

DINAMIKA KOMUNITAS MIKROORGANISME PADA PROSES FERMENTASI TEMPE KORO PEDANG ASAL GUNUNGGKIDUL, D.I. YOGYAKARTA

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INTISARI

Tempe koro pedang merupakan makanan fermentasi tradisional yang sering dikonsumsi oleh masyarakat Yogyakarta, Indonesia. Fermentasi dalam tempe melibatkan berbagai macam mikroorganisme, seperti kapang, khamir, dan bakteri. Dinamika mikroorganisme yang berkembang didalamnya akan berpengaruh terhadap karakteristik fisikokimia serta profil rasa dari produk akhir. Namun, perubahan mikroba selama proses fermentasi tempe koro pedang masih belum banyak dikaji. Oleh karena itu, penelitian ini menyelidiki perubahan komunitas mikroba selama tiga hari fermentasi dengan pendekatan *metabarcoding* melalui platform *Oxford Nanopore*. Tahapan penelitian ini terdiri atas pengukuran pH dan kadar air, pengamatan permukaan tempe dengan *Scanning Electron Microscopy* (SEM), serta analisis data dari sampel tempe koro pedang asal pengrajin Yogyakarta. Analisis data terdiri atas analisis statistik pH dan kadar air serta analisis kemelimpahan relatif dan visualisasi data sekuensing *metabarcoding* EPI2ME dilakukan menggunakan perangkat lunak Rstudio. Hasil penelitian menunjukkan bahwa komunitas bakteri dan fungi mengalami perubahan komposisi dan proporsi kemelimpahan relatif selama proses fermentasi. Bakteri didominasi oleh genus *Staphylococcus*, sedangkan fungi didominasi oleh genus *Rhizopus*. Di bawah SEM, miselium tempe koro pedang tampak semakin kompleks dan kompak, sementara partikel koro pedang semakin tereduksi seiring berjalannya proses fermentasi. Nilai pH mengalami perubahan signifikan ($p < 0,05$) dengan rentang pH 4,8 hingga 6,48. Sementara kadar air tempe koro pedang relatif stabil (62,65%- 64,74%) dan tidak berbeda nyata selama proses fermentasi ($p > 0,05$). Temuan ini diharapkan memberikan wawasan awal mengenai dinamika mikroba selama fermentasi tempe koro pedang yang dapat digunakan sebagai referensi dalam optimalisasi produksi dan standarisasi produk di masa mendatang.

KATA KUNCI: Dinamika mikroorganisme, karakter fisikokimia, *metabarcoding*, tempe non-kedelai

MICROBIAL COMMUNITY DYNAMICS IN THE FERMENTATION PROCESS OF *TEMPE KORO PEDANG* FROM GUNUNGKIDUL, D.I. YOGYAKARTA

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ABSTRACT

Tempe koro pedang (jack bean tempeh) is a traditional fermented food that is commonly consumed by the people of Yogyakarta, Indonesia. In tempeh fermentation, a variety of microorganism involved in it, including molds, yeasts, and bacteria. The dynamics of the develop microorganisms will affect the physicochemical characteristics and flavor profile of the final product. However, microbial changes during the fermentation process of *tempe koro pedang* have not been widely studied. Therefore, this study investigates changes in the microbial community during three days of fermentation using a metabarcoding approach through Oxford Nanopore platform. The stages of this research include pH and moisture content measurements, surface observation of tempeh using Scanning Electron Microscopy (SEM), and data analysis of *tempe koro pedang* samples from Yogyakarta producers. Data analysis includes statistical analysis of pH and moisture content as well as relative abundance analysis and visualization of EPI2ME metabarcoding results data using Rstudio. The results of the study showed a change in the proportion of relative abundance and composition of bacteria and fungal during the fermentation process. The genus *Staphylococcus* dominated among bacteria, while *Rhizopus* dominated in fungi. Under SEM, the mycelium of *tempe koro pedang* appeared more complex and compact and the koro pedang particles became reduced as the fermentation process progressed. The pH value changed significantly ($p < 0.05$) with a pH range of 4.8 to 6.48. On the other hand, the moisture content remained relatively stable (62.65%–64.74%) and did not differ significantly during the fermentation process ($p > 0.05$). These findings are expected to provide preliminary insights into microbial dynamics during *tempe koro pedang* fermentation, which can be used as a guide for future production optimization and product standardization.

KEYWORDS: Metabarcoding, microbial dynamics, non-soybean tempeh, physicochemical characteristics