Development of a web-based application for quality supervision of products marketed by Tecnoazúcar

Dulce María Pérez Martínez

Unidad Empresarial de Base Tecnoazúcar, Villa Clara, Cuba; dulcemaria.perez@tavc.azcuba.cu

Abstract This study arises from the absence of a web-based tool to contain all useful and necessary information for the monitoring of the quality of and regulatory information for products marketed by Tecnoazúcar. The web application was designed in consultation with all appropriate units within the AZCUBA structure. It considered what information each unit required and how they interrelate with each other. This ensured that a useful database was developed to meet the needs of the company. This website is a tool that provides all the information Tecnoazúcar needs to manage its business, whether that is production, marketing or services, to meet agreed requirements and established quality standards. This novel tool will ensure that the company does not incur unnecessary costs and expenses that affect the marketing of its products.

Key words Normative assessment, database, web site, quality requirements

INTRODUCTION

The key to the profitable operation of any company is knowledge of the needs of its customers and the level of their satisfaction in the product or service offered. Hence, the supervision of product quality is vital, as it is no secret that the competitiveness of an enterprise and customer satisfaction are determined by the product quality and service quality (Gómez 2013).

The company Tecnoazúcar is the marketer of sugar and derivatives of the Cuban sugar industry and is the interface between producers and end customers. It takes responsibility within the AZCUBA group to ensure the quality of the entire range of products marketed both in the domestic market and for export.

Poor quality not only results in dissatisfied customers but also higher costs and losses for the company, as well as resultant claims and complaints (de Cornella 2011). Sustained improvement of service and product quality requires that regulatory information is available, that the producer applies any applicable standards, and that the standards are only guides to quality, not carte blanche for inefficiencies. Rules need to be understood, used correctly at the correct time, and used as a contribution to technical debate in making important decisions.

The main international standards which are listed for both industrial plants and derivatives as food plants are those that relate:

- Standards for quality requirements;
- Standards for health requirements;
- Codes of practice and guidelines;
- Standards for test methods;
- Other Related Standards (Management Guidelines, Principles).

A web application would seem ideal for storing information that is updated regularly and for traceability of products and of complaints and their resolution. The aim of this work was to develop and implement a website that is easily accessible and available to all entities of AZCUBA whether production, marketing or service to ensure the establishment and supervision of the quality of the products marketed by Tecnoazúcar.

MATERIALS AND METHODS

The Artisteer 3 software was used for the design template for the development of the webpage. Other functions were added manually to the Notepad ++ 5.8.2 software through five main folders where that a user can access depending on the purpose of their search or information to be processed.
Tecnoazúcar produces and markets a wide range of products such as raw sugar, refined sugar, organic sugar, molasses, molasses, rum, spirits and canned meat products derived from agricultural products. A database was developed to integrate all the standards for the products Tecnoazúcar markets and that are used in sugar factories and their derivatives as well as plants of agricultural foods that supply the sugar sector. These covered all international and Cuban standards in force, using the subscriber service offered by the National Bureau of Standards (NC) which is the National Standards Body of the Republic of Cuba that represents the country in international and regional standardization organizations.

The work commenced in December 2011 and has been refined and updated to the current date (2016), with support from the information provided by an online search for Cuban standards, supplemented with monthly information bulletins from the national office that inform of changes and new corrections from each of the 56 Technical Committees for Standardization (CTN) in the country.

Of the 4375 Cuban standards, 549 were food standards applicable to Tecnoazúcar operations, comprising:

- Standards for quality requirements (133) (24%);
- Codes of practice, guidelines and standards for health requirements (63) (11%);
- Standards for test methods (284) (52%);
- Sensory evaluation standards (25) (4.5%);
- Sampling (11) (2%);
- Terms and definitions, vocabulary (11) (2%);
- Other (management guidelines, principles, pesticides and plant quarantine) (22) (4%);
- Mandatory standards (50) (9%).

Sugar products and sugar derivatives contributed to 130 standards, of which 129 are international standards, representing 23.4% of the ongoing food standards. Plant foods contributed to 142 standards, of which 131 are international standards, representing 24% of the ongoing food standards. All these rules were recorded in the database of the web application, as well as standards used in factories, as well as a set of rules that were not of a specific activity, but their knowledge and application impinged significantly on the results of support and production activities.

RESULTS AND DISCUSSION

Design

The web application is structured in line with organizational structure created by AZCUBA, and covers all the interrelating production, marketing and service units. Figure 1 shows the Home Page.

![Fig. 1. Main page.](image)

The application ensures that information of interest to all these units is correct and is stored and recorded in database folders. Multiple users can access the information at the same time, and look for information including regulatory, legislative, internal control information, general knowledge, all depending on the interest and needs of the user. This provides considerable saving of time and resources to the organization and allows updating technical information throughout the AZCUBA system, generating faster technical decisions or allowing immediate response to any breach of
requirements agreed with the customer. Information is recorded in each of the folders, documents are in digital format, and users can share access to them and print them.

The Home Page allows access to all folders, depending on the interest and the information that is needed, as well as showing the activity running at that time. To access each of the main folders the user can scroll through the top bar of the home page, or folders are equally accessible by the left vertical part of the main page. Each of the main folders is discussed below.

General folder: Provides access to mandatory international standards and Cuban standards from 2012 until the present.

Factories folder: This folder allows access to the various industrial and derivatives and/or foods according to user needs.

Industrial Plants: This section allows access to all standards existing and specifications and assay analyses.

Food: This section allows access to all the standards used in all meat and preserves factories, including quality requirements, standard codes of practice, guidelines, standards, health requirements, test methods, sensory evaluation and sampling and others that are used in meat plants of other companies.

Watch folder: This section is updated monthly and in accordance with information given by Normoteca, the Center for Management and Quality Development (CBDC).

In the folder Surveillance are registered and identified all international and Cuban standards that have been edited and published from 2012, when the database was created, to the current time. These are archived giving the user access to all rules issued, allowing future reference and use in evidence to support any technical decision that was made in the period in which the rule was in force.

The Information folder provides access to multiple portfolios, classified according to the information stored in each.

As the application is updated monthly, depending on the changes that are published in newsletters of NConline the official website (www.nconline.cubaindustria.cu) for Cuban standards, this allows users to new, repealed and replacement rules. These are listed in the folder Watch that forces the user to find the most current information, or they can search the Information folder that stores the updated bulletins, and corroborate the information that the user is requesting, if there are registered rules repealed or outdated. The application allows the user to view the changes before use, giving one of the most innovative aspects of the application.

To enable the producer to prepare and certify compliance for the finished product, this tool provides all the necessary elements, including traceability of the product, and records all the mandatory rules, such as rules of transportation, storage, handling, packing, packaging, sanitary requirements. This is of importance in any claim for a breach of any of the requirements.

**Impact**

Since the implementation of this tool, 10 products have been registered, each supported by those standards that govern them.

For sugars and molasses, 66 rules were recorded:

- 23 rules for white sugar:
  - Standards for quality requirements 1;
  - Codes of practice standards, guidelines and standards for health requirements 11;
  - Standards for test methods 7;
  - Other (Management guidelines, principles) 4.
- 26 rules for raw sugar:
  - Standards for quality requirements 1;
  - Codes of practice standards, guidelines and standards of health requirements 15;
  - Standards for test methods 5;
  - Other (Management guidelines, principles) 5.
- 17 rules for molasses:
  - Rules for quality requirements 3;
• Codes of practice standards, guidelines and standards of health requirements 4;
• Standards for test methods 6;
• Other (Management guidelines, principles) 4.

For factory derivatives, 46 standards were recorded.

For glucose and syrup, 23 rules were recorded:
• Standards for quality requirements 1;
• Codes of practice standards, guidelines and standards of health requirements 11;
• Standards for test methods 7;
• Other (Management guidelines, principles) 4.

For rum and distilled spirits, 18 standards were recorded:
• Standards for quality requirements 3;
• Codes of practice standards, guidelines and standards of health requirements. 2;
• Standards for test methods 11;
• Other (Management guidelines, principles) 3.

In food production, 13 products were recorded:
• 37 recorded rules for meat products:
  • Standards for specifications 20;
  • Standards for sausages 1;
  • Standards for test methods 11;
  • Mandatory rules 5.
• 94 recorded rules for canned products:
  • Standards for specifications 70;
  • Standards for test methods 22;
  • Mandatory rules 2.

Results from the database of the Web application allowed:
• Establishment of an organized system of folders and access to all rules regarding quality requirements of products marketed by Tecnoazúcar.
• Seamless integration and a single language regarding quality among all parties - from the producers, to storage, to transport and though to customer service.
• In the sugar mills and derivatives, evaluation off product conformity and uniformity covered by regulations.
• A surveillance system for tracking and monitoring the quality of the products sold by Tecnoazúcar (Seal of Quality Control).
• From 2013, a system for contracting activity, allowing Tecnoazúcar to be more demanding with producers and to meet customer requirements in terms of quality.

Other contributions made by this application concern:
• Improvement in key organizational technical characteristics for production and services.
• Accuracy of information provided by the producer with regard to quality.
• Compliance with the customer-hired producer.
• Customer service improvement.

Use

The above demonstrates the usefulness of this tool. Our company has gained in prestige, trust and credibility with our customers, and our company has not had to pay for any breach of any requirement or poor quality of any product sold during the last four years. Three examples are given below.
Case 1: In 2012 refinery ‘George W’ was presented with a situation that could have prevented the sale of refined sugar because of alleged discrepancies in the parameters of color that differed significantly from the quality requirements for the international sugar market, as in the standard CODEX STAN 212 -1999 (Amendment-2001). This could have directly cost CUP185.9/t sugar, and flowed on to impacts in the foreign exchange market.

Case 2: Factory derivatives ‘Heriberto Duquesne’: One claim was made in 2012, for payment of CUP6226.44 for economic damages due to breach of contractual obligations according to the contract signed between two parties. However, access to the quality requirements set out in rule Molasses: Technical Standard Central ICAITI 34175: 1986 freed us from paying any alleged damages.

Case 3: Raw sugar factory ‘Hector Rodriguez’: In 2015, there was a claim of CUP464,440.11 for weight differences and failure to comply with agreed requirements. This did not proceed through the use of this tool that facilitated to argue under standards such as ISO/TC176 Quality management and quality assurance, and ISO/TC69 Application of statistical methods, as well as other documents and legal decrees related to metrology.

In all the above examples the success of not give rise to any claims of this was supported by the use of this information tool.

CONCLUSIONS

1. The website resulted in a useful workable tool with fast, easy and reliable for sustained quality monitoring access.

2. The information provided by this application is national in scope and can be used by any company, either supplier (including sugar mills distilleries) or service (commercial).

3. The application in the province of Villa Clara over the last three years has ensured the marketing of sugar and its derivatives with established quality parameters and the implementation of preventive measures to prevent regulatory breaches.

REFERENCES


Développement d'une application web pour superviser la qualité des produits commercialisés par Tecnoazúcar

Résumé. Cette étude découle d’une manque d’un outil sur la toile pour contenir toutes les informations utiles et nécessaires pour superviser la qualité et aussi bien les informations réglementaires des produits commercialisés par Tecnoazúcar. Cette application web a été conçue en consultation avec toutes les unités appropriées au sein de la structure AZCUBA. Elle a pris en compte les informations requises par chaque unité et la relation entre elles. Tout cela a encouragé le développement d’une base de données utile aux besoins de la compagnie. Ce site web est un outil qui fournit toutes les informations nécessaires afin de permettre à Tecnoazúcar de gérer l’entreprise, tant au niveau de la production, du marketing ou des services, pour répondre aux exigences convenues et respecter les normes de qualité établies. Cet outil novateur veillera à ce que la compagnie n’encoure pas des coûts inutiles et des dépenses qui affectent la commercialisation de ses produits

Mots-clés: Évaluation normative, base de données, site web, exigences de qualité

Desarrollo de una aplicacion de internet para la supervision de calidad de los productos comercializados por Tecnoazúcar

Resumen. Este estudio surge de la ausencia de una herramienta de internet que contenga toda la informacion util y necesaria para el monitoreo de la calidad e informacion regulatoria de los productos comercializados por Tecnoazúcar. La aplicacion de internet fue diseñada en colaboracion con todas las unidades concernidas dentro de la estructura de AZCUBA. Se tomo en cuenta que informacion
requería cada unidad y como se interrelacionan entre ellas. Esto garantiza que una base de datos útil fue desarrollada para cumplir con las necesidades de la compañía. Esta página de internet es una herramienta que provee toda la información que Tecnoazúcar necesita para manejar sus negocios, sea de producción, comercialización o servicios, para cumplir con requisitos acordados y establecer estándares de calidad. Esta novedosa herramienta asegurará que la compañía no incurra en costos innecesarios y gastos que afecten la comercialización de sus productos.

**Palabras clave:** Evaluación normativa, base de datos, página web, requisitos de calidad