

ACCREDITATION OF THE TESTING LABORATORY IN THE UNIVERSITY SYSTEM UNDER NTP - ISO/IEC 17025:2017; CHALLENGES AND PROSPECTS

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Abstract

Within the framework of University Law No. 30220, the Peruvian university has the responsibility to train competent professionals who can solve the problems of the region and the country. To this end, it is necessary to strengthen the improvement of infrastructure, ongoing teacher training, research, and service to the community and business. It is the proposal of this bibliographic research, to specify the criteria required to adapt and certify the university testing laboratory to ISO 9001 for the correct management of quality management, ISO 14001 for the identification of environmental risks that may occur, OSHA 18001 and its transition to ISO 45001: 2018 which proposes a management system and occupational health, ISO 26000 which points out the social responsibility and compliance with commitments and ISO IO/EC/17025 to certify the testing laboratory through INACAL, Peru; having as a challenge that the services to be provided are reliable, valid and accurate; generating it an academic site in its region and the country. The reports issued by the laboratory, have the academic rigor in the scientific communities, in addition to the legal value in the civil society.

Keywords: Testing laboratory, INACAL, quality service.

Introduction

The development of science and technology in recent years has been overwhelming, the challenges to understand new concepts, theories and laws to explain the phenomena that occur in nature are deeper and demand more training and experience from the professional. This is a constant challenge for higher education institutions (HEIs), which must keep pace with scientific and technological development, so that teachers and students, supported by technological innovations, can easily access knowledge and contribute to the transformation of society. It is a current demand that HEIs improve their management, according to international quality systems, such as the certification of their laboratories, for example.

The testing laboratory must be certified and accredited to ISO/IEC 17025-2017. Similarly, the assistance of qualified personnel will allow universities to focus on planning and execution (Guadalupe, 2016, p. 21). The rigorous competition among organizations that provide higher education services and the rapid growth and proliferation of these entities, has led to demand high levels of quality in the field in which they specialize, to be highly competent in a highly demanding

and demanding environment. This competition in the university and professional field leads to introduce the term Accreditation and incorporates in its processes the concept of Quality (Contreras and Galleguillos, 2009).

There are very few testing laboratories in Peruvian HEIs that are accredited with the NTP ISO/IEC 17025 standard. The credibility of the quality service they provide is not guaranteed and the validity of the results generates some suspicion. Therefore, there is a growing trend in the organizational environment to integrate several management systems, based on international standards such as ISO 9001, ISO 14001, OSHAS 18001, among others. In this way, organizations manage their processes and provide products and services with higher quality, guaranteeing the preservation of the environment and the health and safety of workers (Antúnez et al., 2017, pp. 1-12). Based on the current situation and the need to increase the certification and accreditation of testing laboratories in Peruvian HEI, the present study aims to determine the requirements necessary for the certification and accreditation of a university laboratory, based on the analysis of the regulations established for the certification of the testing laboratory.

Content

Accreditation is not mandatory, but it builds confidence, it is that the certification body has been independently verified and is accredited to ensure that it operates in accordance with international standards. (Mateo, 2014, p. 29)

Accreditation, is a mechanism by which the laboratory objectively demonstrates that it is competent to perform a certain type of analysis. This process accredits the quality of the procedures to be audited and may include all or a limited number of all procedures practiced by a laboratory (Tormo et al., 1996, p. 3).

It is therefore important for the laboratory to indicate the type of need it wants to cover, in order to select the ISO it needs to implement. The planning of the same should consider the following items:

- Define the need to be covered. Build the objectives. Planning the need. Selecting the ISO. Adapting to ISO. Certify the laboratory with ISO.

HEI must join the challenge of being in line with the accelerated scientific, technological, political, economic, social and cultural changes occurring in today's world; which can be achieved if university authorities have an objective vision of what they want as institutional development, and transcend in space and time.

For the testing laboratory certification, it is necessary to resort to the ISO 9001-2015, ISO 14001, ISO 17025, ISO 26000, OSHA 18001 and its transition to ISO 45001:2018 and ISO/IEC 17025, which should guide the planning and execution of the accreditation of the testing laboratory in HEI; seeking the improvement of quality, service and customer satisfaction.

1. The ISO 9001-2015 Standard

The implementation and certification of quality management systems under ISO 9001 is a great challenge, since it implies the adoption of a new philosophy and a profound transformation in the work culture, so that a radical intervention in the social culture is required to achieve new ways of doing things that meet the needs of users and achieve that valuable product of the new economy: knowledge (Hernández et al., 2001, p. 27).

The ISO 9001 standard proposes leadership in the context of quality management. The eight principles on which quality is based are:

- Customer Focus. Leadership. Commitment and competencies of people. Process-based approach. Continuous improvement. Information-based decision making. Relationship management.

Font (2018, p. 2) specifies that:

Risk-based thinking enables a laboratory to determine in advance the factors that could cause its processes and management system to deviate from planned results, and thus put in place preventive actions to minimize negative effects and maximize the use of opportunities as they arise (adapted from ISO 9001:2015 to the context of ISO/IEC 17025:2017).

Laboratory authorities should establish a program to regularly monitor apparatus and exhibit proper calibration and operation of instruments, reagents and analytical systems, as well as a documented preventive maintenance program that complies with manufacturers' recommendations (Briozzo, 2007, p. 13-36).

So, the laboratory must have calibrated equipment, current reagents, standardized analysis procedures, storage and transportation to provide a quality service.

1. The ISO 14001-2015 Standard

Called Environmental Management System (EMS), it indicates that the organization must be committed to the management of environmental risks, respect for nature and an additional plus in the marketing of its products, improving its commercial image and sales. ISO 14000; 2015, is configured as follows:

- Purpose and scope of application. Normative references. Terms and definitions. Context of the organization. Leadership. Planning. Support. Operation. Performance evaluation. Improvement.

Acevedo & Severiche, 2013, p. 32-38 points out that:

The reflection that should be had on the safety measures to take care of the environment and the analysis laboratory, trying to decrease the environmental impact and reuse, is well established because it identifies the environmental aspects of a water laboratory, to comply with environmental regulations, which are:

- Consumption of raw materials and inputs. Energy and water consumption. Atmospheric emissions and fuel consumption. Noise levels. Liquid discharges. Solid waste generation

Alfonso, 2003, p. 83-87, states that:

Occupational risks are made up of occupational diseases and occupational accidents. Occupational health is achieved through industrial hygiene and safety and should focus on four aspects:

- Industrial Hygiene. Industrial Safety. Occupational disease. Occupational accidents

In the case of an analysis laboratory, the risks of environmental contamination are subject to the release of any chemical or biological solution into the environment that can contaminate the air, soil or water to the detriment of human health or nature.

Biosafety is an issue that concerns all persons who perform activities within a clinical analysis and diagnostic laboratory, pathology laboratories, industrial laboratories and teaching laboratories at different educational levels that must maintain a general biosafety regulation (Lara, et al., 2008).

Therefore, it is important, in laboratory work, the proper use of containers for intermediate storage of hazardous waste, as stated by Martinez, 2020, p. 49-51, who points out two types of containers for solid waste, plastic containers for culture media and amber glass containers for chemical reagents.

In this way, ISO 14001, seeks the biunivocal relationship that should exist at all times between the environment and the environmental impact generated through the services or products provided in the testing and calibration laboratory, evaluating whether this type of actions is beneficial or adverse to nature. The relationship of harmony between both variables, would indicate that the laboratory enjoys a good planning, quality service committed to the care of the environment and sustainable development.

2. The ISO 26000 Standard

The ISO 26000 standard sets out seven CSR principles for correct and responsible decision making, which are as follows:

- Accountability (ISO 26000:2010 Clause 2.1)
- Transparency (ISO 26000:2010 Clause 2.24)
- Ethical behavior (ISO 26000:2010 Clause 2.7)
- Respect for the interests of stakeholders
- Respect for the principle of legality (ISO 26000:2010 Clause 4.6)
- Respect for international standards of behavior (ISO 26000:2010 Clause 2.11 and 4.7)
- Respect for Human Rights (ISO 26000:2010 Clause 4.8)

ISO 26000 in point 6.5.3 Topic 1, on the environment: Pollution Prevention. 6.5.3.1 Topic Description, states that a company to improve its environmental performance should prevent:

- Air emissions. Water discharges. Waste. Release of toxic and hazardous chemicals. Other identifiable forms of pollution.

For then under 6.5.3.2 Related actions and/or expectations, try to identify, measure, implement programs, publicize prevention and pollution

Finally, The ISO 26000 standard, seeks that testing and calibration laboratories in their sustainability process, adapt to social responsibility within the social, legal, but above all environmental framework. Manage an ethical behavior, respect for regulations, legality and human rights. These principles must be in accordance with the vision and mission of the university, protected by its statute and the university law.

3. The Standard NTC-ISO: 45001:2018

- This standard, which replaces the OHSAS 18001 standard, aims to ensure the safety and health of workers in the workplace, cultivating a holistic culture in the risk management system to try to prevent or minimize risks. The principles that govern the standard are: Occupational Safety and Health oriented approach. Commitment to Leadership. Involvement of workers. Risk assessment. Hierarchy of control. Management of the "supply chain". Management of internal and external communications.

ISO 45000; 2018, is configured as follows:

- Purpose and scope. Publications for consultation about OSH. Terms and definitions. Requirements of the Occupational Health and Safety Management System. Scope. Normative references. Terms and definitions. Context of the organization. Leadership. Planning. Support.

Martínez, 2018, p. 49, points out that:

The NTC-ISO-45001:2018 Standard based on its control standards, tracks deficiencies in occupational safety and health, through monitoring indicators, such as:

- Frequency rate, Severity rate, Incapacitating injury rate
- Frequency rate, Severity rate, Mortality rate, Prevalence of occupational illness, Occupational disease rate, Severity rate, Mortality rate.
- Prevalence of occupational disease, Occupational disease index.
- Absenteeism

Benítez, 2019, p. 16, develops:

A proposal for the implementation of the management system in occupational safety and health based on ISO 45001:2018 which is as follows:

- The first stage: initial diagnosis of the current situation of the company in relation to compliance with the requirements of ISO 45001:2018.
- In the second stage: the risks faced by the workers are identified, evaluated and assessed.
- Finally, a plan of activities is made based on the results obtained in the diagnosis, for the evaluation of compliance with the implementation of the OSHMS.

Caycedo, 2019, p. 14 proposes a similar approach and develops a proposal for an implementation plan of the Occupational Safety and Health System under the requirements of the NTC ISO 45001:2018 standard, which is as follows:

- general diagnosis of the current situation of the company against the requirements of the standard.

- design proposal to top management and workers.
- proposed chronogram where the activities to be followed are evidenced

Summarizing: it can be established that ISO 45000: 2018 seeks that the testing and calibration laboratory in the exercise of its activities is responsible with the safety and health of its workers in its work center, for this it must generate safe working environments, preventing damage to health and promoting the physical and mental protection of the worker.

4. The ISO/IEC 17025:2018 Standard

It is a standard that indicates the essential requirements that the testing and calibration laboratory must comply with for its accreditation, so that its analytical data can generate the reliability of the results and therefore the technical competence with other laboratories.

NTP 482, p. 1, complements the information with the UNE-EN ISO/IEC 17025:2000, pointing out that the Quality Manual is the first document that is normally required to a laboratory that applies a quality system and wishes to be accredited by an accrediting entity or body. Likewise, on p. 3, in the quality systems, it indicates: European Standard EN 45001 "General criteria for the operation of testing laboratories", specifies in point 5.4.2 that "The laboratory shall have in place a quality system appropriate to the type, scope and volume of its activities. The elements of this system shall be described in the quality manual (...) which shall be made available to the laboratory personnel. (...)"

Castañeda & González, 2007, p. 7-14, state that the adequate calibration and maintenance of measuring instruments in a company is guaranteed with the execution and correct compliance of the following ten aspects:

- Definition of metrological needs. Calibration of measuring instruments. Establishment of calibration procedures. Assurance of correct operation. Identification of measuring instruments. Elaboration and registration of service life sheets. Establishment of procedures for decommissioning due to inappropriate service or declassification. Ensuring environmental conditions. Protection of instruments during storage and use. Assurance of metrological properties.
- ISO/IEC 17025:2018, points out two types of requirements that must be executed to comply it with the standard, these requirements are:
 - Requirements related to the management systems. Customer services. Corrective actions. Audits. Control of records, among others.Technical requirements
 - Personnel. Test and calibration methods. Validation methods. Equipment and traceability of measurements. Sampling. Test report. Calibration certificate, among others.

The accrediting entity in Peru is INACAL (Instituto Nacional de la Calidad).

To consult about Accredited Test Methods. See the link. <https://www.gob.pe/9843-consultar-metodos-de-ensayo-acreditados>

To verify the calibration of metrological instruments. See the link. <https://www.gob.pe/9844-verificar-la-calibracion-de-instrumentos-metrologicos>

Keep in mind that it is not the laboratory that is accredited but the test method; for which it must comply with the regulations. See the link. <https://www.inacal.gob.pe/acreditacion/categoria/acreditados>

Once the requirements have been met, a DOCUMENTATION CHECKLIST must be made. /CAMPO NTP-ISO/IEC 17025:2017. See the link. <https://www.inacal.gob.pe/acreditacion/categoria/formatos>

The evaluation and analysis in the testing and calibration laboratory must be subject to the specific document DA-acr-13D that indicates the criteria for participation in Proficiency Testing / Interlaboratory Comparisons. See the link. <https://cdn.www.gob.pe/uploads/document/file/518889/-256265643967360030620200207-6209-5krwj1.pdf>

Table 1: *Documentary evaluation of theses and laboratory articles according to the standard NTP-ISO/IEC 17025*

Name	Objective	Conclusions
Evaluation of Propilven's laboratory, according to ISO 17025:2005. Author: Peggy Ferreira R.	Evaluate the procedures and methods used in Propilven's laboratory.	The degree of implementation of the technical standard in the laboratory, according to the given scale, is 50%.
Diagnosis of the Compliance with the Criteria of the ISO/IEC 17025: 2017 Standard in the Bacteriology Laboratory Levapan S.A. Tuluá Plant. Author: Ana María Flórez Gutiérrez, Katerine Andrea Solano Pineda, María Camila Sánchez Ramírez, Sara Pauline Hoyos Hanrry	Diagnose the level of compliance with the requirements of ISO/IEC 17025: 2017, in the facilities of the Bacteriology Laboratory of Levapan S.A. Tuluá plant.	It presents a high level of adherence to the requirements established in NTC ISO 17025: 2017 which demonstrates its aptitude to undergo an accreditation process in said standard.

<p>Analysis of compliance with documentary and technical requirements demanded by ISO 17025/2005 in the UCC veterinary clinical laboratory, for the purpose of recognition by the ICA. Author: Lizeth Andrea Tarazona</p>	<p>The laboratory is identified as a research site, in which the existing documents were observed, analyzed and reviewed, evidencing compliance or non-compliance with the requirements for the diagnosis of the ISO 17025/2005 quality standard.</p>	<p>It has a high percentage of compliance with items 4 and 5 of the ISO17025/2005 Standard, required by resolution 3823/2013 for purposes of recognition as a laboratory offering services to third parties.</p>
<p>Diagnosis of a drinking water treatment laboratory according to NTC ISO/IEC 17025:2017 guidelines, case study: Empumelgar E.S.P. Author: Angie Yeraldin Salamanca Parra</p>	<p>Establish based on the guidelines of the NTC ISO/IEC 17025:2017 standard the diagnosis to the laboratory of the drinking water treatment plant of EMPUMELGAR E.S.P. company.</p>	<p>The laboratory diagnosis revealed the absence of control and follow-up formats for the handling of equipment and reagents, calibration processes and equipment maintenance; certification of the person in the handling of equipment, measurements and delivery of results.</p>
<p>Proposal for the design of a management system based on the NTE ISO/IEC 17025:2018:2018 standard. Author: Paola Elizabeth Simbaña Díaz</p>	<p>Design a proposal for a management system based on the NTE INENISO/IEC 17025:2018 Standard in the UPS soil and water laboratory in the Cayambe sector for the "Determination of manganese and iron by flame atomic absorption spectrophotometry in water".</p>	<p>From the documentary diagnosis with respect to the SAE accreditation request, the LSA has gaps of 80% with respect to the management requirements and 50% of the documentation. While 66.7% of other documents requested by the SAE do not have.</p>
<p>Improvement proposals based on ISO/IEC 17025 for the quality control laboratory of a coffee processing company in the city of Guayaquil. Author: Edison Raúl Rodríguez Cochea</p>	<p>Propose improvements for the quality laboratory based on the international standard ISO/IEC 17025.</p>	<p>There is a large % of non-conformities in facilities, environmental conditions, test methods, calibration, and method validation; but that in a short time can be improved.</p>
<p>Developing a methodology for the implementation of the</p>	<p>Develop a methodology for the implementation of the</p>	<p>It was determined that the NTP-ISO/IEC 17025:2017</p>

NTP-ISO/IEC 17025:2017 standard for the accreditation of soil, concrete and pavement testing laboratories in private universities in Peru - 2018 Author: María Etelvina Duarte Lizaraburo	NTP-ISO/IEC 17025:2017 Standard for the accreditation of soil, concrete and pavement testing laboratories in Private Universities in Peru.	Standard is not implemented in the soil, concrete and pavement laboratories of private universities in Peru; currently only one laboratory of a private university is accredited to perform a test related to the construction industry (concrete).
Quality systems and accreditation applied to testing laboratories. Author: Andrés Hernández Guzmán, Manuel de Jesús Fabela Gallegos, Miguel Martínez Madrid	The main characteristics of a quality system are described, as well as other technical and administrative requirements that a testing laboratory must meet to obtain recognition.	To guarantee the satisfaction of the client's need by offering a service of a testing laboratory and that presents recognition of its technical and administrative capacity.
Improving the Quality of Results in Plant Pathology Laboratories. Author: Teresa Gally	Evaluate the improvement of the Quality of Results in Plant Pathology Laboratories based on the ISO 17025 standard.	It is recommended to develop an interpretation standard of ISO/IEC-17025 for agricultural laboratories and a specific standard with more specific requirements.

Source: *Own elaboration.*

Interpretation: Table N° 1 shows the difficulties encountered by the different laboratories in implementing the ISO/IEC 17025 Standard, the difficulties are significant, among which we can indicate a lack of commitment from the authorities, lack of resources and a coherent policy of the institution; as a consequence, the laboratory tries to make the necessary effort to comply with the validation of the standard and to accredit the laboratory, which will allow it to obtain higher returns and a better position in the market.

Table 2: *Documentary assessment of ISO 9001, ISO 14001, ISO/IEC 17025, ISO 26000, OSHA 18001 and their transition to ISO 45001:2018 for testing and calibration laboratory certification.*

STANDARD	ISO 9001	ISO 14001	ISO 17025	ISO 26000	OSHA 14001 Y SU ADECUACIÓN A LA ISO 45001: 2018
DEFINITION	The correct management of quality management	Identification of the environmental risks that may arise	Certify the testing and calibration laboratory through INACAL.	Social responsibility and fulfillment of commitments	Occupational occupational health and safety management system
WORK OBJECTIVE	Optimize the capacity to provide quality products, respecting the law and its regulations.	Improve environmental care management; control discharges, waste, emissions and mitigations, etc.	Guarantee the technical competence and reliability of analytical results, personnel, calibration, test reports and certificates, among others.	Establish, implement or improve social responsibility frameworks or structures.	Minimize through control the hazards and risks to which workers are prone in your organization by improving satisfaction levels.
WORK ACTIONS	Consider 4.1, 4.2, in the review of risks and opportunities in order to generate continuous improvements.	Consider the 4.1, 4.2, risks and opportunities related to the prevention of environmental risks and in relation to the aspects	Requirement 6.2.5 states "The laboratory shall have procedures and maintain records to determine proficiency requirements". Requirement 6.4.3 states "The laboratory shall have a procedure for the handling, transport, storage, use, and	Governance of the Organization, consisting of procedures, policies, manuals that regulate and organize the way of doing business.	6.1 Actions to address risks and opportunities 6.1.1 General When planning the Occupational Health and Safety Management System, the company has to consider the issues referred to in section 4.1, the resources referred to in sections 4.2 and 4.3, in addition it has to
	OPERATION	OPERATION			

Quality requireme nts for products and services are establishe d and planned. PERFO RMANC E EVALU ATION Determin e where the quality of laborator y processes will be evaluated and monitore d. IMPRO VE Complain ts will be responde d to promptly and processed according to the scope of the	Implement actions determined in sections 6.1 and 6.2 of the standard. PERFOR MANCE EVALUA TION Monitor, measure, analyze and evaluate the performanc e and effectivenes s of the EMS. IMPROVE Impacts will be mitigated, and actions related to EMS compliance will be corrected. Determine the mechanism of internal and external communica tions relevant to the EMS	planned maintenance of equipment. Requirement 6.6.2 states "The laboratory shall have a procedure and maintain records for defining, reviewing, and approving laboratory requirements for externally supplied products and services; among others. Requirement 7.1.1 states "The laboratory shall have a procedure for the review of solicitations, bids and contracts". Requirement 7.4.1 states "The laboratory shall have a procedure for the transport, receipt, handling, protection, storage, preservation and disposal or return of test or calibration items." Requirement 7.7.1 says "The laboratory shall have a procedure for following up the validity of the results".	Human rights. fair pay working hours, safe working environmen t, among others. Labor practices, working conditions, hiring processes, and the way of operating with personnel while respecting workers' rights. Environme nt. Environme ntal managemen t practices. Fair operating practices. Value chain, suppliers. Consumer issues. Customer relations.	determine the risks and opportunities that need to be addressed in order to: Ensure that the Occupational Health and Safety Management System that can achieve the intended results. Prevent and minimize undesirable effects. Achieve continual improvement. 6.1.2 Hazard identification and assessment of risks and opportunities 6.1.2.1 Identification of hazards The company shall establish, implement and maintain hazard identification processes. 6.1.2.2 Assessment of OSH risks and other risks to the OSH management system. 6.1.2.3 Assessment of OSH and other opportunities for the OSH management system 6.1.2.4 Assessment of OSH and other OSH management system opportunities 6.1.3 Determination of statutory and other requirements
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<p>laboratory y. Determine the internal and external communications mechanisms to answer the questions what, when, to whom, how and who communicates.</p>	<p>that answer the questions what, when, to whom, how and who communicates. Staff interviews, Photographic records, Compliance checklist. Management of waste and residues produced in the laboratory.</p>	<p>Requirement 7.10.1 says "The laboratory shall have a procedure that implements activities when the results do not comply with what was agreed with the client. Requirement 8.7 states that corrective actions must be implemented when a nonconformity occurs.</p>	<p>Community involvement and development.</p>	<p>6.1.4 Action planning The company has to plan: Actions to address all risks and opportunities, cope with legal requirements, be prepared to respond to emergency situations.</p>
<p>COMMITMENT</p>	<p>Strengthen the Management System, Leadership and quality in the achievement of results. Improve the negative impacts that generate damage to the environment by making adequate use of natural resources.</p>	<p>Establish that activities and processes harmonize with documentation, organizational policy and work procedures.</p>	<p>El respeto a la Norma, los derechos humanos, el respeto ético al medio ambiente y su sostenibilidad.</p>	<p>Demonstrate leadership at all times for the Occupational Health and Safety Management System, minimizing the risk of worker accidents.</p>

<p>CONCLUSION</p>	<p>The standard is not applicable to processes, products or services; but to the systems that create and manage them, generating at all times the quality of the organization.</p>	<p>The standard promotes environmental awareness and the reduction of ecological damage to nature. If the organization is not certified then its documents are inadequate and will affect laboratory management and legality.</p>	<p>The standard is specific to the testing and calibration laboratory. The University must play a leading role so that its laboratories are certified and have the research and legal value in the country and abroad.</p>	<p>The standard promotes a good relationship, a continuous improvement between the worker, the user and the companies, contributing to sustainable development and reducing environmental, social and economic impacts.</p> <p>The standard promotes the leadership and management of the company, as well as the worker's safety, role and responsibility in the organization.</p>
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Interpretation: Table 2 shows the required criteria, objectives and work actions to be developed to adapt and certify the testing laboratory to IES through ISO 9001 for the correct management of quality administration, the strengthening of the Management System and Leadership, ISO 14001 for the identification of environmental risks that may occur trying to remedy the negative impacts as well as the correct management of natural resources, OSHA 18001 and its transition to ISO 45001: 2018 which proposes a management system and occupational health at work trying to keep occupational risks to a minimum, ISO 26000 which points out social responsibility, ethical and responsible behavior with nature as well as the fulfillment of commitments and finally ISO IO/EC/17025 to certify the testing laboratory through INACAL so that its infrastructure and quality service transcends giving added value to the investigative and legal work in the country and abroad.

CONCLUSIONS

The ISO standards used in the testing laboratory ensure quality, integrity of services and validity of data, as well as communication between all stakeholders in the process. The ISO standards are varied, depending on the needs of the laboratory, such as analysis, safety, specifications, production of goods and services, etc.

The accreditation processes help to create the necessary conditions for a correct quality evaluation, comparing what the institutions really offer with what the society as a whole expects from them. The position acquired in the face of these concepts is vital for the quality of higher education, and as a consequence for the cultural, social and political life of institutions and nations. If a new world corresponds to new universities, it also corresponds to new ways of evaluating their quality and relevance, which are fair and coherent (Cruz Y., 2009).

Challenges

La Universidad a través de su laboratorio de ensayo acreditado debe apostar por la competitividad de sus servicios.

Los resultados de los análisis que brindan deben ser válidos y confiables.

Los técnicos que laboran en estos laboratorios deben demostrar en todo momento capacidad y competencia.

La infraestructura, los equipos, los reactivos químicos, materiales de laboratorio, etc. deben siempre estar especificados sus características y tener vigencia actual.

La normatividad y el buen servicio en el laboratorio debe cumplirse en todo momento.

Perspective

The accredited testing laboratory must be based on the correct conformity of a Quality Management System, therefore, comply with all administrative and technical requirements set by the standard.

The testing laboratory must seek at all times the triple certification for "excellence" which is referenced to Quality, Environment and Occupational Health and Safety.

The accreditation of the testing laboratory based on the selected method of analysis, should allow it a different status from other laboratories and a special place at the university.

Services to third parties must comply with quality, relevance and safety standards, unequivocally ensuring service to industry and commerce by applying cutting-edge science and technology.

The generation and construction of new knowledge, methodologies and new strategies in laboratory analysis should improve the teaching experience and quality service

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