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ETHANOL QUALITY REGULATION

Antonio Bonomi

INTRODUCTION

Historically, a new configuration of the sugarcane agro industrial system, that supports the most important biofuel – fuel ethanol, started in Brazil with the deregulation of the sector, the commercial globalization of the Brazilian economy and the perspective of increasing international demand for ethanol.

The deregulation process of the sugar-alcohol industry during the 1990s was due to the Brazilian State withdrawing control caused by the stagnation of the sector at that moment. Nevertheless, the state departure was only partial, because of its importance in the dynamics of the sector.

In order to maintain the leading position in the production and commercialization of biofuels, it was very important for the Brazilian biofuel sector to have official support. Law n. 11 097 of January 13, 2005 formally introduced biofuels in the Brazilian Energy Matrix and the Brazilian Petroleum, Natural Gas and Biofuels Agency – ANP was responsible for the regulation of the sector.

In this context, there is a regulatory and methodological framework that maintains the Brazilian leading position in the biofuel area.

In this chapter, the fundamental aspects required to guarantee the ethanol quality will be presented in detail – essential for internal market consumption and to facilitate its commercialization in the international market. In addition, different fuel ethanol specifications that exist today in the world, strategies and mechanisms to be implemented in a bioenergy policy, to ensure the quality of the biofuels, will also be evaluated. The requirement for the harmonization of the Brazilian fuel ethanol specification with that of other countries will be discussed. This is because ethanol will be commercialized in a highly competitive and globalised market, in which quality and price are the major differentials. Besides discussing ethanol specification, the present chapter presents major aspects related to the quality and control and suggests mechanisms, that can be implemented by the State of São Paulo.

THE REGULATORY FRAMEWORK

The regulatory framework that exists today in Brazil provides support to the production and commercialization of ethanol, seen as a global commodity. Three federal entities are the basis for this regulatory framework:

- ANP – Brazilian Petroleum, Natural Gas and Biofuels Agency, set up by Decree n. 2 455, of January 14, 1998. It is the regulatory organism for activities related to oil, natural gas and biofuels industries in Brazil (ANP, 2008a); and responsible for the definitions and specifications of biofuels (ethanol in this case) and for quality control, in all the stages of the production and commercialization chain.
- INMETRO – Brazil's National Institute of Metrology, Standardization and Industrial Quality, created by Law n. 5 966 of December 11, 1973. It is responsible for metrology field, formulation, coordination and super-

vision of the national metrology, standardization and industrial quality policy (DIAS, 1998). INMETRO is therefore, responsible for the metrology standards of the country and is the leading Brazilian technical organism in ensuring that biofuels meet the metrological requirements in Brazil, European Unit and United States of America tripartite task force (WHITE PAPER..., 2007).

- ABNT – Brazilian Association for Technical Norms, founded in 1940, is the organism responsible for the technical standardization in the country. It supplies the required basis for the Brazilian technological development (ABNT, 2008a) – and is therefore responsible for up to date technical norms tuned to effective national specifications and regulations.

The supply of biofuels (as well as other fuels) is considered of public interest and deserves some state intervention which in the case of the fuel ethanol including production, commercialization, distribution, sale and quality control. It is the responsibility of the State of São Paulo, the country leader of ethanol production, to give technical support and to create institutional conditions for the three federal regulatory entities to operate in a coordinated and effective way.

FUEL ETHANOL SPECIFICATION

The fuel specification is defined through a set of characteristics required for a good performance of the engine, evaluated through internationally standardized agreed methods. ANP, as well as all the international organisms responsible for fuel specifications, do not regulate the chemical composition of the fuels, but establish, through Resolutions and Technical Regulations, specifications that define the minimum quality requirements for the proposed utilization. The proposals of the fuels specifications elaborated by specialized technicians are consolidated by the regulatory organism based on discussions, looking for a consensus among the agents responsible for the production and use of the fuels and the environmental organisms responsible for emissions control, trying always to satisfy the consumer's requirements. Such specifications are periodically revised to meet the new engine technologies, the environmental requirements and, finally, the supply of products to society.

As an example of the continuous improvement of the specifications, a revision of the Brazilian ethanol specification (ANP Decree n. 2/2002) was performed in December 2005, regulating the addition of dye to anhydrous ethanol – ANP Resolution n. 36/2005 (ANP, 2005), that started to be commercialized with an orange color, without interfering in the physicochemical characteristics of the product. The addition of dye was best alternative to solve the problem of addition of water to anhydrous ethanol (used only in the mixture with gasoline) commercialized as hydrated ethanol.

The specification of a product, besides insuring its quality, is also a reference standard for the consumer market. For ethanol, the international market points to a growing demand, stimulated by public policies through the use of renewable energies that will lead to a reduction of CO_2 net emissions.

Brazil and the United States of America (USA) are discussing ways to increase ethanol utilization in the world. The idea is to transform ethanol in a world commodity such as petroleum, corn or and coffee. The US is planning to increase internal ethanol consumption by more than six fold in the next few years for environmental and social reasons, and is looking for greater cooperation with Brazil in this area.

Presently, there are important differences between Brazilian and international specifications for biofuels, in general, and for fuel ethanol, in particular. For international trade of these fuels their harmonization is essential.

In 2007, a Tripartite Task Force was created, comprising specialists from the European Union, Brazil and the USA, aiming at harmonizing ethanol and biodiesel specifications. On the Brazilian side, the group of specialists is coordinated by Itamaraty (Brazilian Ministry of External Affairs), with the participation of ANP, Petrobras, INMETRO, ABNT and UNICA (WHITE PAPER..., 2007).

Table 1 compares the ethanol specifications (characteristics and limitations) adopted in Brazil – ANP Resolution n. 36/2005 (ANP, 2005), The European Union – prEN 15376/2007 (CEN, 2007) and USA – D4806-07a (ASTM, 2008).

Table 2 (WHITE PAPER..., 2007) classifies the differences found in fuel ethanol specifications in 3 categories: (A) similar characteristics, (B) characteristics with significant differences and (C) characteristics with fundamental differences.

The three current specifications are very similar, mainly because all of them were derived from a unique specification (the Brazilian one). Differences reflect different markets, climate conditions in each country and region, and variations in raw materials used for production. A significant difference among the three sets of standards is water content, which is set at different levels, primarily due to the varying ethanol concentrations allowed in gasoline mixture and also to gasoline distribution differences (WHITE PAPER..., 2007).

TABLE 1 Brazilian, European and North American specifications for fuel anhydrous ethanol.

Property	ANP n. 36/2005 (ANP, 2005)	prEN 15376/2007 (CEN, 2007)	ASTM D 4806 – 07a (ASTM, 2008)
Appearance	Clear & no impurities	Clear & bright	Clear & bright
Color	Colorless[a]	–	–
Acidity[b] – max	30 mg/l	0.007% m	56 mg/l
Electrical Conductivity – max	500 S/m	–	–
Residue by Evaporation – max	–	10 mg/100 ml	–
Density at 20 ºC – max	791.5 kg/m^3	–	–
Ethanol content – min.	99.3 ºINPM[c]	98.7%m	92.1%v
Ethanol content – min.[d]	99.6%v	–	–
C3-C5 sat. alcohols – max.	–	2%m	–
Methanol content – max	–	1%m	0.5%v
Hydrocarbons content – max	3%v	–	–
Denaturant – min-max	–	–	1.96% a 5%v
Water content – max	–	0.3%m	1%v
Copper content – max	0.07 mg/kg	0.1 mg/kg	0.1 mg/kg
Sulfur content – max	–	10 mg/kg	30 ppm
Sulfate content – max	–	–	4 ppm
Phosphorus content – max	–	0.5% mg/kg	–
Inorganic Chloride content – max	–	20 mg/l	32 mg/l
Washed Gum content – max	–	–	5 mg/100 ml
pHe	–	–	6.5 a 9

[a] Colorless before dye addition; a 15 mg/l dye content should be added, giving the product an orange color.
[b] Defined as acetic acid.
[c] ºINPM = %m.
[d] Limit only applies to ethanol not produced by fermentation from sugarcane or ethanol contaminated by other types of alcohol.

Source: ANP, 2005; CEN, 2007; ASTM, 2007.

TABLE 2 Classification of the differences of the various bioethanol specifications.

Category (A)	Category (B)	Category (C)
Appearance	Ethanol content	Water content
Color	Acidity	
Density	Phosphorus content	
Sulfate content	pHe	
Súlfur content	Gum/Evaporation residue	
Copper content		
Iron content		
Sodium content		

Source: WHITE PAPER..., 2007.

For bioethanol, the Task Force concluded that there is no technical specification characteristic that constitutes a barrier to trade given the current situation. However, it is recognized that additional drying and testing will be required by Brazil and USA exporters willing to supply the EU market. The impact and costs associated with these additional processes have not been evaluated by the Task Force (WHITE PAPER..., 2007). It is also important to know the composition of the anhydrous ethanol before denaturation in different countries, in order to establish the quality limits, considering the different raw-materials (sugarcane, corn, sugar beet and others) and the processes employed in production.

TECHNICAL NORMS FOR FUEL ETHANOL

The technical norms are documents produced by nationally and internationally recognized organizations that establish guidelines and restrictions for the execution of an activity, service or product. In general, technical norms are required for the standardization or to make uniform the procedures and actions of the different interested parties. In Brazil, the official organization in charge of technical norms for emission is the ABNT. Each country has one or more entities equivalent to ABNT and these entities discuss and harmonize related matters through the International Organization for Standardization – ISO. ABNT was given the responsibility to the secretary of the ISO's Normalization Committee for the biofuels (WHITE PAPER..., 2007).

The national ethanol normalization is currently make up from 18 Brazilian norms for the characteristics of ethanol and water mixtures, 6 for the distribution logistics, 3 for the characteristics of superior alcohols; 2 for the characteristics of ethanol for industrial use, 9 for the use in engines and 2 for the production of fuel ethanol. Table 3 presents a complete list of the Brazilian ethanol norms currently in use. In the context, besides the national norms, the US norms produced by the American Society for Testing Materials – ASTM are also largely used (ANP, 2005; ABNT, 2008b).

The application of technical norms is strongly connected to the technology and regulatory framework. For this reason, it is necessary to update regularly in order to make them compatible with the present technological changes of the country. Therefore, the organizations responsible for normalization set up technical committees with the objective to keep up with technical changes specifications and regulations. An example is PROCONVE – the national program for the control of the air pollution by automotive industry, coordinated by Ibama/MMA (Ministry of Environment), that requires a continuous update of the norms for measuring the sulfur content in gasoline and diesel oil.

In relation to ethanol norms, there is an ABNT commission, named ABNT/CEET-00:001.61 – A Temporary Special Commission on Fuel Ethanol, that revises old norms as well as develops new ones (ABNT, 2008c).

CERTIFIED REFERENCE MATERIALS FOR FUEL ETHANOL

There is a strong need to guarantee and control the quality of the chemical analysis, reducing costs, avoidance of analysis duplication, use of Certified Reference Materials – CRMs. The CRMs are specific materials produced in a certain amount

TABLE 3 Brazilian ethanol norms in use.

Code	Title	Publication	Reference
NBR10260	Ethyl alcohol – Determination of acetal, acetaldehyde, ethyl acetate, acetone, methyl alcohol, superior alcohols and benzene contents by gas chromatography	01.04.1988	**Quality**
NBR10266	Alcohols – Determination of the brome number	01.04.1988	**Quality**
NBR10422	Ethyl alcohol – Determination of the sodium concentration – Method of flame photometry	30.04.2007	**Quality**
NBR10425	Alcohols (establish characteristics required for alcohol reception)	01.08.1988	Distribution Logistics
NBR10429	Superior alcohols – Determination of total alcohol content	30.08.1988	Superior Alcohols
NBR10430	Superior alcohols – Color stability assay with sulfuric acid	01.08.1988	Superior Alcohols
NBR10517	Corrosion inhibitor additive for fuel hydrated ethyl alcohol – Efficiency evaluation as a function of the storage period	01.10.1988	Distribution Logistics
NBR10547	Ethyl alcohol – Determination of the electrical conductivity	11.12.2006	**Quality**
NBR10649	Ethyl alcohol – Determination of benzene by ultraviolet spectrophotometry	30.04.1989	**Quality**
NBR10891	Hydrated ethyl alcohol – Determination of the pH – Potentiometric method	11.12.2006	**Quality**
NBR10892	Hydrated ethyl alcohol for the alcohol chemistry industry	01.01.1990	Industrial Use
NBR10894	Ethyl alcohol – Determination of chloride and sulfate concentration – Ions chromatography method	27.08.2007	**Quality**
NBR10896	Anhydrous ethyl alcohol for the alcohol chemistry industry	01.01.1990	Industrial Use
NBR11331	Ethyl alcohol – Determination of iron and cupper concentration – Atomic absorption spectrophotometry method	27.08.2007	**Quality**
NBR11481	Light road automobile vehicles – Measurement of evaporative emissions	01.11.2002	Engines Use
NBR11483	Alcohols – Determination of the relative density	01.06.1990	Quality
NBR12026	Light road automobile vehicles – Determination of emissions of aldehydes and acetone in the exhaust gas by liquid chromatography – DNPH method	30.03.2002	Engines Use
NBR12781	Wagon tank – Degasification	01.02.1993	Distribution Logistics
NBR12782	Wagon tank – Tank cleaning	01.01.1993	Distribution Logistics
NBR13992	Automotive gasoline – Determination of the fuel anhydrous ethyl alcohol content	01.10.1997	**Quality**
NBR13993	Fuel ethyl alcohol – Determination of the gasoline content	01.02.2002	**Quality**
NBR14052	Sugarcane spirit – Determination of superior alcohols	01.04.1998	Superior Alcohols
NBR14525	Fuels – Determination of gum by evaporation	24.07.2006	Engines Use
NBR14752	Auto motor road vehicles – Fuel electric pump – Maintenance assays	01.10.2001	Engines Use

continues

Code	Title	Publication	Reference
NBR14753	Auto motor road vehicles – Injection valve – Maintenance assays	01.10.2001	Engines Use
NBR15531	Ethyl alcohol – Determination of water content – Karl Fischer volumetric method	08.10.2007	**Quality**
NBR15559	Ethyl alcohol – Determination of non-volatile material content by evaporation	28.01.2008	**Quality**
NBR5824	Acetone, ethyl and methyl alcohols – Determination of permanganate reduction time – Barbet Method	01.07.1986	**Quality**
NBR5991	Plastic packages for alcohol – Requirements and assay methods	30.07.1997	Distribution Logistics
NBR5992	Determination of density and alcohol content of ethyl alcohol and its mixtures with water	01.03.1980	**Quality**
NBR7485	Color use for piping identification in sugar plants and refineries and alcohol distilleries	02.10.1994	Alcohol Production
NBR7820	Safety on installations for production, storage, handling and transport of ethanol (ethyl alcohol)	01.04.1983	Alcohol Production/ Distribution Logistic
NBR8644	Fuel ethyl alcohol – Determination of evaporation residue	17.03.2008	**Quality**
NBR8645	Corrosion inhibitor additives for fuel hydrated ethyl alcohol – Efficiency evaluation in carburetors without coating	30.10.1984	Engines Use
NBR8689	Light road automobile vehicles – Fuels for test – Requirements	30.04.2006	Engines Use
NBR9184	Gasoline and alcohol filter – Determination of characteristics	01.12.1985	Engines Use
NBR9297	Alternative internal combustion engines for vehicles using fuel hydrated ethyl alcohol – Verification of calibration requirements	01.03.1986	Engines Use
NBR9866	Ethyl alcohol – Determination of acidity	11.12.2006	**Quality**
NBR9868	Ethyl alcohol – Determination of formaldehyde content	30.05.1987	**Quality**

Source: ABNT, 2008b.

and certified afterwards. They are prepared with the highest metrological quality and focus on three major functions:

- to help develop better analytical methods (reference methods);
- to calibrate measuring systems used to improve the commerce of goods, to establish a quality control and to determine performance characteristics or properties measurement;
- to insure the adequacy and integrity of the quality control programs in long-term measurements.

Despite the fact that Brazil has been, for a long time, one of the largest world producers of ethanol and that the federal government has adopted many actions to implement a biodiesel production program, there are only 4 CRMs available in Brazil. They are for bioethanol (water content, density, pH and ethanol content for anhydrous and hydrated fuel ethanol) and none for biodiesel (INMETRO, 2008).

QUALITY CONTROL OF FUEL ETHANOL

Nowadays, in order to guarantee the quality of fuels commercialized in the State of São Paulo, there are monitoring and sample inspection programs, promoted by ANP and the São Paulo Finance

Secretariat, as well as some verifications/controls performed by the Public Ministry and the Public Safety Commission – generally based on complaints.

Since 1999 the ANP, through agreements established with research institutes and universities, has evaluated the quality of the fuels commercialized in Brazil, including the State of São Paulo, mapping the and directing the enforcement actions of the agency.

The quality of ethanol (anhydrous and hydrated) produced in the country is presently directly controlled by ANP through Quality Certificates provided by the producers.

Through these monitoring and enforcing actions, a reduction was observed (Figure 1) in the non-conformity index of the fuels commercialized all over Brazil (ANP, 2008b).

Since 2004, the Finance Secretariat of the State of São Paulo, together with ANP, is controlling the quality of gasoline and hydrated ethanol commercialized in the state, as well as the fiscal situation of the gas (petrol) stations in several urban areas. This action has improved the gasoline station enforcement in the State of São Paulo.

In order to inhibit fuel adulteration and also to guarantee their quality, besides the monitoring and enforcing programs, there is a Fuel Tracing Program. ANP's Regulation n. 274/2001 establishes the requirement of adding a tracer to solvents and petroleum derivatives selected by the Agency, as well as the prohibition of the presence of the tracer in gasoline.

EXISTENT BARRIERS TO BIOFUELS COMMERCE

Although Brazil is the world largest exporter of ethanol, markets suffer from large bottlenecks. Despite the fact that the US and the EU Community have established ambitious targets for ethanol use, the alignment of the Brazilian specification with the ones practiced in these countries is extremely important.

Worldwide, the technical specifications of fuel ethanol are not centralized in any international normalizing organization, with each country adopting a different specification. Thus, the requirements vary depending on the importing country; in the Brazilian case the ANP is the national organism responsible for setting the specifications of the ethanol produced and commercialized internally.

Nowadays, the Brazilian norms not always present experimental methods similar or equivalent to the tests defined by the majority of the international countries that, in the future, can represent large commercial partners, importing Brazilian biofuels.

Many of the available ethanol norms have been effective for more than 5 years and some of them have been used for 20 years as mentioned (Table 3), violating ABNT's own recommendation. This situation, alone, increases the probability of having its validity questioned by buyers.

On the other hand, some of the Brazilian norms recently updated define quite simple and

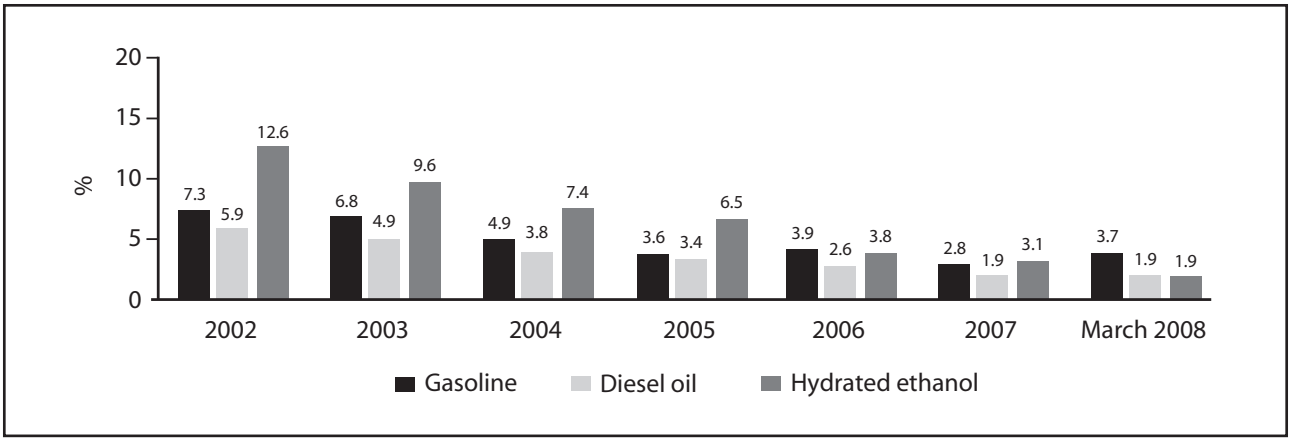

FIGURE 1 Non-conformity index of fuels in Brazil.

low cost methods. This, from one side, facilitates the operation of laboratories in the production units, as they do not require additional investment, but, on the other side, they do not consider more sophisticated methodologies indicated in several international specifications, reducing its acceptance by the importers.

It is true that one of the major bottleneck to be overcome related to the technical norms is the reduced availability of specialists working in the technical committees. This fact is due to several reasons, such as the reduced dissemination of the normalization culture among the administration of the enterprises, the traditional overload of professionals in their activities, the cost represented by an effective participation and, sometimes, the lack of appropriate technical committees.

As already mentioned, these technical barriers to the commerce of biofuels, in general, and specially of fuel ethanol are been analyzed and discussed by an international Working Group, that is trying to eliminate them (WHITE PAPER..., 2007).

In the context of the international market, countries are aware against the creation of technical barriers based on biased regulations that hamper free commerce. The World Commerce Organization – WCO keeps a notification panel of cases of technical barriers sent by the international community, aiming at a fair handling of the disputes (PERINA; MACHADO; MIRANDA, 2003).

Besides the technical barriers on the biofuels quality, there are several other barriers that can be created. Presently, it is clear that there is a tendency to create new barriers related to aspects of biofuels production, associated to the requirement of demonstration of good labor relations in the production units and lack of environment damage. These aspects will be fundamental to make business in biofuels international trade viable. The problem related to these requirements is the fact that a position has not been negotiated at WCO. Brazil has tried, through its regulation organisms, biofuels producers associations and researchers working in the area, to demonstrate the sustainability of the fuel ethanol production from sugarcane (GOLDEMBERG; COELHO; GUARDABASSI, 2008).

In the case of ethanol, Brazil can be notified regarding the production process, due to the burning operation used in sugarcane harvesting, besides problems with labor relations. Since these are aspects not regulated by WCO, Brazil should give special attention to solve them, mainly because biofuels commerce is associated to environment preservation.

Recently, the new attack of the international community against biofuels has focused the following claim: “biofuels are using land that should be used to produce food”. In Brazil, food production increased 6.8% in the last harvesting season in spite of the ethanol production growth. Still this year, the Federal Government informs, that the sugarcane zoning will be complited. This document will tell where it is possible to plant sugarcane and where should be avoided and even forbidden (SELO..., 2008).

CONTRIBUTIONS TO POLICIES PROPOSITION

Specification and normalization of biofuels

In this quality context, the major demand is the requirement of technical support of the existing Working Groups including the regulatory organizations (ANP, INMETRO, ABNT), producers, automakers, research institutes and universities. These groups aim at specifying the quality required by the biofuels in order to meet the national and international demands, looking for harmonization with the different world specifications. In spite the fact that specification regulation is an ANP assignment, the State of São Paulo can contribute to the process as an inductor, reinforced by the position of the largest ethanol producer and consumer.

The evolution of the sector normalization has not started naturally with this focus, but the present context makes it more critical that the national norms include, without prejudice of the methods traditionally employed, the modern methods, which are used in the developed countries that are potential importers of biofuels.

As a general conclusion, the requirement will be to stimulate and support an effort to elaborate Brazilian norms with analytical methods compa-

rable with their equivalents reported in the international specifications. It is obvious that there will be questions related to the cost of implementing these new methodologies, since some of the old Brazilian norms include low cost methods, that did not require high investments by the producers, mainly in training and instrumentation operation.

A policy of the state of São Paulo should foresee, in a first stage, the support for the instrumentation update of the laboratories of the Research Institutes that support the producers and, in a second stage, a policy of incentives to the laboratories of the producers that envision exporting the biofuels. A way to support this industrial sector in updating their infrastructure would be by opening special lines of credit in State Banks.

Another favorable action in this context would be the promotion of a Training Program, including updating courses and conferences, for Brazilian personnel responsible for the tests and analysis of the biofuels, covering up to date normalization, if possible with the participation of members of the international normalization committees and specialists of the major biofuels testing centers.

The certified reference materials for the biofuels could be prepared from the moment that the specifications and the norms are consolidated, that some national primary standards are available and that the required specific specialized knowledge is defined and available in the academic and technical sector. The Government of the State of São Paulo would be responsible to create incentives for the utilization of the certified reference materials by the biofuels producers, including their use as an evaluation item for receiving a state quality certificate.

Quality control

It seems important to increase the investment in the present working model (fuels quality monitoring, aiming at directing the enforcement actions), since it has produced positive results, improving even the quality of the new biofuels.

The Government of the State of São Paulo should establish a policy to create and keep up to date reference laboratories, for monitoring and controlling the quality of the fuels commercialized in the State, being responsible for the logistic aspects.

An additional aspect of the biofuels quality control policy is the incentive to strengthen a national production chain in the State of São Paulo of the required instrumentation for the analysis of biofuels, decreasing the dependence of the traditional foreign producers, as well as creating new labor posts.

Considering the aspect of using tracers to control the quality of biofuels, it is strategic that the Government of the State of São Paulo supports the development of new tracers that will allow the monitoring laboratories to identify possible frauds practiced in the production and distribution of the biofuels. Still in this area, the Government of the State of São Paulo should, through organisms that deal with legal matters, discuss with ANP a technical alternative to answer the legal questioning of the impossibility of a complete defense of those accused of fraud, due to the secrecy involved in the use of tracers.

Quality certificate

The creation of a state quality certificate for the sector or the active participation of the state in a national certification scheme, being constructed by Inmetro (INMETRO, 2008b) would be important policies to indicate the quality of the biofuels produced in the State of São Paulo. The introduction of a quality certificate implies not only the adoption of standards for the product, but also the implementation of a tracking procedure in order to make the control of the production links that are to be certified viable. In this way, in the case that some portion of the product does not meet the required specifications for commercialization, it would be easy to identify and analyze the source of the problem and work it out in order to minimize its effects.

The tracking of the chain can be total or partial, considering the economic cost of a tracking system compared with the benefits. Nevertheless, in the case of compulsory tracking, the scope of the process covered is defined by the quality standards that should be reached (MACHADO, 2000).

The Social Environmental Certification of the Sugar-alcohol Sector, designed by Imaflora, Embrapa – Meio Ambiente and Fase (FERRAZ; PRADA; PAIXÃO, 2000), establishes several standards for evaluating and monitoring for the certificate grant:

- Conformity with the international legislation and pacts and treaties.
- Right and responsibility of property and use of land.
- Fair relationship with the workers.
- Relationship with the community.
- Planning, monitoring and evaluation of the agro industrial activity, considering technical, economic, social and environmental aspects.
- Ecosystems conservation and biodiversity protection.
- Soil and hydro sources conservation.
- Control of the use of agro-chemicals.
- Management and utilization of residues and other chemical substances.
- Interaction with the landscape.
- Promotion of the optimization of the use of multiple sources and products of the agricultural production system, in order to guarantee the economic sustainability of the activity.
- Accomplishment of the pertinent legislation and promotion of the natural sources conservation and workers and community security in the industrial processing of the sugarcane.

In the case of the biofuels, the challenge, after the definition of the scope of the certificate, i.e., on which process it will focus (only final quality, or production process, workers conditions, environment respect, among others), is to coordinate the different agents, making the process homogeneous and the data available.

Actually, even with the benefits of a quality certificate scheme, reducing the risks in the commercialization of the products, a resistance towards its adoption can be observed, both from the entrepreneur sector and the technical teams. In order to minimize this resistance, it is essential to disseminate the largest amount possible of information regarding the implementation procedure and the benefits and risks in case it is not adopted completely. In the case of the technical team, the adoption of a training program is essential as a way to support and motivate the implementation of quality certificates schemes.

The implementation of a quality system, although costly, will bring large benefits to the sector and its cost can be minimized if the benefits to be achieved are clear and there is a strong coordination and cooperation among the agents involved.

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