

PROFICIENCY TESTING SCHEMES (PTS): External Quality Control Tool for Animal Nutrition Laboratories

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The global feed market is growing constantly, representing approximately \$120 billion in 2022, and will reach more than \$160 billion in 2030. However, this growth has been followed by several health crises, such as the Bovine Spongiform Encephalopathy (BSE) or bird flu, which have increased consumers' concern about the quality of food.

Faced with the resurgence of these crises, testing laboratories must be trusted by manufacturers through the analysis that they are being given.

The internal and external quality controls implemented in the laboratories are essential to ensure the validity of the results; Proficiency Testing Schemes (PTS) perfectly meet this objective. Indeed, the evaluation of analytical performance is essential to ensure the accuracy of a laboratory's analytical results. The participation in PTS programs is a requirement of ISO/IEC 17025.

The feed safety and the safety of food of animal origin are essential and intimately linked. In feed, several substances are prohibited; according to the French Ministry of Agriculture and Food, residues of veterinary drugs represent 33% of the contaminants identified, including antibiotics or anti-inflammatory drugs.

In conformity with national and international requirements, some molecules must be sought, which are present in various PTS: mycotoxins, microbial pathogens, residues of veterinary drugs etc. Therefore, feed quality control is an important health and economic issue for industry and testing laboratories.

Definition of a PTS

According to ISO/IEC 17043, a PTS is defined as the evaluation of a laboratory's testing by means of performance, using inter-laboratory comparisons. These are used to monitoring the continuity of laboratory performance.

Objectives of a PTS

The main purpose of inter-laboratory comparisons used in PTS is to monitor the continuity of laboratory performance.

In addition, participation in a PTS also enables the laboratory to:

- detect analytical problems.
- demonstrate the accuracy of their results to third parties.
- compare the methods used by the laboratories.
- and to validate the uncertainties measurement claimed by the laboratories.

Participation in several rounds of a campaign is of interest to the laboratories, in particular the identification of deviations in time and the maintenance of skills of all operators.

How to Participate to a PTS ?

Participation in a PTS follows a classic and simple pattern: after registering the laboratory to the PTS of interest, the laboratory receives the samples according to the defined schedule and carries out the analysis. After the results' transmission, a statistical treatment is carried out before the report is sent.

The report is provided to the laboratory with several points of information. Firstly, an overall summary of the results which includes the data of the PT program: from the design of the program to the participants' results, including statistical treatment, homogeneity, stability checks. Secondly, an individual summary of its results with a judgement of its performance by criteria.

Available Programs in Feed

In this field, BIPEA offers a wide range of proficiency testing in chemistry, contaminants and microbiology with real matrices' samples.

Real Matrices Available

BIPEA offers several proficiency tests depending on different types of analysis, and based on a wide range of real matrices: raw materials, finished products, fodder, silage, premix, cereals, compound feeds, etc.

The analysis of these samples must be carried out under routine conditions in terms of the procedures and applied methods.

- Chemistry analysis: the animal nutrition programs are offered as a whole and account for a variety of analytical parameters such as nutrient values, amino acids, minerals and vitamins with a variety of matrices.
- Microbiological analysis: a program dedicated to the research of Salmonella spp in compound feeds is proposed.
- Contaminants and drug residues: programs for the analysis of mycotoxins, trace elements and veterinary drugs on raw materials and processed products are offered.

PTS 13 – Feed

This program brings all together 200 participants from 50 countries around the world and offers different matrices (raw matrices, finished products, etc.) for the analysis of the following analytical parameters:

- Minerals: Ca, Cl, Cu, Fe, K, P, Mn, Mg...
- Amino acids by hydrolisis: Cystine, Lysine, Methionine
- Free amino acids: Lysine, Methionine
- Vitamins: A, E, D3
- Pigments: Carotene, Xanthophylles

- Microscopics analyses: Identified cereals, Identified leguminous plants...
- Fatty acids profile: Butyric, Caproic, Erucic...
- Residue of veterinary drugs

PTS 42 – Premix

A hundred laboratories from more than 41 countries participate in this program. A large number of analytical criteria are proposed, including:

- Minerals: Calcium, Chlorides, Fluorine, Iodine, Magnesium, Potassium...
- Metals: Arsenic, Cadmium, Copper, Cobalt, Iron, Lead, Mercury...
- Vitamins (according to the composition of the products): A, E, D3, C, B1, B2, B5, B6...

PTS 105 - Microbiology in Feed – Salmonella spp Detection

With about ten participants worldwide, this round consists of three randomly contaminated samples for the detection of *Salmonella* spp by reference method and alternative methods.

PTS 107 – Veterinary Drugs in Feed

This trial, which brings together 15 participants from 10 countries, invites laboratories to detect and/or quantify antibiotics and coccidiostats from a list provided in advance: Amprolium, Carbadox, Clopidol, Sulfathiazole, Tetracycline TC, Decoquinat, Diclazuril, Halofuginone etc.

Conclusion:

The consequences of deviations in the laboratory's analytical results are numerous: unreliable results delivered to third parties, damages caused in the production chain, loss of confidence by customers, emergence of health crisis, etc.

This is why the use of PTS for decision-making on corrective measures is particularly effective: testing laboratories quickly detect regressions in their performance over time and the methods used with the help of the graphic results we provide.

The increase in demand from laboratories to take part in PTS proves the interest of laboratories in their quality control approach. The sustainability for participation in these PTS is a key to helping the laboratory to have confidence in its results.

About the BIPEA:

BIPEA is a non-profit scientific organization created in 1970 and currently offers a wide range of proficiency testing and external reference materials for quality control testing laboratories.

ISO 17043 accredited and ISO 9007 certified (scope 1-1495 available on www.cofrac.fr) and BIPEA gathers over 2500 testing laboratories from 120 countries.

With our experience, we offer a range of services to testing laboratories and manufacturers in various fields such as food, environment, cosmetics and pharmaceuticals.

BIPEA's core activity is to enhance the performance of laboratories and works its position up as a privileged partner of testing laboratories.