

## The Phases and Stages of Microbial Transformation of Steroids and Sterols

Shradha Kakaria\*

<sup>1</sup>Department of Zoology, Govt. P.G. College Bhakhara, Dhamtari, India

### ABSTRACT

This article summarises regarding microbial transformation of steroids which contains different types like Oxidation- in which the alcohols are oxidised to form ketones, Hydroxylation- in this the mycobacterium flavobacterium dehydrogenans helps in hydrolysis, Dehydrogenation, Epoxidations which is a sparse process, Ring A Aromatization, Oxidation to ketone through hydroxylation, Ring A Aromatization, Degradation of steroid nucleus, Oxidation of alcohols to ketone, Side chain cleavage of steroids, Decarboxylation of acids, Reduction in this the Aldehyde and ketone to alcohol, Hydrolysis, Isomerisation, Resolution of racemic mixture, Other reactions, Esterification were explained.

**Keywords:** Steroids

### INTRODUCTION

**Microbial transformation:** The modification of an organic compound if it is being performed by microbes. It is said to be called as microbial transformation. There are many types of steroidal transformation which are as follows Oxidation, Hydroxylation, Dehydrogenation, Epoxidations, Oxidation to ketone through hydroxylation, Ring A Aromatization, Degradation of steroid nucleus Oxidation of alcohols to ketone, Side chain cleavage of steroids, Decarboxylation of acids, Reduction Double bond, Aldehyde and ketone to alcohol, Hydrolysis, Isomerisation, Resolution of racemic mixture, Other reactions, Aminations, Enolization of carbonyl compounds, Esterification.

**Oxidation:** Alcohols are oxidised to ketone. Splitting of side chain of steroids takes place.

**Hydrolysis:** Replacement of hydroxyl group directly for the hydrogen takes place at the position. Which might be alpha or beta in the steroid where either a retention or configuration takes place. Flavobacterium dehydrogenans contain a specific enzyme acetolase which hydrolyses the steroidal acetates. A particular enzyme called acetolase is present in flavobacterium dehydrogenans due to which steroidal acetates gets hydrolysed.

**Dehydrogenation:** Consequent introduction of double bond with the dehydrogenation has been outlined for all four rings of the steroid nucleus.

**Epoxidations:** In biological epoxidation, steroidal epoxidation is a sparse process.

**Ring A aromatization:** If appropriate steroid substances are aromatized microbially leads to ring A aromatic compounds.

Specifically, in oral contraceptives in which the important ingredient is oestrogen.

**Degradation of steroid nucleus:** In sidechains, steroids are degraded. Is the aliphatic side chain is removed selectively without additional malfunction of steroidal nucleus. Species like nocardia can cause breakdown of sidechain in order to produce C-17 ketosteroids.

**Reduction:** Alcohols & ketones are depleted to form alcohols.

**Dehydrogenation:** In the corticosteroids A-ring 1,2 double bond is introduced prediction for the glucocorticoid receptor takes place. With the 3-keto-4 group depletion of its metabolic degradation rate causes increased therapeutic potency. By using the whole cells, microbial transformation takes place.

**Esterification:** It is a process in which the androstenedione in the presence of sacromyces fragilis, testosterone acetate is formed.

**Steroidal ring degradation:** Cholesterol is converted to androsterone followed by formation of androstadienedione, on later reactions 9 alpha-hydroxy-androstandiendione is formed which is later converted to androstandiendione. The whole process of deterioration of cholesterol takes place by mycobacteria.

### CONCLUSION

This article concludes that microbial transformation of steroids is of different types which involves oxidation, hydroxylation, dehydrogenation, reduction, ring A aromatisation, Steroidal ring degradation, esterification, degradation of steroidal nucleus & Epoxidation in which some of them takes place in presence of enzymes whereas many of them requires bacterial species in order to get the final product.

**Correspondence to:** Shradha Kakaria, Department of Zoology, Govt. P.G. College Bhakhara, Dhamtari, India, E-mail: kakariyaanich@gmail.com

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