

Abstract Type : Poster

Abstract Submission No. : PO-1717

Production of anti-inflammatory steroid drug precursor used in treatment of different kidney diseases

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Objectives: Use of anti-inflammatory steroid drugs in different kidney conditions is reported by different researchers; the conditions include lupus nephritis, systemic vasculitis, and other types of glomerulonephritis. Corticosteroids (methylprednisolone and prednisone) are one of them. Reduced inflammation is reported in acute kidney failure by glucocorticosteroid. These drugs inhibit some protein synthesis by blocking receptors. The complex of drug and receptor interacts with DNA and blocks production of inflammatory biochemical. The production of these important steroidal drugs is done by complex chemical process. Androst-4-ene 3, 17 dione (AD) and 9-hydroxyandrost-4-ene 3, 17 dione (9-OH-AD) are current precursors of corticosteroids. The present study was aimed at production of androstenedione by using microorganism and screening of efficient substrate carrier solvent.

Methods: Two strains of *Mycobacterium* species were used for two different bioconversion reactions. For phytosterols to AD conversion *Mycobacterium fortuitum* subsp. *fortuitum* NCIM 5239 was used. Optimized medium B was used as incubation medium. For hydroxylation of AD to 9-OH-AD, *Mycobacterium* sp. NRRL B-8119 was used. Analysis of products was done by quantitative thin layer chromatography.

Results: As compared with control, ethanol and DMF exhibits enhanced biotransformation of AD after 144 h incubation time. But in case of hydroxylation, organic solvents are suppressed the production of 9-OH-AD. Vegetable oils in both bioconversion reactions showed nearly 90-95 mol % conversion of products. Sunflower oils exhibited nearly 88 and 92 mol % conversion of AD and 9-OH-AD respectively.

Conclusions: Production of AD and 9-OH-AD could be optimized for industrial production of corticosteroids. Organic solvents and oils may be used as substrate carriers to enhance industrial scale production of kidney failure drugs.

Image: Bioconversion of steroid substrate into different intermediate drugs.

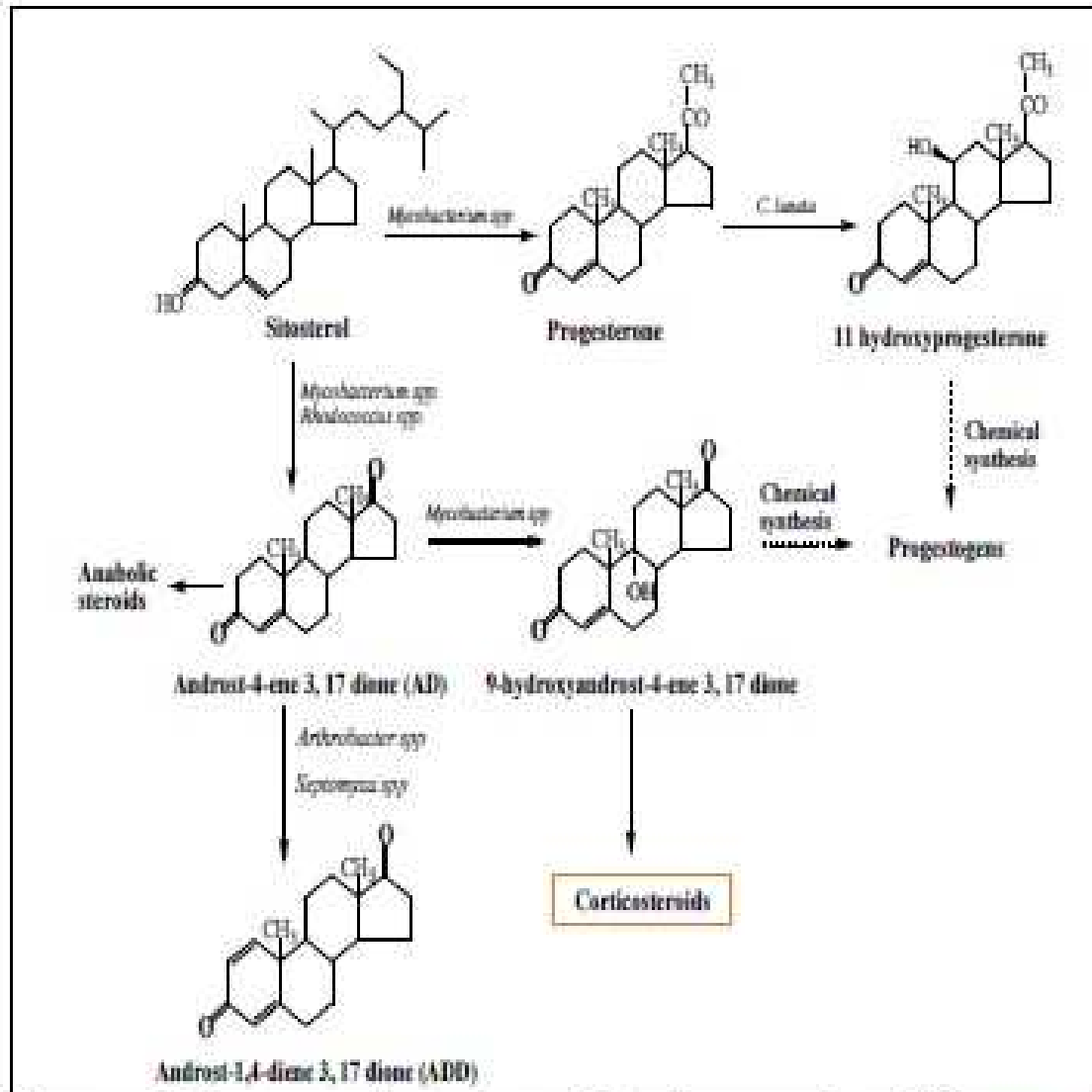


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