

KERUSAKAN KULIT OLEH MIKROBIA GELATINOLITIK PADA PROSES PENYAMAKAN

INTISARI

Novita Kurniawati
19/450348/SPT/00199

Kerusakan yang terjadi pada tahapan penyamakan kulit yang terdiri dari kulit awetan *pickle* cacat, kulit samak *wet blue* cacat, dan kulit samak *upper shoes* cacat sering terjadi dan disebabkan oleh mikrobial. Jenis mikrobial yang merusak adalah kelompok mikrobial gelatinolitik dan kolagenolitik. Penelitian ini bertujuan untuk mengetahui kerusakan kulit pada tahapan penyamakan dan mengidentifikasi mikrobial penyebab kerusakan kulit. Penelitian menggunakan kulit awetan *pickle* cacat, kulit samak *wet blue*, dan kulit samak *upper shoes* dari Balai Besar Standardisasi dan Pelayanan Jasa Industri Kulit, Karet, dan Plastik sebagai sumber mikrobial gelatinolitik dan kolagenolitik. Uji gelatinase menggunakan larutan minimal mineral medium pertumbuhan dan gelatin 2%. Adapun komposisi minimal mineral medium yang dipergunakan adalah K_2HPO_4 0.07%, KH_2PO_4 0.01%, $MgSO_4 \cdot 7H_2O$ 0.02%, dan gelatin 2% sebagai satu-satunya sumber karbon dan nitrogen. Morfologi mikrobial kulit dideteksi menggunakan *scanning electron microscope*. Data yang diperoleh dilakukan analisis diskriptif analitik. Pada penelitian ini menghasilkan data bahwa mikrobial gelatinolitik memiliki nilai pH dengan rentang yang luas dari 5 sampai 9. Nilai uji gelatinase positif pada semua kisaran nilai pH asam, netral, dan basa. Perubahan nilai pH asam tersebut berhubungan dengan pelepasan ion H^+ dari gugus karboksil sedangkan nilai basa dari pelepasan ion NH_3^+ amina dari sample kulit yang terlarut. Nilai netral disumbangkan oleh gugus ion krom yang terlepas. Perubahan nilai pH tersebut terjadi lambat yaitu setiap bulan, pengamatan dilakukan dari 30 hari hingga 120 hari. Hasil pengujian mikrobial pada sampel kulit menggunakan *scanning electron microscope* menghasilkan data morfologi mikrobial gelatinolitik. Morfologi tersebut menunjukkan pada kulit awetan *pickle* cacat banyak ditemukan dominan bakteri sementara hifa kapang jumlahnya sedikit. Hasil kulit samak *wet blue* cacat menunjukkan data dominan kapang dibandingkan kulit yang lain. Hasil penelitian pada permukaan kulit samak *upper shoes* cacat baik bagian atas atau bagian *nerf* ditemukan banyak sekali kapang dan ditemukan bakteri dalam jumlah sedikit. Bagian bawah permukaan kulit samak *upper shoes* cacat ditumbuhi kapang.

Kata kunci: Kulit Awetan Pickle Cacat, Kulit Samak Wet Blue Cacat, Kulit Samak Upper Shoes Cacat, Morfologi Mikrobial, Uji Gelatinase

THE DEFECTS LEATHER CAUSED BY GELATINOLYTIC MICROBES ON TANNED PROCES

ABSTRACT

Novita Kurniawati
19/450348/SPT/00199

Microbes are generally responsible for the occurrence of damage during the tanning process, which includes defects in pickle-preserved leather, wet blue tanned leather, and upper shoes tanned leather. The gelatinolytic and collagenolytic microbial groups are the sorts of bacteria that cause damage. The objective of this study was to assess the extent of leather damage throughout the tanning process and identify the specific microorganisms responsible for such damage. The study utilised defective pickle preserved leather, wet blue tanned leather, and upper shoes tanned leather obtained from the Centre for Standardisation and Services of the Leather, Rubber, and Plastic Industry as a source of gelatinolytic and collagenolytic bacteria. The gelatinase test utilised a diluted solution of mineral growth medium containing 2% gelatin. The mineral medium utilised consisted of K_2HPO_4 at a concentration of 0.07%, KH_2PO_4 at a concentration of 0.01%, $MgSO_4 \cdot 7H_2O$ at a concentration of 0.02%, and 2% gelatin as the only source of carbon and nitrogen. The morphology of skin microbes was observed using a scanning electron microscope. The acquired data were analysed using descriptive and analytical methods. The investigation yielded results indicating that gelatinolytic bacteria exhibited a broad pH range spanning from 5 to 9. The gelatinase test yielded favourable results across all pH ranges, including acidic, neutral, and alkaline. The variation in pH level was associated with the release of H^+ ions from the carboxyl group, whereas the alkaline value was attributed to the release of NH_3^+ amine ions from the dissolved skin sample. The released chrome ion group contributed a neutral value. The pH value experienced a gradual change, namely on a monthly basis, with observations conducted over a period ranging from 30 to 120 days. The scanning electron microscope analysis of skin samples yielded morphological data on gelatinolytic bacteria. The morphological analysis revealed that the skin of the pickle leather defect was primarily colonised by bacteria, with a limited presence of mould hyphae. The analysis of wet blue tanned leather defect revealed a significant prevalence of mould compared to other types of leather. The research findings revealed significant mould growth and a minor presence of germs on the surface of the upper shoes defects, both on the upper and nerf parts. Mould was formed on the lower surface of the upper shoes leather defects.

Keywords: Pickled Leather Defect, Wet Blue Tanned Leather Defect, Upper Shoes Tanned Leather Defect, Microbiological Morphology, Gelatinase Test