PENGAWETAN KULIT MENTAH KAMBING DENGAN ASAP CAIR DARI LIMBAH TEMPURUNG KELAPA

(THE PRESERVATION OF GREEN GOAT SKIN USING LIQUID SMOKE FROM COCONUT SHELL)

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ABSTRACT

The objective of the research on the preservation of green goat skin using liquid smoke was to reduce the environmental contamination caused by usage of the environmentally-unfriendly chemical in skin preservation process. Liquid smoke is the outcome of coconut shell waste containing a lot of phenol and acid compound. It is an organic material that is environment-friendly and it can inhibit the bacteria growth. The research was conducted using 18 pieces of green goat skin. Eighteen pieces of green goat skin were divided into 2 treatments. The first stage treatment used liquid smoke as the preserving material with 0,1%, 0,5% and 1,0% in concentrations without crystal salt and anti-bacteria material. The second stage treatment used liquid smoke with 5%, 10% and 15% in concentrations and used crystal salt without anti-bacteria material. The skins then were stretched and dried in the sun. They were observed for 1 week, 2 weeks and 1 month. The results of the skin preservation then were tested in organoleptic method, including the tests for the shedding of feather and the damage of skin owing to bacteria / louse. The skins also were tested in physical method (tensile strength & elongation at break). The result of research showed that the skins preservation for 1 month using liquid smoke, 10% in concentration, was the most effective. Usage of liquid smoke as the substitute of anti-bacteria / fungicide would reduce a part of the environmental contamination owing to usage of the environment-unfriendly chemical in skin preservation process.

Key words : skin preservation, liquid smoke, environment-friendly

ABSTRAK

Penelitian pengawetan kulit kambing berbulu menggunakan asap cair tujuannya adalah mengurangi pencemaran lingkungan yang disebabkan oleh pemakaian bahan kimia yang tidak ramah lingkungan dalam proses pengawetan kulit. Asap cair merupakan hasil dari limbah tempurung kelapa yang banyak mengandung senyawa asam dan fenol yang dapat menghambat pertumbuhan bakteri dan merupakan bahan organik yang ramah lingkungan. Penelitian dilakukan menggunakan kulit mentah kambing berbulu sebanyak 18 lembar terbagi menjadi 2 perlakuan. Perlakuan tahap pertama menggunakan asap cair sebagai bahan pengawet dengan konsentrasi 0,1%, 0,5% dan 1,0% tanpa menggunakan garam kristal dan bahan anti bakteri. Sedangkan perlakuan tahap kedua menggunakan asap cair dengan konsentrasi 5%, 10% dan 15% dan garam kristal tanpa menggunakan bahan anti bakteri. Kulit tersebut kemudian dipentang dan dijemur di bawah sinar matahari dan diamati selama 1 minggu, 2 minggu dan 1 bulan. Hasil pengawetan kulit kemudian diuji secara organoleptis yaitu meliputi kerontokan bulu dan kerusakan kulit akibat serangan bakteri / kutu. Kulit tersebut juga dilakukan pengujian secara fisis (kekuatan tarik & kemuluran). Hasil penelitian menunjukkan bahwa pengawetan kulit selama 1 bulan menggunakan asap cair konsentrasi 10% adalah yang paling efektif. Dengan menggunakan asap cair sebagai pengganti bahan kimia anti bakteri / jamur maka akan dapat mengurangi sebagian pencemaran lingkungan yang ditimbulkan oleh penggunaan bahan kimia yang tidak ramah lingkungan dalam proses pengawetan kulit.

Kata kunci : pengawetan kulit, asap cair, ramah lingkungan

INTRODUCTION

Hides and skins, in the condition in which they are removed from the carcass, are subjected, particularly in hot climates, to rapid putrefaction, as they are then very liable to attack by many types of bacteria and larva. If hides and skins are left uncured, the combination of water and bacteria will cause putrefaction at a rate dependent upon the temperature.

At a temperature of 10°C (50°F) putrefaction may require 3 or 4 days. Under tropical condition, say 38°C, skins begin to smell within 12 hours, if kept damp, as putrefaction is speeded by combination of moisture and warmth. (Aten et al, 1977).

Hides and skins are putrescible proteinaceous materials. In order to arrest immediate autolysis attack when they are removed from animal carcass, various

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methods of preservation need to be applied (Higham, 1994). The objective of raw skin preservation is to avoid / prevent the leather not to be spoiled because of being infected by bacterial, so it stands on the surrounding condition. Preservation treatments utilize various methods for introducing preservative agent into hides or skins. Preservative application is generally based on contacting the surface of the hide or skin with an aqueous solution of antiseptic. Hide and skin preservation studies have shown that storage duration is dependent upon antiseptic concentration, contact time and storage temperature. The temperature dependence of storage, both in green and in treated raw stock, closely follows the general trend of build-up in bacterial numbers with temperature increase (Russel, 1998). The most economic method in such instances is air drying. This can be applied for sheep and goat skins and light bovine hides. Drying is done preferably in the shade and by stretching the hide out on frames. Usually the results in material of poor quality and low value (Higham, 1994).

Hides and skins that are intended for export require treatment with pesticides to prevent fly infestation, moth larva damage and beetle attack. In addition, other biocide, bactericides or fungicides, might be required (Mitchel, 1987, Higham, 1994). Derivates of chlorinated aromatic hydrocarbons persist in wastes and are toxic to the environment. Pentachlorophenol, DDT, benzene hex chloride, dihedron, arsenic and mercury based biocides are either banned or severely restricted and listed in International Register of Potentially Toxic Chemicals (IRPTC).

Salt is the most widely used preserving chemical. It can be scarce and expensive commodity in some developing countries. The dehydration caused by salt inhibits the growth of bacteria. The bacteria that cause the red discoloration known as "red heat" will cause hides damage. The disadvantages in using alternative chemical means of preservation are that they are relatively short-term and more expensive than salting. Some chemicals are toxic and create a dangerous environment. (Higham, 1994). Decreasing the amount of salt used to preserve hides by adding some environmentally acceptable antiseptics (such as boric compound, acetic acid and sodium sulphite) or commercial based mainly on ethildithiocarbonate and isothiazolin. Processing hide with lower amounts of the salt combined within an acceptable antiseptic can reduce the load by on half (Buljan, 1995).

Processing hides and skins and converting them into leathers has long been an important industrial activity. The negative environmental impact of the processing has been regarded as an

inevitable consequence of that activity. The technical methods for reducing the negative environmental impact of hide processing fall into to broad groups. The first group involves the introduction of processing technologies usually term low – waste or cleaner technologies (Environmental Commission of IULTCS) that can be regarded as advanced technologies in comparison to conventional methods. Mainly aimed at decreasing the effluent pollution load, they avoid the used of harmful chemicals and produce solid waste which can be used as by products. The second group encompasses the treatment of waste water and the environment – friendly handling and processing of solid waste (Environment Commission of IULTCS). The methods applied in both groups should be used to prevent leather production impacting negatively on environment (Covington, 1989., Ludvik, 2000).

The success of leather tanning an industry is every reliant to the leather raw material, both quality and quantity. The quality of raw hide and skins is very influenced by damage available on raw material both biologically (bacterial, fungus) and mechanically (the scratch of knife and holes that occurred by the time of skinning animal. The raw materials (hide and skins), usually collected first by the leather collectors with administering preservation in order that the leather is not spoiled during the collection in store house before transported to the leather tanning industry.

In this research, green goat skin preservation will use liquid smoke that is hoped that it can substitute chemical agent that is not familiar with environment, so from the outcome of this preservation will not produce waste that is very hazardous for human and environment (Untari, S et al, 2003). The liquid smoke which is used as preservation agent is obtained from the waste of coconut shell which is processed by pyrolysis at temperature of 400°C and accompanied by the condensation process as cooling (Jogjakarta Coconut Centre Team, 2006).

Coconut shell that is cleaned from its fibers, and then its size is reduced to make pyrolysis process. That process produces substance in three forms namely solid, gas, and liquid. The liquid composition in this pyrolysis is liquid smokes. Liquid smokes from coconut shell waste contain acid compound and phenol as well as shows high anti bacterium activity (Tranggono et al, 1997).

The result of research could hopefully decrease the environment pollution resulted from the administration of chemical agents which is not familiar with environment in the process of green goat skin preservation and uses coconut shell waste which has not been exploited optimally.

MATERIAL AND RESEARCH METHOD

Material

This research used 18 pieces of green goat skin. The agent of skin preservation used is liquid smoke from coconut shell and crystal salt.

Method

1. Research carried out is divided into 2 stages of research each using 9 pieces of green goat skin in every stage. The first phase of preservation process using liquid smoke that is dissolved in 1 liter of water with a concentration of 0.1%, 0.5%, and 1.0% without using crystal salt and anti-bacterial ingredients. The second phase of preservation process using liquid smoke concentration of 5%, 10% and 15% without using anti-bacterial ingredients.
2. Skins soaked in liquid smoke solution for 10 minutes and then sprinkled with salt crystals on the surface of the flesh sides for the second phase of treatment.
3. Skins are stretched and then dried in the sun.
4. Dry skins are stored and then observed for 1 week, 2 weeks and 1 month.
5. After the skins were observed for 1 month, they were subjected to test.
6. Tests conducted on organoleptic and physical (tensile strength and elongation at break).

Equipment

Experimental Tanning Drum, wooden drying frame, wooden rack

RESULTS AND DISCUSSION

1. **Organoleptic observation of green goat skins are preserved with the liquid smoke concentration of 0.1%; 0.5%; 1% without using crystal salt and anti bacterium substance.**

To determine the quality of green goat

skins, after preserving with liquid smoke, organoleptic observation is done consisting of fur/feather falling and damage of skins at the flesh sides.

Organoleptic of observation showed that the use of liquid smoke to the concentration of 0.1% to 1% per liter of water for the preservation of green goat skins without adding the salt and anti-bacterium substance showed that the liquid smoke has not been able to function as anti-bacterium. This indicated by the number of lice / worms on the skins either on the flesh side and the fur that causes the fur of skins easily removed and destroyed a lot of loss due to bacterium or larva. Preservation without using salt was producing delicate skins in less than 1 week. Salt causes dehydration of the skins, which will inhibit the growth of bacteria (Higham, 1994). The effectiveness of the used of liquid smoke with a concentration of 0.1% to 1% turn out to be ineffective in preserving materials (Higham, 1994., Tranggono, 1997). Because of the possibility that the preserved raw skins wide enough and broad, so not worth the amount of liquid smoke is used (Untari et al, 2003., Tranggono et al, 1997), thus leading to a skins protein microbial destroyer that served as the fastener fur, so feathers consequently easily removed and fall (Higham, 1994., Untari et al, 2003., Tranggono et al, 1997). After preserved for 1 week, the observation was discontinued because the skins had been damaged.

The organoleptic observations of green goat skins that preserved using liquid smoke concentration of 0.1% to 1% without using salt and other chemical preservatives can be seen in the following figures (figure 1 to figure 6).

Figure 1.

The result of organoleptic test on raw skin preserved for 1 week by using liquid smoke with 0,1% concentration

Figure 2.

The result of organoleptic test on raw skin (flesh side) preserved for 1 week by using liquid smoke with 0,1% concentration

Figure 3.

The result of organoleptic test on raw skin preserved for 1 week by using liquid smoke with 0,5% concentration

Figure 4.

The result of organoleptic test on raw skin (flesh side) preserved for 1 week by using liquid smoke with 0,5% concentration

Figure 5.

The result of organoleptic test on raw skin preserved for 1 week by using liquid smoke with 1,0% concentration

Figure 6.

The result of organoleptic test on raw skin preserved for 1 week by using liquid smoke with 1,0% concentration

2. Organoleptic observation of green goat skins preserved with the liquid smoke concentration of 5%; 10%; 15% and added salt crystal.

Organoleptic observations can be seen in the following table:

Table : The result of organoleptic observation

Concentration of liquid smoke	Organoleptic Observation		
	1 week	2 weeks	1 month
5 %	<ul style="list-style-type: none"> • The fur falls a bit off in the side of stomach edge and neck • The fur is easily taken off in the side of thin stomach and little side of tail • There is a little lice in the flash sides and the thin skin 	<ul style="list-style-type: none"> • The fur in the thin leather is easy to fall and easy to take off • Few lice are found both in the flash sides and in the fur 	<ul style="list-style-type: none"> • Almost in all sides, the fur is easy to take off and fall • Several lice are also found in the side of skin both in the flash side and fur
10 %	<ul style="list-style-type: none"> • The fur is not fall • The fur is hard to take off • No lice in the flash side and fur at the skin 	<ul style="list-style-type: none"> • The fur is not fall • The fur is hard to take off • No lice in the flash side and fur at the skin 	<ul style="list-style-type: none"> • The fur is not fall • The fur is hard to take off • No lice in the flash sides and fur at the skin
15 %	<ul style="list-style-type: none"> • The fur is not fall • The fur is hard to take off • No lice in the flash side and fur at the skin 	<ul style="list-style-type: none"> • The fur is not fall • The fur is hard to take off • No lice in the flash side and fur at the skin 	<ul style="list-style-type: none"> • The fur is not fall • The fur is hard to take off • No lice in the flash side and fur at the skin

From the observations in the table above, the most effective preservation treatment of green goat skins using liquid smoke with concentration of 10%. Observations are even up to > 1 month of the skin is still in good condition. Preservation by using liquid smoke with 15% concentration can also be used for preservation of green skin, but is less efficient because it produces the green skin with the same conditions

when using liquid smoke with 10% concentration.

Raw hide or skin preservation success is strongly influenced by preservation method used, the number and types of preservatives, as well as temperature and humidity of storage space (Higham, 1994., Mitchel, 1987., Russel, 1998). The liquid smoke from coconut shell contains acid compound, phenols and carbonyl compounds which are

functional as anti bacterium activity in the preservation of materials (JCC, 2006., Tranggono et al, 1997). The greater of the liquid smoke concentration is used to produce the preserved material (green skin) stored resistance (JCC, 2006). Environmentally friendly chemicals (liquid smoke) which is used as a preservative of green skin will

reduce the environmental pollution (Bulyan, 1995., Covington et al, 1989., Ludvik, 2000).

The observations of green goat skins preserved with the liquid smoke with concentration of 5% s / d 15% and salt, can be seen in the figure below (figure 7 – figure 9). The results of green goat skin preservation are shown the figure 7 – figure 9.

Figure 7.

The result of organoleptic test on raw skin preserved for 1 month by using liquid smoke with 5 % concentration

Figure 8.

The result of organoleptic test on raw skin preserved for 1 month by using liquid smoke with 10 % concentration

Figure 9.

The result of organoleptic test on raw skin preserved for 1 month by using liquid smoke with 15 % concentration

3. Physical tests (tensile strength test and elongation at break test) of green goat skin with liquid smoke concentration of 5% - 15% and added with crystal salt.

Physical test results can be seen in the following figure:

Figure 10 – 11. The results of tensile strength test and elongation at break test with the preservation of liquid smoke concentration of 5% - 15% and the crystal salt

Figure10. The result of tensile strength test

Figure 11. The result of elongation at break test

If seen from the figure above it can be concluded as follows:

- The highest tensile strength test shown in the preservation of liquid smoke with the concentration of 15% is an average of 555.89 kg/cm2 and the lowest resulting in preservation of liquid smoke with concentration of 5% is an average of 469.88 kg/cm2. Based in these data, it is suggested that the higher concentration of liquid smoke used, the higher of tensile strength

of the skins will be. This is because the liquid smoke has anti-septic properties so more liquid smoke used in curing the skin will produce a resistant skin stored (JCC, 2006., Tranggono et al, 1997). Liquid smoke also inhibits microorganism growth because of the liquid smoke producing liquid acid compounds, phenols and carbonyl compounds which are functional in the preservation of materials (Tranggono et al, 1997).

- b. The highest elongation at break test shown in the preservation by using liquid smoke with 5% concentration is an average 15.6% while the lowest resulting by using liquid smoke with 15% concentration is an average 14.4%. This condition is caused by the smaller concentration of liquid smoke giving the lead to microorganism resistance to decrease, the result can be easily damaged the structure of the skin. The elongation at break skin condition is influenced by the structure of the skin so that when the structure of the skin damaged, the elongation at break will be greater (Aten et al, 1977., Covington et al, 1989).

CONCLUSION

1. Liquid smoke produced from the pyrolysis of coconut shell containing acid compounds, phenols and carbonyl can serve as a barrier to growth microorganism in the preservation of materials.
2. Liquid smoke from coconut shell waste materials can be used to process skin preservation.
3. The use of liquid smoke for the preservation of green goat skin is the most effective use of liquid smoke with a concentration of 10% / liter of water
4. Preservation of green goat skin by using liquid smoke with concentration of 10% and added salt, for 1 month the skin condition is still good.
5. Liquid smoke can replace chemicals as anti-bacteria.
6. By using liquid smoke instead of anti-bacteria chemicals / mold, it will be able to reduce some environmental pollution caused by the use of chemicals that are not environmentally friendly in the process of skin preservation.

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