UNIVERSITAS GADJAH MADA
PENGHAMBATAN PERTUMBUHAN JAMUR DAN SINTESIS OKRATOKSIN A MENGGUNAKAN Lactobacillus plantarum HL-15
SELAMA FERMENTASI BIJI KAKAO (Theobroma cacao Linn.)
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Universitas Gadjah Mada, 2017 | Diunduh dari http://etd.repository.ugm.ac.id/

INTISARI

Fermentasi biji kakao merupakan salah satu proses dalam pembuatan produk kakao. Fermentasi ini melibatkan mikrobia seperti yeast, bakteri asam laktat (BAL) dan bakteri asam asetat (BAA). Keberadaan jamur pada fermentasi biji kakao tidak diinginkan karena dapat menyebabkan kerusakan produk kakao dan berpotensi menghasilkan mikotoksin. Isolat BAL *Lactobacillus plantarum* HL-15 dari fermentasi biji kakao mempunyai kemampuan menghambat pertumbuhan jamur. Tujuan dari penelitian ini adalah mengetahui kemampuan starter cair BAL selama fermentasi biji kakao dalam menghambat pertumbuhan jamur dan sintesis okratoksin A.

Bahan yang digunakan dalam penelitian ini adalah: buah kakao jenis *Lindak* yang dipanen dari Gunung Kidul Yogyakarta, BAL: *Lactobacillus plantarum* HL-15; yeast: *Candida famata* HY-37, BAA: *Acetobacter spp* HA-37 dan jamur *Aspergillus niger* YAC-9 yang mampu memproduksi okratoksin A. Penelitian dilakukan dengan cara fermentasi dalam keranjang bambu berkapasitas 2,5 kg biji kakao segar, dilakukan pada suhu ruang, selama 5 hari. Fermentasi dilakukan dengan 7 variasi perlakuan yaitu: (1) alami atau tanpa penambahan starter; (2) penambahan starter campuran yang terdiri dari yeast, BAL dan BAA; (3) penambahan starter BAL dan jamur; (4) penambahan starter BAA dan jamur; (5) penambahan yeast dan jamur; (6) penambahan jamur; dan (7) penambahan starter campuran yang terdiri yeast, BAL dan BAA dan jamur. Pada akhir fermentasi, dilakukan perendaman selama 1 jam dan pencucian menggunakan air bersih, kemudian dijemur selama 5 hari. Sampling dilakukan setiap 24 jam disertai pembalikan pada biji kakao. Selama fermentasi dan penjemuran dilakukan analisa total populasi yeast, BAL, BAA dan total jamur.

Penambahan starter *Lactobacillus plantarum* HL-15 pada proses fermentasi biji kakao mampu menghambat pertumbuhan *Aspergillus niger* YAC-9 selama fermentasi dan pengeringan. Kadar okratoksin A pada akhir fermentasi (2,55 µg/kg), dan pada akhir pengeringan (2,04 µg/kg). Hasil ini menunjukkan bahwa *Lactobacillus plantarum* HL-15 mampu menghambat pertumbuhan *Aspergillus niger* YAC-9 dan sintesis okratoksin A pada biji kakao selama fermentasi dan pengeringan.

Kata kunci: fermentasi biji kakao, aktivitas anti-jamur, bakteri asam laktat, *Lactobacillus plantarum* HL-15

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ABSTRACT

The fermentation of cocoa beans is one of the processes in the manufacture of cocoa products. This fermentation involves microbes such as yeast, lactic acid bacteria (LAB) and acetic acid bacteria (AAB). The existence of mould in cocoa bean fermentation is undesired because it defects the cocoa product and potentially produces mycotoxin. Recent study has successfully isolated LAB with ability to inhibit the growth of mold from fermented cocoa bean. However, that LAB has not been used as starter for cocoa bean fermentation. The objective of this study are to know the ability of that LAB starter in fermenting cocoa bean to inhibit the growth of mould and synthesis of ochratoxin A.

The materials used in this study are: cocoa fruits harvested from Gunung Kidul Yogyakarta, LAB: *Lactobacillus plantarum* HL-15; Yeast: *Candida famata* HY-37, AAB: *Acetobacter spp* HA-37 and *Aspergillus niger* YAC-9 as ochratoxin A producer. The fermentation was conducted in a bamboo basket with a capacity of 2.5 kg of fresh cocoa beans, for 5 days at room temperature. The Fermentation conditions were designed in 7 treatment variations consisting of: (1) natural or without addition of starter; (2) addition of mixed starter consisting of yeast, LAB and AAB; (3) addition of LAB and mould; (4) addition of AAB and mould; (5) addition of yeast and mould; (6) addition of mould; and (7) the addition of mixed starter consisting of yeast, BAL and BAA and mould. At the end of fermentation, soaking for 1 hour and washing was conducted using clean water, then sun dried for 5 days. Sampling was done every 24 hours with reversal on cocoa beans. During fermentation and drying, the total population of yeast, LAB, AAB and total mould were analyzed.

The addition of *Lactobacillus plantarum* HL-15 starter in the fermentation process of cocoa beans could inhibit the growth of *Aspergillus niger* YAC-9 during fermentation and drying. Levels of ochratoxin A at the end of fermentation (2.55 µg / kg), and at the end of drying (2.04 µg / kg). These results indicate that *Lactobacillus plantarum* HL-15 could inhibit *Aspergillus niger* YAC-9 growth and synthesis of ochratoxin A in cocoa beans during fermentation and drying.

Keywords: Cocoa bean fermentation, anti-fungal growth, lactic acid bacteria, *Lactobacillus plantarum* HL-15