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SHIKIMIC ACID PHATHWAY- AN OVERVIEW

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ABSTRACT

The Shikimic acid pathway is responsible for the biosynthesis of many aromatic compounds by a broad range of organisms, including bacteria, fungi, algae, plants, and some protozoans. Animals are considered to lack this pathway; this pathway is essentially used to synthesize basic amino acids by plant and lower organisms. Shikimic acid is the starting point in the biosynthesis of many phenolic compounds. Through which phenylalanine, tyrosine and tryptophan are obtained which act as a precursor for the biosynthesis of phenylpropanoids. Therefore these reviews focus mainly on the metabolic pathway of the Shikimic acid.

Keywords: Shikimic Acid, Phenylalanine, Tyrosine, Tryptophan, Amino Acids.

I. INTRODUCTION

The Shikimic acid pathway is related to the metabolism of carbohydrates and aromatic amino acids. The Shikimic acid pathway consists of seven steps, starting with the condensation of phosphoenolpyruvate and D-erythrose-4-phosphate which comes from the glycolysis and pentose phosphate pathway. This pathway is responsible for the production of vitamins and aromatic amino acids such as phenylalanine, tyrosine, and tryptophan and their condensation and cyclization lead to the formation of Shikimic acid and end with the synthesis of chorismic acid. The seven enzymes involved in the shikimate pathway are DAHP synthase,(3-deoxy-D-arabinoheptulosonate-7-phosphate-synthase),3-dehydroquinatesynthase, 3-dehydroquinate dehydratase, shikimate dehydrogenase, shikimate kinase, EPSP synthase and chorismate synthase. These enzymes are involve in the biosynthesis of Shikimic acid pathway in the seven steps as shown as figure as below.

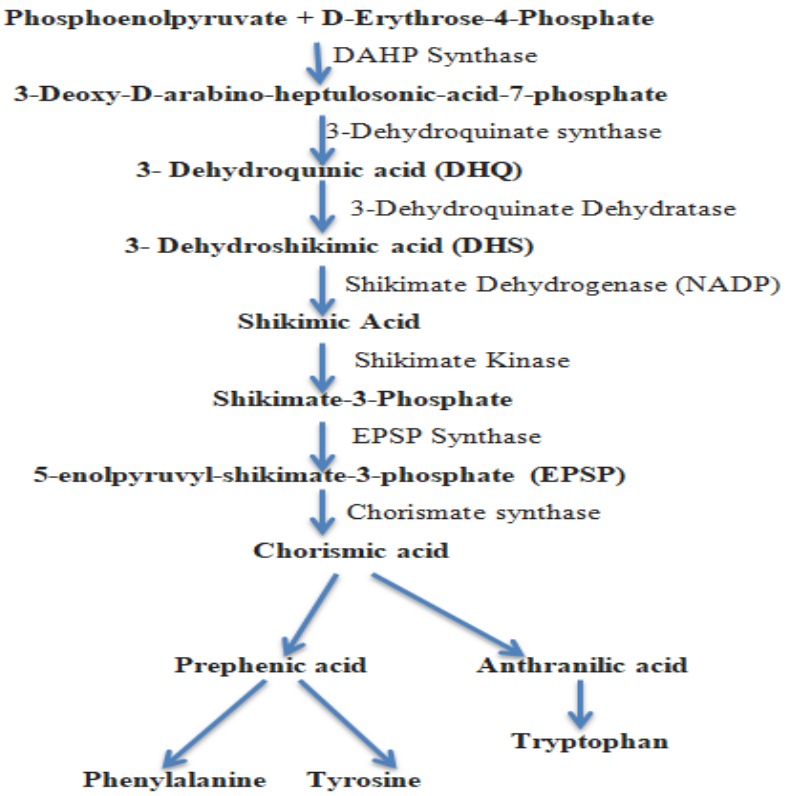

Figure- 1 Flowchart of Shikimic acid pathway

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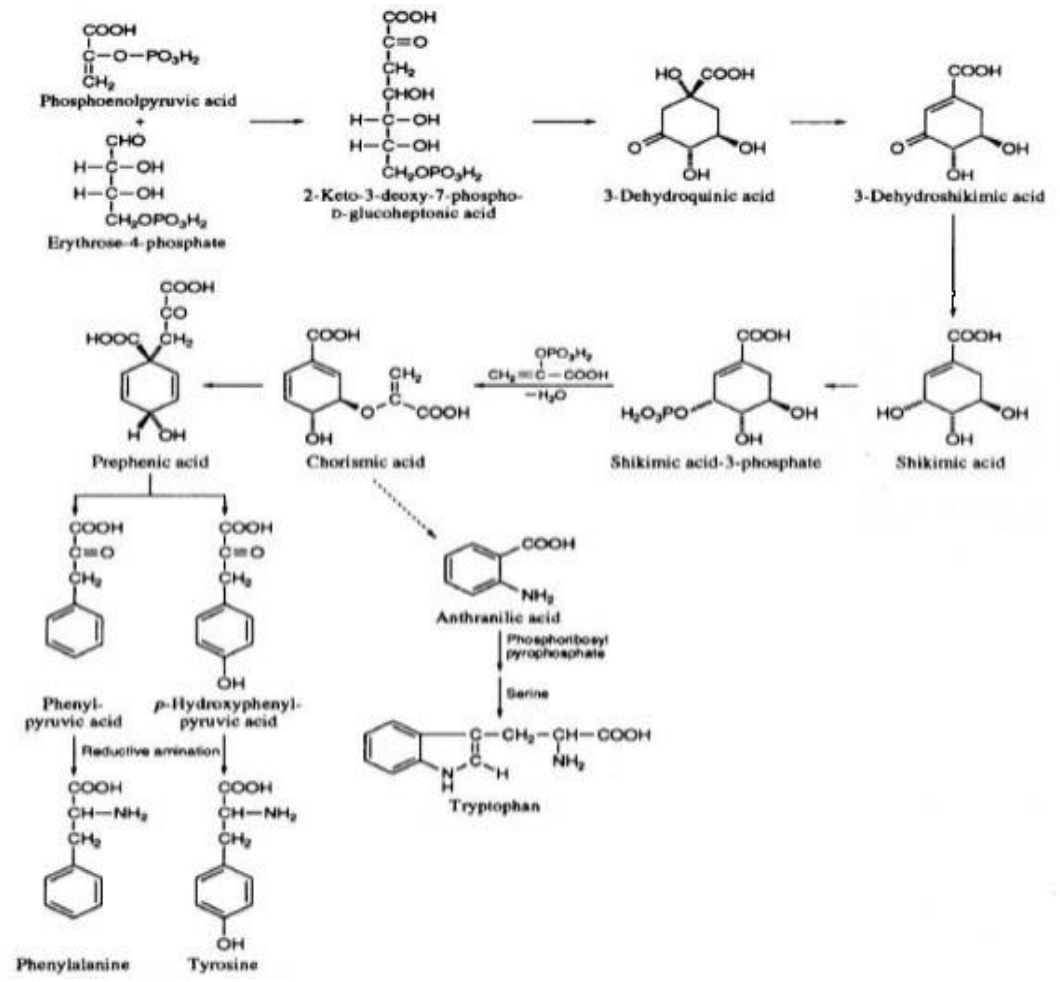

Figure-2 Shikimic acid pathway with chemical structure

The shikimic acid pathway is an anabolic route that organisms use for the synthesis of amino acids and in particular, aromatic amino acids. Amino acids are essential for all living organisms, as they are the building blocks for proteins. Which are formed by hundreds to thousands of amono acid units linked to each other.

II. ROLE OF SHIKIMIC ACID PATHEWAY

1 Shikimic acid is the starting point in the biosynthesis of many phenolic compounds. Through such pathway phenylalaninie and tyrosine are obtainded which act as a precursor for the biosynthesis of phenylpropanoids. The phenylpropanoids are then used to produce flavonoids, coumarins, lignin and tannins.

2 Shikimic acid pathway also involved in the biosynthesis of indole, indole derivatives and aromatic amino acid derivatives and many alkaloids and other matabolic metabolites.

III. CONCLUSION

The shikimic acid biosynthetic pathway of leads to understanding the reaction mechanisms of enzymes and thus discovering antimicrobials, pesticides, and antifungals. The seven steps of the biosynthetic pathway are elucidated; these metabolites are the precursors of phenolic compounds, more complex molecules that are necessary for the adaptation of plants to the environment. So, the shikimate pathway is the basis for the subsequent biosynthesis of phenolic compounds. There is scientific interest in continuing to investigate the biosynthesis of phenolic compounds from several points of view: pharmaceuticals, agronomy, chemical and food industries, genetics, and health.

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