

**POLLUTION PREVENTION TO PROVIDE LEATHER PRODUCTS SUSCEPTIBLE  
TO UTILIZATION OF ENVIRONMENTAL LABEL PROGRAM**

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**POMS 19th Annual Conference**

**La Jolla, California, U.S.A.**

**May 9 to May 12, 2008**

**Abstract:** With the insertion of the environmental variable in international business, negotiations have a new competitiveness factor, because the organizations regulating international business are trying, through the environmental label, to minimize the impacts resulting from productive activities. Brazil, an important leather exporter, has in its production process breeding and fattening activities, and the cattle-raising sector has been implanting new pastures, due to the beef international demand. In addition, inadequate herd handling, waste and atmospheric emissions during the process increase the impact in the environment. In this context, the objective of this article is to present through an exploratory research an environmental management system, based on pollution prevention, with an environmentally friendly production process, making it possible to manufacture products susceptible to utilization of the environmental label program, bringing competitive advantages to the national leather production sector.

**Keywords:** Environmental label, Pollution prevention (P2), Leather

## 1. INTRODUCTION

After the ratification of the Sustainable Development concept at the Earth Summit in Rio de Janeiro in 1992, some economy sectors began to see it as a lever for new business opportunities, making it a strategic reference for the socio-environmental development of companies (BARRA et al, 2007a). To accomplish this objective, it is necessary to leave some of the practices whose only aim is to comply with regulations, such as the so-called end-of-pipe measures, adopting an efficient methodology reducing the natural resources demand without increasing costs from other processes, called pollution prevention (P2).

Brazil is the 5<sup>th</sup> bovine leather manufacturer in the world, having exported until October 2007 US\$ 1.82 billion, expecting to close the year at US\$ 2.2 billion, 22% more than in 2006, US\$

1.87 billion (COUROMODA, 2007). The national leather industry has near 450 factories, of which 80% are considered small businesses, in the south and southeast of the country, tending to move to the mid-west due to the location of the herds, freezers, cheaper labor, local fiscal incentives and looser environmental control (CÂMARA; GONÇALVES FILHO, 2007; PACHECO, 2005).

Leather production implies in raising, breeding, and fattening activities, and new pastures have been invading the regions of the Amazon, Cerrado and Pantanal in Mato Grosso state, pushed by international demand. Inadequate herd management, liquid waste with large quantities of DBO and DQO, tanned and no tanned solid waste as well as gas emissions are responsible for great impact in the environment during the whole leather manufacture process. It is therefore clear that the sector does not show concern for the environment.

In this context, this study aims to present, through an exploratory research, an environmental management system based on pollution prevention and a less aggressive production process, manufacturing products susceptible to the environmental label program, adding competitive advantages to the national leather sector.

## **2. ENVIRONMENTAL MANAGEMENT SYSTEM**

Environmental degradation issues, starting in the 18<sup>th</sup> century with the Industrial Revolution, are one of the most important challenges for companies this century, leading them to incorporate the environmental issue in their strategic schedule, thus starting the development of the Environmental Management Systems - SGA (BARRA et al, 2007b; SILVA, 2003).

An SGA, according to ABNT ISO 14000 (2004), is a set of proceedings and systemic measures concerning continuous improvement and pollution prevention, compliance with the

environmental legislation and requirements of the target markets, staff awareness and training, communication to all parties involved, critical evaluation of the environmental performance and adoption of corrective measures.

According to Dias (2006), the companies have showed different attitudes regarding the implementation of the environmental issue: a reactive attitude and a proactive one. The reactive environmental management takes corrective measures only to comply with the legislation, that is, tries to eliminate or reduce the existent impact, with end-of-pipe technologies.

The proactive environmental management sees the environmental theme as a strategic factor for the company, directly relating it to the decision making by preventive measures over possible environmental damages. It acts preventively to avoid such impacts. Pollution prevention - P2 and the environmental label program are examples of proactive management. The main difference between the two postures lies in the competitiveness, since while one tries to decrease degradation only at the end of the productive process, the other prevents it in its course, improving its efficiency and competitiveness.

According to Shen (1995 apud MARINHO, 2001), P2 is a continuous improvement process, meaning impact reduction at its source, including practices that cut down or eliminate pollution generation through more efficient use of natural resources. Among its advantages, are risk and cost reduction, company image improvement and benefits to the environment and public health.

Gianneti et al (2003) affirms that the application of this concept targets mainly the reduction of waste and the development of products more environmentally friendly in their life cycle. Therefore, P2 requires attitude changes, responsible environmental management and creation of national environmental policies. It contributes to the optimization of industrial processes in an environmental point of view, resulting in a more efficient use of energy and raw-material.

Some P2 practices have been adopted by factories all over the world (FARENZENA, 2007; PACHECO, 2005; LEÃO; VIEIRA, 1997), such as baths recycling, recovering or replacement of chemical products, shorter baths, water reuse, cleaning and tidying of the work place, effluent treatment with use of the solid waste. Some of these practices are listed as requirements for the concession of the ecological label.

Environmental labels, also called green stamps, environmental stamps and ecological labels, are one of the alternatives the manufactures use to advertise their environmentally friendly practices (BIAZIN, 2002; BIAZIN; GODOY, 2000).

There are today more than 26 type I<sup>1</sup> environmental labeling programs in the world, with more than 23 thousand certified products (COLTRO, 2007). Their objectives are to increase environmental awareness in the consumers, guiding them in their choice for environmentally friendly products and to encourage the development of products and processes that consider environmental, economical and quality aspects (CORRÊA, 1998). However, only five of these programs have defined criteria for the leather-shoe category<sup>2</sup>.

### **3. LEATHER PRODUCTIVE PROCESS**

Leather is produced in business unit called a tanning factory. According to Figueiredo and Figueiredo (2005), tanning is considered an agro-industrial activity, following environmental management guidance regarding local, state and national laws.

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<sup>1</sup> Type I environmental labels are volunteer; they compare similar products and are given to those that are environmentally preferable considering their total lifecycle. They are based on multiple criteria and certified by third-party program entities (COLTRO, 2007; PREUSSLER, 2007).

<sup>2</sup> Nordic Swan Label, Korea Eco-Label, Ecomark Scheme of India, European Ecolabel/The Flower and Stichting Milieukeur.

The 450 or so Brazilian tanning factories use cattle skin as raw material for its highly economical use and for having the world's largest commercial herd. Brazil is the 5<sup>th</sup> bovine leather manufacturer in the world, after the United States, Russia, India and Argentina, having exported until October 2007 US\$ 1.82 billion, expecting to close the year at US\$ 2.2 billion, 22% more than in 2006, US\$ 1.87 billion (COUROMODA, 2007; CÂMARA; GONÇALVES FILHO, 2007).

These factories, according to Pacheco (2005) are classified as integrated tanning, wet blue tanning, semi-finished tanning and finishing tanning. The integrated tanning does all the operations, that is, receives the raw or salted hide and processes it until the finished leather. The wet blue tanning processes the hide until the chrome tanning or resting/drying, after the tanning. The semi-finished tanning uses the wet blue leather and processes it into semi-finished or crust. The finishing tanning processes the crust in finished leather. The factories that process the wet blue into finished leather can be included in this category.

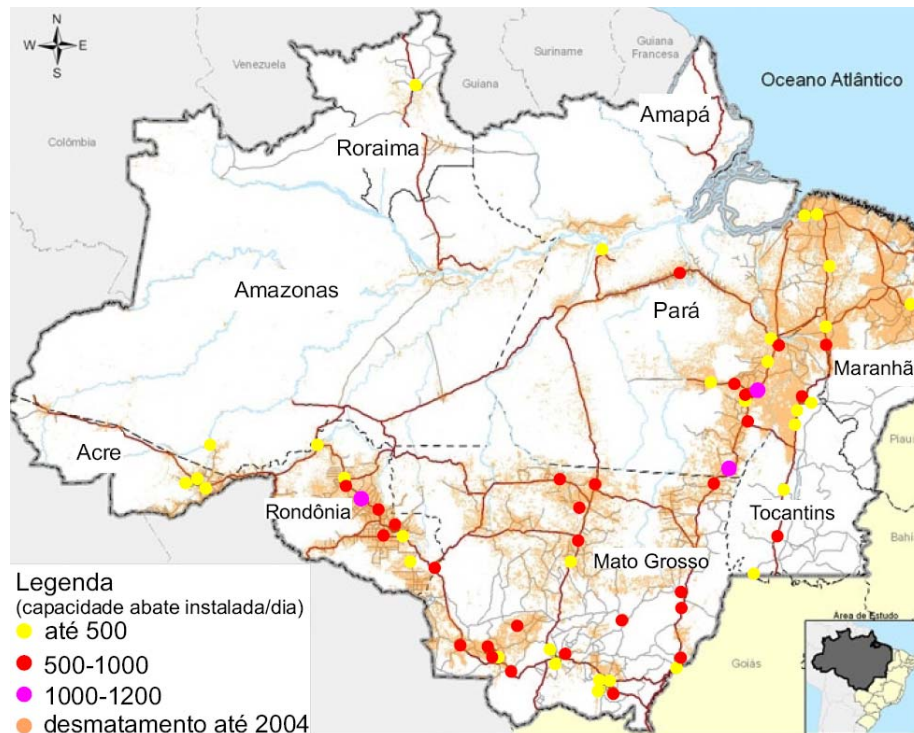
The most important phase of the leather production process, called tanning, transforms the hide, an unstable and putrescible material into a stable, durable material, the leather. However, not only during the tanning phase, but during the whole leather life cycle, starting in the cattle-raising activity, important environmental impacts are created.

## **4. ENVIRONMENTAL IMPACTS RELATED TO THE LEATHER LIFE-CYCLE**

### **4.1. EXPANSION OF AGRICULTURAL LAND FOR PASTURES**

The unsustainable expansion of cattle-raising in Brazil is directly related to productivity indicators improvement and to the introduction of the Amazon in the sector, for its low land

prices when compared to other regions, cheap labor and appropriate climate and soil, making highly profitable business (RIBEIRO et al, 2005) (Picture 1). In addition, the valuation of the commodities and the offer of wood for the pig iron steel industry make those areas even more attractive, thus intensifying the deforestation process and bringing economical, social and environmental problems.



Picture 01: Chillers in the Legal Amazon, 2005.

Source: adapted from IMAZON, 2008.

According to Salomon and Angelo (2008), Deter (Real Time Deforestation and Detection) system, from Inpe (National Institute of Space Research), registered the deforestation of 3.235 km<sup>2</sup> of the Amazon Forest, concentrated in the northeast of Mato Grosso – soy production region, and southeast of Pará – cattle-raising region, in the last five months of 2007. According to

Ribeiro et al (2005), cattle-raising is responsible for 80% of deforestation in the Legal Amazon region, and the burnings put the country in the list of the biggest CO<sub>2</sub> emitters in the world.

Riparian forests, that work as natural filters, deterring agricultural chemicals, pollutant material and sediments that would be otherwise washed to the water courses, thus affecting the quality and quantity of water, risking animal and vegetable species, as well as people, have been destroyed. They are considered by cattle raisers as preferential areas for the construction of roads, ditches and obstacles for the access of the cattle to the water. Furthermore, lack of monitoring and public policies, low technological standards and inadequate management of these large areas with high concentration rates cause pasture degradation, resulting in the search for new areas for the activity (RIBEIRO et al, 2005) (Picture 02)



Picture 02: Deforestation in the Amazon region

Source: [www.greenpeace.org.br](http://www.greenpeace.org.br)

#### **4.2. LACK OF ADEQUATE CARE IN BOVINE MANAGEMENT**

According to Gomes (2001), 85% of Brazilian leather has defects, bringing annual loss of about US\$ 500 million. These defects occur especially because of inefficient cattle management,

as 70% are generated in the producers' domain, 60% still in the rural properties, due to parasites such as ticks, maggots and horn-flies, that contribute to 40% of the damage. Iron marks in the noble leather region correspond to 10%, other 10% are caused by barbed wire, dog bites and thorns and the last 10% by inappropriate transport. Therefore, the quality and better use of the leather, with a consequent lower environmental impact, start with cares during herd confinement and transport.

#### **4.2. PROCESSING SKIN INTO LEATHER**

In an integrated tanning factory, these are the process stages: conservation and storage of the hides, soaking, curing and finishing, which can be divided into wet finishing, pre-finishing and final finishing. Every one of these stages causes environmental impacts. To process 1000 kg of salted skin, 30 thousand liters of water are used, generating only between 200 and 250 kg of leather (FARENZENA, 2007; PACHECO, 2005).

The conservation and storage stages aim to avoid autolysis and decomposition of microorganisms, using chemicals such as salts, insecticides and biocides, generating liquid and gas effluents (LEÃO; VIEIRA, 1997; PACHECO, 2005).

The soaking operations hydrate, clean and remove hair from the skin for curing; they include mechanical operations to remove flesh and divide the skin into flower and scudding (AQUIM et al, 2004). In this stage water and chemical products are used, such as chalk and sodium sulphite, considered highly pollutant, generating solid and liquid waste (CÂMARA; GONÇALVES FILHO, 2007; PACHECO 2005).

The curing operation transforming the skin into leather causes the largest environmental impact, using in the process chrome, for its easy access and processing and excellent properties given to the leather (FUCK et al, 2007). During the curing, liquid and solid waste are generated,

both rich in chrome. The biggest problem related to the use of chrome is its possible oxidation, that is, the transforming  $\text{Cr}^{+3}$  into highly carcinogenic  $\text{Cr}^{+6}$ . This substance, according to Ravacci (2007), can penetrate through the cell membrane very easily and be a very strong anti-oxidant agent, able even to interact with genetic cell material.

However, according to Gallon and Giacomolli (2006), chrome oxidation is not considered a common event, needing specific conditions. Fuck et all (2007) presents, in Table 1, some factors that can cause Cr (III) oxidation, other that can catalyze it in favorable conditions, other inert and some with the power to inhibit it.

Table 1: Substances that cause oxidation of  $\text{Cr}^{+3}$

Factors that cause oxidation	Factors that catalyze oxidation	Inert factors	Factors that inhibit oxidation
<ul style="list-style-type: none"> <li>• Sulphate fish oils or substances presenting double links;</li> <li>• Use of oxidating substances</li> </ul>	<ul style="list-style-type: none"> <li>• High pH;</li> <li>• Low humidity during leather storage;</li> <li>• Excessive drying</li> </ul>	<ul style="list-style-type: none"> <li>• Polymers;</li> <li>• Synthetic tannins;</li> <li>• Synthetic waxes;</li> </ul>	<ul style="list-style-type: none"> <li>• Vegetable tannin use;</li> <li>• Reducing agents;</li> <li>• High relative humidity of storage leather;</li> <li>• Low pH;</li> <li>• Anti-oxidants.</li> </ul>

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Source: adapted from Fuck et all (2007).

## 5. FINAL CONSIDERATIONS

Labeled products have as final objective to inform the consumers on the manufacturer's productive practices for, when buying, they can make the best decision and thus help to popularize the environmentally sustainable consumption.

This type of product, however, like food produced without the use of toxic chemicals, are more expensive, since they transfer to the final consumer the costs of belonging to the labeling program. Unlike the tendency in some developed countries, in Brazil the preference for products without any environmental commitment is common, especially because of the low purchase power and lack of awareness in the population.

Therefore, lack of responsible consume, inherent to citizens conscious of their social and individual role towards mankind, end up to motivate the public despise regarding Amazon issues, such as: illegal possession of land, illegal timber extraction, bio-piracy, slave labor, burning, among others.

Although the Brazilian labeling program is not yet concluded, many tanning factories, most of them exporters, have adopted some P2 practices. However, it is necessary to include ethical issues, herd origin and traceability, fiscal incentives to minimize the costs transferred to the final consumer, educating campaigns to improve awareness regarding the importance of labeled products, forming a society concerned with individual and collective well-being.

Thus, the leather sector can give these consumers goods with the fantastic characteristic of providing well-being to the 'be' society, for the simple fact that they are used, differently than in the 'have' society, where this well-being is reached through the private property of these goods.

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