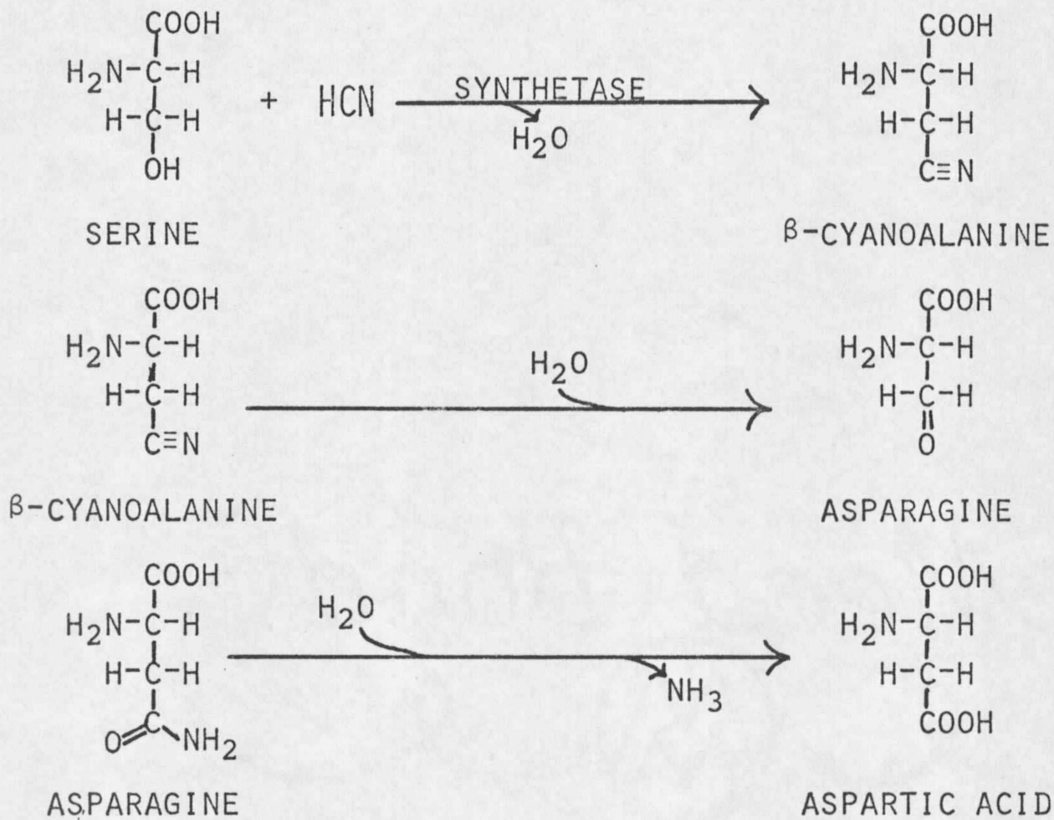

Fig. 2

Scheme of Incorporation of Cyanide to Aspartic Acid