INTISARI

PENENTUAN RESOLUSI SPASIAL CITRA MIKRORADIOGRAFI SINAR-X DIGITAL

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Citra merupakan salah satu komponen multimedia yang memegang peranan penting sebagai bentuk informasi visual. Kualitas citra nantinya akan mempengaruhi informasi yang diberikan sebagai diagnostik. Kualitas citra yang baik akan memberikan nilai diagnosa yang baik, karena tidak ada informasi yang hilang pada citra radiograf. Salah satu faktor yang mempengaruhi kualitas citra yaitu resolusi spasial. Penelitian dengan judul "Penentuan Resolusi Spasial Citra Mikroradiografi Sinar-X Digital" memiliki rumusan masalah bagaimana cara mengukur resolusi spasial dan berapa nilai resolusi spasial citra mikroradiografi sinar-X digital. Penentuan nilai resolusi spasial diperoleh dari nilai lebar setengah puncak (*Full Width at Half Maximum*) dari grafik fungsi sebar sisi (*Edge Spread Function*) dan grafik fungsi sebar garis (*Line Spread Function*). Penelitian ini menggunakan *step-wedge* yang terbuat dari bahan akrilik dengan ukuran 24 mm x 24 mm yang terdiri dari delapan langkah, masing-masing langkah memiliki ketebalan 3 mm. *Step-wedge* dieksposi dengan tegangan 30 kVp dan arus 30 mA. Data yang diperoleh berupa file citra digital radiografi format BMP kemudian dianalisa menggunakan *software* ImageJ dan *Microsoft Excel* 2013, sedangkan untuk proses *fitting* dilakukan menggunakan *Software* Matlab R2014b. Hasil perhitungan diperoleh nilai resolusi spasial (fwhm) masing-masing *region of interst* (ROI) ialah $((0,11 \pm 0,07)$ mm, $(0,31 \pm 0,08)$ mm, $(0,58 \pm 0,06)$ mm, $(0,63 \pm 0,08)$ mm, $(0,93 \pm 0,09)$ mm, dan $(1,2 \pm 0,2)$ mm.

Kata-kata kunci: mikroradiografi sinar-X digital, citra digital, resolusi spasial

ABSTRACT

DETERMINATION OF THE SPATIAL RESOLUTION OF X-RAY DIGITAL MICRORADIOGRAPHY IMAGE

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The image is one of the multimedia components that plays an important role as a form of visual information. The image qualitys will provide the information as a diagnostic tool. The good image quality will give a good diagnostic value since there is no lost information on the radiograph image. One of the factors that affect the image quality is the spatial resolution. This research encountered problems regarding measuring method of the spatial resolution and the measured value of spatial resolution of X-Ray Digital Microradiography Image. The determination of spatial resolution value was derived from the value of Full Width at Half Maximum (FWHM) of the Edge Spread Function and the Line Spread Function (LSF) graphics. This research used a step-wedge made of an acrylic-based material with the size of 24 mm x 24 mm that consists of eight steps, each step has a thickness of 3 mm. The step-wedge was exposed to x-ray, generated by 30 kVp voltage and 30 mA current. The image quality of the data was obtained in the form of radiography digital image with BMP format, then, it was analyzed using ImageJ and Microsoft Excel 2013 software, as for the fitting process is done using Matlab 2014b software. The calculation results showed the spatial resolution value (fwhm) of each Region of Interest (ROI) that were (0.11 ± 0.07) mm, (0.31 ± 0.08) mm, (0.58 ± 0.06) mm, (0.63 ± 0.08) mm, (0.93 ± 0.09) mm, and (1.2 ± 0.2) mm.

Keywords: X-ray digital microradiography, digital Images, spatial resolution