EFFECT OF TERPENOIDS, ALDEHYDE, AND ORGANIC ACID ON FILAMENTOUS FUNGAL GROWTH AND ETHANOL PRODUCTION

ABSTRACT

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There is accumulation of fruit and vegetable wastes in the world, and the valorization is not optimal. This waste material can be treated by utilizing it as the substrate for the growth of some microorganisms. Filamentous fungi that can grow in the wide range of substrate is a suitable microorganism for processing fruit and vegetable wastes. However, bioactive compounds, including flavor compounds, could still have an inhibitory effect on filamentous fungal growth. Limonene, Car-3-ene, Myrcene, Hexanal, and Ascorbic acid from three different kinds of flavor compound groups were evaluated for their effect on three strains of filamentous fungi, *i.e. Rhizopus oligosporus, Aspergillus oryzae* and *Neurospora intermedia.* The experiment was carried out by growing the fungi in 100mL of synthetic media with addition of individual flavor compound at a concentration of 0.0002-0.02% at 125rpm for seven days. It was found that 0.02% of ascorbic acid, limonene, myrcene, and hexanal were able to enhance the growth of *Rhizopus oligosporus,* and 0.02% of car-3-ene was able to enhance the growth of *Aspergillus oryzae*. However, 0.02% of limonene inhibited the growth of *Neurospora intermedia*. Accordingly, the production of ethanol as the metabolite was also inhibited.

Keywords : Limonene, Car-3-ene, Myrcene, Hexanal, Ascorbic Acid, biomass, ethanol, fungi, *Rhizopus oligosporus, Aspergillus oryzae, Neurospora intermedia*

PENGARUH TERPENOID, ALDEHID, DAN ASAM ORGANIK TERHADAP PERTUMBUHAN DAN PRODUKSI ETANOL PADA FILAMENTOUS FUNGI

ABSTRAK

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Limbah buah dan sayur sangat melimpah jumlahnya dan pengolahannya belum maksimal. Limbah ini dapat diolah dengan memanfaatkannya sebagai substrat pertumbuhan mikroorganisme. Jamur berfilamen yang dapat tumbuh di berbagai macam jenis substrat merupakan mikroorganisme yang cocok untuk pengolahan limbah buah dan sayur. Namun, senyawa bioaktive, termasuk senyawa flavor yang terdapat pada limbah buah dan sayur memiliki kemampuan untuk menghambat pertumbuhan jamur berfilamen. limonen, car-3-ene, myrcene, hexanal dan asam ascorbat yang berasal dari tiga kelompok jenis senyawa flavor akan diuji pengaruhnya terhadap pertumbuahan tiga strain jamur berfilamen yaitu *Rhizopus oligosporus, Aspergillus oryzae* dan *Neurospora intermedia.* Percobaan ini dilakukan dengan menumbuhkan jamur pada 100mL media sintetik dengan penambahan senyawa flavor dengan konsentrasi 0,0002-0,02% pada kondisi 125rpm selama 7 hari. Dari percobaan ditemukan bahwa 0,02% asam askorbat, limonen, myrcene, dan hexanal mampu meningkatkan pertumbuhan *Rhizopus oligosporus,* 0,02% Car-3-ene mampu meningkatkan pertumbuhan *Aspergillus oryzae*, dan 0,02% Limomene dapat menghambat pertumbuhan *Neurospora intermedia*. Produksi ethanol juga terhambat dengan 0,02% limonene pada *Neurospora intermedia*.

Kata Kunci: Limonene, Car-3-ene, Myrcene, Hexanal, Ascorbic Acid, biomassa, etanol, jamur, *Rhizopus oligosporus, Aspergillus oryzae, Neurospora intermedia*