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# PRODUCTION OF A SYNTHON FOR OPTICAL ANTIPODS OF *Drosophila mulleri* AND *Mayetiola destructor* PHEROMONES USING *Aspergillus* FUNGUS STRAINS

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The key synthon for synthesizing sex pheromones of *Drosophila mulleri* and *Mayetiola destructor* is ethyl-3*S*-hydroxybutanoate, which is synthesized by reduction of acetoacetic ester by enzymes and various types of microorganisms [1, 2].

We studied the reduction of acetoacetic ester using various micromycete strains of *Aspergillus* to prepare optical antipods of *D. mulleri* and *M. destructor* pheromones.

Mycelium of microscopic fungi is known produce the dehydrogenase enzyme complex, which is involved in redox reactions [3]. We used this property in our experiments.

Soil samples of typical serozems were used to isolate the microorganisms. Fungi were isolated by the known microbiological method with inoculation on solid agar Czapek–Dox medium [4]. The following microorganism species were selected and determined as before [5]: *Aspergillus oryzae* strain Pro-1; *A. niger* strain 50; *A. flavus* strain 48; and *A. flavus* strain 4.

Microorganisms were grown on the following media (g/L): a) Czapek medium (saccharose, 20.0; $NaNO_3$, 2.0; $KH_2PO_4$, 1.0; $MgSO_4 \cdot 7H_2O$, 0.5; KCl, 0.5; $FeSO_4$, 0.01; distilled $H_2O$, 1000 mL); b) starch medium (starch, 20; KCl, 1.0; $MgSO_4$, 0.5; $CaCl_2$, 0.1); c) Anderkofler medium (corn starch, 30; $KNO_3$; $CaCO_3$, 5.0; $KH_2PO_4$, 0.8; KCl, 0.4; $FeSO_4$, $ZnSO_4$, $CuSO_4$, 0.0035).

Acetoacetic ester was biotransformed into ethyl-3*R*-hydroxybutyrate, $[\alpha]_D^{22}$ –39.3 (*c* 0.1, $CHCl_3$).

Acetoacetic ester was processed by the filtered biomass and stirred for 72 h in a thermostat at 35°C. A small amount of culture medium was added to the reaction mixture in order to activate the transformation. Active growth of the microorganisms was observed during the experiments. When the experiment was finished, the reaction mixture was extracted with $Et_2O$. The extract was filtered and dried over $MgSO_4$. Solvent was removed at reduced pressure. The solid was analyzed by GC.

According to the chromatographic analysis, the best result (80%) was obtained with *A. flavus* strain 4 (Table 1).

Table 1. Reduction of Acetoacetic Ester Using *Aspergillus* Fungus Strains

| Fungus strain | Amount, g | | Yield, % | Optical purity of product, % |
|---|---|---|---|---|
| | biomass | substrate | | |
| *Aspergillus niger* – 50 | 34.6 | 0.8 (6.15 mmol) | 30 | 95.5 |
| *Aspergillus oryzae* – Pro-1 | 14.4 | 0.5 (3.84 mmol) | 28 | 95.6 |
| *Aspergillus flavus* – 48 | 33.7 | 0.65 (5.0 mmol) | 64 | 95.8 |
| *Aspergillus flavus* – 48 | 50 | 3.45 (26.5 mmol) | 62 | 95.8 |
| *Aspergillus flavus* – 4 | 18.8 | 0.5 (3.84 mmol) | 80 | 96.0 |

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