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CHAMOIS LEATHER TANNING USING RUBBER SEED OIL

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Abstract

Indonesia is one of the countries having the largest rubber plantations in the world. Besides producing latex, rubber plantations produce also about 1500kg/hectare of rubber seeds, which has not been utilised optimally. Rubber seed oil may be able to be used for chamois leather tanning.

Chamois leather is a popular leather article in the market, as it has unique uses, such as in high quality gasoline filtration and cleaning of optical equipment (spectacles, windows, vehicle, jewellery, silverware, *etc.*). In this research, the use of rubber seed oil for chamois tanning was investigated. The objectives of the research were to discover whether the rubber seed oil could be used as chamois leather tanning agent, and to identify chemical, physical as well as organoleptic properties of the rubber seed oil tanned leather. This study shows that the chemical, physical, and organoleptic properties of rubber seed oil tanned leather were similar to those of fish oil tanned leather. In terms of colour and odour, rubber seed oil tanned leather was better than fish oil tanned leather. The chemical properties of rubber seed tanned leather were a pH of 6.9-7.0 and ash content of 4.9%. Its physical properties were thickness of 0.4-1.0mm, tensile strength of 27.6N/mm^2, elongation at break of 104%, and water absorption of 380% (2 hours). The organoleptic properties of the leather, *i.e.* softness, colour, and odour, were good to excellent. All of those characteristics fulfill the quality requirements for chamois leather. Therefore, rubber seed oil might be suitable to use as a substitute for fish oil in oil tanning for chamois leather production.

Introduction

Indonesia is one of the biggest natural rubber producers in the world. Indonesia has about 3,338,162 hectares of rubber plantation. Besides producing latex, the plantation produces also rubber seed, about 1500 kilograms per hectare per season.

One of the uses of the rubber seed is for rubber seed oil. The oil is a drying oil; it changes into a thick viscous layer, and forms a membrane when it is oxidised or exposed to an open air. The type of oil can be used as a material for making soap, paint, and cosmetics.[1] Moreover, rubber seed oil has potential as a leather tanning agent for chamois leather.

Chamois leather is a well known product. It has specific uses, such as in high quality gasoline filtration, cleaning and drying optical equipment, spectacles, mirror, and vehicles, *etc.*

Nowadays, oil tanned leather is produced using fish oil as its main tannage. Tanning using fish oil faces an odour problem, caused by oxidized fish oil residues attached to the chamois leather. The odour cannot be removed completely from the leather. Reducing the use of fish oil in the chamois tanning would help to reduce the odour.

Rubber seed oil is a vegetable oil which is expected to substitute for fish oil in tanning. The oil will not produce odour and might be able to cross-link with protein in the skin or hide to produce leather.[3-4] The objectives of the research were to discover whether the rubber seed oil could be used as chamois leather tanning agent, and to identify the chemical, physical as well as organoleptic properties of the rubber seed oil tanned leather.

Materials and methods

Materials and equipment

Materials used in the research were pickled sheep skin, rubber seed oil, fish oil (as a control), sodium chloride, Relugan GT (50% glutaraldehyde, BASF), sodium formate, sodium carbonate, and Eusapon S (Wetting/degreasing agent, BASF). The equipment used included an hydraulic press, tanning drum, stacking, paddle, shaving machine, toggle dryer, buffing machine, pH meter, shaker, grinder, burner, tensile strength meter, Kubelka glass apparatus, and Fourier Transform Infra Red Spectrophotometer (FT-IR).

Method

Oil Extraction

The seeds were sun dried for 3 days, 5 hours each day, and then were dried in an oven at 70°C for 1 hour. Oil was extracted by using a hydraulic press at 65°C. The yield of oil was approx. 10% for whole seeds or 20% for endosperm only.

Oil Analyses

Colour, density, iodine value, acid value, free fatty acid content, peroxide value, and saponification value of rubber seed oil and fish oil were measured. The colour of the oils was measured by using a DR 2000 spectrophotometer at wavelength of 455nm. A pycnometer was used to measure the density of the oils. Iodine value was analysed using Wijs method.[5] Acid value was measured using the AOAC method.[6]