

AKTIVITAS ANTIBAKTERI SUSU SARI TEMPE FERMENTASI SINBIOTIK DENGAN FORTIFIKASI ZAT BESI FeSO_4 DAN NaFeEDTA TERHADAP BAKTERI *Escherichia coli* DAN *Staphylococcus aureus*
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INTISARI

Latar Belakang: Prevalensi anemia defisiensi zat besi di Indonesia masih tinggi. Fortifikasi makanan merupakan cara paling efektif dan berkelanjutan untuk menangani anemia. Salah satunya dengan fortifikasi zat besi pada susu sari tempe fermentasi sinbiotik. Tetapi fortifikasi besi memiliki efek negatif karena besi digunakan sebagai nutrisi pertumbuhan terutama bakteri patogen. *Lactobacillus plantarum* Dad13 sebagai probiotik mampu menghasilkan zat yang berpotensi sebagai antibakteri dan FOS sebagai prebiotik dapat digunakan probiotik untuk pertumbuhannya.

Tujuan: Untuk mengetahui pengaruh fortifikasi NaFeEDTA dan FeSO_4 terhadap sifat antibakteri susu sari tempe fermentasi sinbiotik terhadap bakteri *Escherichia coli* dan *Staphylococcus aureus*.

Metode: Susu sari tempe fermentasi sinbiotik dibagi menjadi SF (susu yang difortifikasi FeSO_4 sebanyak 50 ppm), SN (susu yang difortifikasi NaFeEDTA sebanyak 50 ppm), dan susu kontrol (tanpa fortifikasi) yang dibagi menjadi tiga kelompok yaitu SK1 (tanpa sentrifugasi), SK2 (supernatan), dan SK3 (pelet). Karakterisasi sampel susu sari tempe fermentasi sinbiotik yang difortifikasi NaFeEDTA dan FeSO_4 serta tanpa fortifikasi (kontrol) berupa total asam laktat menggunakan metode Total Asam Titrasi dan total fenol menggunakan spektrofotometer UV-Vis dilakukan pada hari 0. Pengujian antibakteri menggunakan metode difusi sumur pada hari 0 dan 14 yang ditunjukkan dengan terbentuknya zona bening di sekitar lubang sumuran yang diukur dengan menggunakan jangka sorong dengan satuan mm.

Hasil: Susu sari tempe fermentasi sinbiotik yang difortifikasi NaFeEDTA dan FeSO_4 serta tanpa fortifikasi (kontrol) mempunyai aktivitas antibakteri yang kuat terhadap bakteri *S.aureus* dan *E.coli*. Aktivitas antibakteri susu sari tempe fermentasi sinbiotik yang difortifikasi NaFeEDTA dan FeSO_4 serta kontrol terhadap bakteri *S.aureus* dan *E.coli* tidak berbeda secara signifikan ($p>0,05$).

Kesimpulan: Fortifikasi NaFeEDTA dan FeSO_4 tidak berpengaruh terhadap sifat antibakteri susu sari tempe fermentasi sinbiotik terhadap bakteri *S.aureus* dan *E.coli* jika dibandingkan dengan kontrol.

Kata Kunci: aktivitas antibakteri, fortifikasi Fe, susu sari tempe fermentasi sinbiotik.

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ANTIBACTERIAL ACTIVITIES OF TEMPEH EXTRACT MILK FROM SYNBIOTIC FERMENTATION UNDER FeSO₄ AND NaFeEDTA IRON FORTIFICATIONS TOWARD *Escherichia coli* AND *Staphylococcus aureus* BACTERIUM

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ABSTRACT

Background: Anemia prevalence of iron deficiency in Indonesia is still high. Food fortifications are the most effective and sustainable ways to deal with anemia. One of them is through iron fortification of tempeh extract milk synbiotic fermentation. However, the iron fortification has a negative effect because iron is used as a growth nutrient especially by pathogenic bacterium. *Lactobacillus plantarum* Dad13 as a probiotic is capable of producing a substance which has a potential as an antibacterial agent and FOS as a prebiotic can be used as a probiotic for its growth.

Objective: To determine the effect of NaFeEDTA and FeSO₄ fortifications toward antibacterial activities of tempeh extract milk from synbiotic fermentation toward *Escherichia coli* and *Staphylococcus aureus*.

Method: Tempeh extract milk from synbiotic fermentation which was divided into SF (the milk which was fortified with 50 ppm FeSO₄), SN (the milk which was fortified with 50 ppm NaFeEDTA), and control milk (without fortification) were separated into three groups: SK1 (without centrifugation), SK2 (supernatant), and SK3 (pellets). Characterization of synbiotic fermented tempeh extract milk samples fortified with NaFeEDTA and FeSO₄ and without fortification (control) in the form of total lactic acid using Total Acid Number titration and total phenolic method using UV-Vis spectrophotometer was conducted on day 0. The experiment of antibacterial activity using well diffusion method on day 0 and 14 which was indicated by the formation of a clear zone around the well hole was measured by using calipers in mm.

Results: Tempeh extract milk from synbiotic fermentation fortified with NaFeEDTA and FeSO₄ and also without fortification (control) had strong antibacterial activities toward *S. aureus* and *E. coli* bacterium. The antibacterial activities of tempeh extract milk from synbiotic fermentation fortified by NaFeEDTA and FeSO₄ and also control of *S. aureus* and *E. coli* bacterium did not differ significantly ($p > 0,05$).

Conclusion: NaFeEDTA and FeSO₄ fortifications did not affect the antibacterial activities of tempeh extract milk from synbiotic fermentation toward *S. aureus* and *E. coli* bacterium if they were compared to controls.

Keyword: antibacterial activities, Fe fortification, tempeh extract milk from synbiotic fermentation

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