A SHORT REVIEW ON QUALITY ASSURANCE

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Abstract- **Quality Assurance (QA) is a way of managing that checks if things like products, services or results meet certain standards. A Quality Assurance program means doing the work needed to make sure these things are good enough for use. (ISO, 1994) Any watching plan or test should try to make information that is true, dependable and just right for what it's meant for. This means you need to know what kind of data and details are needed before the project begins. This is called a goal for high-quality data. Goals for data quality are qualitative and quantifiable targets that help create a system which will reduce doubt to an acceptable limit within the rules allowed. These goals are often made by the people who use the data (usually those paying for it) along with experts in technology. Quality Assurance for a water checking program will not just help make sure results are accurate, it will also increase the belief of those who give money.**

Keyword- **Testing, Regression, Test Cases, Agile methodologies SQL**

Introduction

Measurement results should yield trustworthy information, and the laboratory must keep adequate records to show accuracy of measurements. Analysts are responsible for the quality of their work and have a large burden to produce accurate, useful analysis.. Growing domestic & Foreign business, the obligation of national registration authority, and the approval of the use of different chemicals all necessitated the adoption of trustworthy test procedures that were long ago agreed upon by all parties. Measurement results should yield trustworthy details, and the lab ought to be able to substantiate accuracy of measurement with records. Analysts are entirely responsible for the caliber of their work and have substantial obligations to generate accurate and timely analytical outputs. Growing domestic & foreign trade, the obligation of national registration authority, and approval of the use of different chemicals all necessitated the adoption of trustworthy test procedures that were long ago agreed upon by all parties.

QUALITY SYSTEM

A quality system called Good Laboratory Practice (GLP) addresses the organizational procedures and environmental safety and health studies' non-clinical planning, execution, monitoring, archiving, and reporting requirements. The ISO/IEC 17025: 2005 Standard replaces earlier benchmarks, requiring laboratories to meet technical competence requirements for conducting tests, including sampling, to demonstrate a quality system and produce results that are technically sound. It includes analytical tasks with methods developed in laboratories as well as non-standard ones.essentially outlines the same AQC standards.There is always some degree of mistake in measurements. When sample is gathered, moved, stored, & examined, or when information is assessed, reported, saved, or transferred digitally, an error component may be introduced. A foundation for identifying and reducing these errors at every stage of samples collection, analysis,& data managements procedures must be provided by quality assurance programs. Both the experiment itself and its execution must be guaranteed by the method.8 Systems by themselves are unable to provide quality. Employees need to be instructed and engaged in the work in such a The goal of the quality assurance (QA) program was to reach the necessary analytical standard. It refers to a well defined system, with staff, that is separate from the research's conducts & intended to reassure test facilities management that sample analyses and study conducts adhere to established protocols. in which they can share their knowledge and suggestions, and they must be given access to the required materials. A laboratory that complies with recognized standards and is accredited by the relevant national accreditation process is likely implementing good quality assurance practices. A quality assurance program must also included personnel training, administrative procedure, management structures, auditing, and internal QC(quality control) and proficiency testing. To ensure the quality of the results, the laboratory must document all of its rules, systems, programs, processes, and directions. The relevant personnel must be informed of, comprehend, have access to, and use the system's documentation. The laboratory must have quality control protocols in place to ensure that the analyses are carried out with validity, accuracy, and precision from batch to batch. Measurement and documentation specifications meant to show how well analytical methods works in everyday situations. Related intelligence must be collected so that trends may be identified, and statistical methods must be used to assess the outcomes whenever possible. This monitoring will be organized and evaluated, and it could involve the following: using certified reference

materials on a regular basis & conducting internal quality control using secondary reference materials; taking part in programs for proficiency testing or interlaboratory comparison; administering duplicate tests using the same or different approaches; and retesting of retained items. Before being used, the analytical methods must be thoroughly validated in accordance with established protocol. To guarantee that the processes are subject to appropriate statistical control, control charts should be created, personnel must be properly taught in their usage, and these approaches must be meticulously and completely recorded. Participating successfully in proficiency testing programs does not take the place of establishing the method's laboratory performance. The method's performance ought to be appropriate for its intended use and meet the necessary standards for sensitivity, specificity, accuracy, and precision. Every reported data should, if at all possible, be able to be tracked back to international standards through the use of analytical standards with known purity that have been confirmed by an ISO recognized provider and calibrated equipment. Nowadays, hiring reputable, experienced, and ideally accredited laboratories to handle a few samples that need specialized testing is unquestionably more cost-effective than devoting a lot of time, resources, and equipment to setting up and maintaining a validated procedure for incidental samples in a laboratory. By taking part in proficiency testing programs, laboratories can objectively show that they are capable of delivering results that can be trusted as an external quality check.

An assessment of the approaches' bias and degree of uncertainty

The accuracy and precision of the measurements must be known in order to properly evaluate the data and make decisions. Numerous contributing factors might result in random, systematic, and egregious errors during the measuring process.9, 10 Monitoring , uncertainty & accuracy of the measurements findings is the goal of the process' quality control.

Systematic error measurement bias

Every stage of this measuring process, from begin to end, can fall victim to systematic errors. In truth, the process lies outside at its exterior field phase. It is impossible to measure when that point has been reached. After obtaining the sample, we can determine which systematic error is largest and has the greatest precision by using radiolabelled chemicals. Such a calculation takes into account not only systematic error caused by selective absorption or redistribution of various ingredients at the reception end, but also other factors affecting integrity. It includes an allowance With radioisotopes there is no need to worry. Fortunately, though they are invisible and odorless, handling them takes no special equipment nor any special expertise (see also Addendum 1). But sadly there are to date few ordinary pesticide residue laboratories which have facilities for handling radioactive matter. But there is a lot of valuable information contained in the world health organisation(WHO) series on pesticides residue-Evaluations, which are issued and distributed by the FAO every year. These can be freely downloade from website of Pesticide Management Group (PMG).19" However, in order to prove that it can be used as an officialicide, a great body is another source of information. The portion of the package that deals with residue analysis could be made available to laboratories that analyze pesticide residues, even though the entire thing is private. Typically the recovery study is carried out with untreated sample. When no unused sample or the final distillate of the blank samples gives a detectable responses, it is necessary to consider taking as an analytes equivalent for the average instruments reading from untreated sample. If average recovery is statistically significantly different from 100% through t-test, then in theory results should be corrected for the average recovery. However, at present some regulatory authorities demand uncorrected results, so one cannot exactly reflect on this matter. When parties testing same lot using method that yield different recoveries, it's an argument in frustration. In this case, the shipment will simply be refused due to lower recoveries of analytical method used in the exporting country. Yet another area, where it is absolutely essential to report the best result, is giving data on estimated exposure to pesticide residues. In this case, however, the residues measured should be corrected for mean recovery (specifically if that is not 100 %). In order to prevent any confusion when reporting the results, whenever it is necessary to make a correction, the analyst should provide both the original figure and the corrected figure. They must also cite reason for and method of the change. which affects the uncertainty of the corrected results ( ). If the mean recovery of substance can be determined from □15 measurements, then the uncertainty in adjusted residue values can basically be cancelled. (CVAcor □ 1.03x CVA) However, if the correction were performed by means of a single procedure recovery, the uncertainty on the corrected result would then be 1.41CVA. Therefore, such corrections should be avoided as much as can be.

Fluctuation values obtained from performance verification are mostly characterized symmetrically around the mean, which shows that there is some kind of random variation in measuring. If the recovered legal alkali quantity falls within an expected range based on the mean recovery and within-laboratory reproducibility of the method, then at least this analyst has shown that when he applied it he obtained results in keeping with defined performance. Thus the correct way is to employ standard recovery obtained from method validation and long term performance. Confirmation (within laboratory reproducibility studies), as a reference value when carrying out correction calculation of measured residue values, should this be required. In some situations, like when extracting soil samples, it is impossible to perfectly replicate the extraction conditions from one batch of samples to the next, which results in significantly higher within-

laboratory reproducibility than repeatability (3Sr <SR). In this instance, modifying the measured residues via concurrent recovery could yield more precise findings with less uncertainty. Equation 1 should be used to calculate the uncertainty of the residue value adjusted for recovery in cases when there is a correlation between the observed residue values. In cases where there is measurable connection between the findings, it could be essential to conduct a minimum of two recovery tests within a single analytical batch that encompasses the anticipated residue range. The average value of these tests can then be utilized for correction purposes to mitigate result uncertainty.

SAMPLING

One often hears the expression that analysed results can never be better than what is being analysed. Despite recognition of the value of reliable sampling, most regulatory laboratories limited their efforts to method validation and establishment of performance characteristics. Most attention was given in this regard to keeping the results of measurements fresh, because they indicated only a sample specified as received, not necessarily sampled commodity. This means that when sampling uncertainty is relevant, it must be incorporated. The ISO/IEC Standard 17026 have change situations forever.

Validation of a method of sample for analysis of pesticide residues is not possible. Usually the ideal way to obtain a representative sample that would reflect the residues contents of the sample commodity or object can only be attained by a well-planned sampling program, with clear instructions given but for each of these steps in an integrated manner; packaging and shipping also have to be prescribed from sampling through to final disposal. The sampling strategy is determined by the analysis's goals, therefore the managers who are making decisions based on the data, the analysts, and the sampling officers' representative who is in charge of collecting samples should all work together to establish the sampling plan and procedure. Sample size, frequency , spacing, mixing, and division will all be determined by the investigation's goals and the corresponding acceptable uncertainty of the measurement results, which can be expressed using Equation 2. This will also affect the amount of times needed for sampling & associated costs for shipping, sampling, and sample analysis. When creating sampling programs, careful cost and benefit analysis is essential Information regarding sample processing, subsampling, and sampling uncertainty is just as crucial as that regarding analysis uncertainty.

Sample quality

The aim of sampling: exploration of which actually is a series to provide room for other engagements. But the sample, is not much like that-the real positive example of victory through debate. G1) consiste des gens qui ne peux a nous agants eaux assister de minces portions, proportion (5 kg)--4 .if only because then judgment would be left up to the laboratory.) 10-5-10 6) to make judgement in In an analysis, the portion taken from the laboratory sample is known as test portion. Aliquot It is typically 2-50 g and symbolizes a specified portion of the entire sample. But in order to present even such a small slice of the sampled object as objective, sure knowledge with which quantified uncertainty can be associated, staff members who are highly qualified and accountable must work by established standards. We would expect subjective judgments on the quality of test sections and samples to have some basic standard are as follow:

• The object's physical characteristics in issue (particle size distribution, composition).

• The sample size; what the sampler and analyst should take is left up to us, but it should have all of the properties that it had when last we corresponded (at least in a mathematical sense) both over time and through space. We want to study how things change at different times or places then analyze them by looking back to see under which conditions they came about. The most effective way for the purposes of research (doing separate sample work would be necessary to collect data on averages of residues in a commodity or distributions within crops units, lot by plot, field by field), key items include recurrence and transience.

• A precise definition of the object, which is often achieved by using the time and space coordinates;

• Information gathering about the object's characteristics before sampling (site inspection may be essential to ascertain the circumstances and equipment needed);

• choice of adequate sampling technique and method; testing the acceptability of containers for taking, packing & shipping samples, including health, safety& security considerations.

• Calculation the amount of time needed to reach the sampling site and perform sample processing.

• Prevention of contamination and deterioration In particular, concerning the protection of contamination and deterioration at all stages, size reduction of bulk sample.

• Provisions for securing the sealing and labelling, shipping of samples and signing of the sampling record by the laboratory personnel in unchanged form; insuring integrity of whole operation.

• Training of sampling personnel so that they understand the purpose of the operation and the precautions to be taken in collecting reliable samples (for example, flexible enough-even enabling them to adapt their method or equipment--to suit individual situations; documenting requirements; recording rules; dealing with legal steps etc**.**

Commodities of Plant &Animal Origin Sampling

A technique for assessing compliance with maximum residue limits (MRL) was created by CCPR, and it was extensively embraced and used in many countries. The maximum level permitted to exist in a composite bulk sample that has been derived from several units of the treated product is indicated by the Codex MRLs for plants, eggs, and dairy products. For every identified lot whose compliance needs to be confirmed, a separate sample needs to be obtained. The minimal quantity of primary samples required depends on the size of the batch.. A sample taken from an effectively random location for each primary specimen is preferable. Biological sampling The samples to be collected must provide the laboratory sample(s) needed. If feasible, the individual samples should be combined and mixed together to form the large specimen. If the bulk sample is large enough to exceed the requirements for a laboratory sample, it should be split up so that a representative portion may provide other scientists with a reasonable approximation of the whole. Fresh plant goods units or entire eggs should not be sliced or broken; instead, they should be quartered or subjected to another suitable size reduction procedure. A sample equipment may be utilized. Replica laboratory samples should be withheld or the units should be randomly assigned to replicate laboratory samples at the time of taking the primary samples if the processes of mixing or dividing the bulk sample could damage the units (and thereby affect the residues) or if large units cannot be mixed to produce a more uniform residue distribution. The mean of the legitimate results derived from the laboratory samples examined in this instance should be the result that is used. The guidelines provide details for the minimum mass and also the number of primary samples to be taken according to the size of sampled lot (or dress material) or rate that is deemed acceptable in terms of violation rates. Since the primary goal of supervised trials is to get the best estimate for the average residues, samples used for residue analysis are typically bigger than those allowed by the Codex GLs. Samples might be drawn at random or using a stratified random sampling technique from the experimental site. It was demonstrated

Estimation of the sampling uncertainty;-

Just as was demonstrated, the typical residues and residue CV in each crop unit based on samples containing 100 or so to 120 (that is each sample contains one hundred odd to two dozen individual crop units) taken out continuously from the same parent population can have a large degree of fluctuation. The mean of the C V values is probably the best estimate for uncertainty of sample.24.Naturally, the sampling uncertainty itself is determined by composite sample size and residue distribution in the sampled commodity. The typical ambiguity in sampling estimation for various kinds of plant commodities and sample specifications set out under by the Codex Standard of Samples 22 . These estimates were derived from data sets of 174 residue samples, comprising a total of 22665 validity residue data collected from intentional supervision trials involving the spiking experiment with p. No information was available to estimate the level of uncertainty in the samples of processed foods, eggs, and cereal grains. The Codex GLs provide information about the incalculability of prill , meat and edible offals. In composite samples collected from several fields, there is a significantly greater variance in residues. In composite samples, the mean coefficient of variation (CV) for residues varied between fields was between 80 and 100%. The analysis of the data showed that pesticide& pre-harvest interval, and the dosing rate had no effect on the coefficient of variation of residues within and between fields.27 To get knowledge on the uncertainty of extracting in bulking samples from different lots, the ISO Standard 11648-1 for sampling bulk materials28 proposes applying completely nested or staggered nested experimental design. This reduces the sample size through sub-sampling (sample preparation and analysis). Figure 1 provides an illustration of the processes. The standard suggests sampling about 20 lots, preferably multiple pairs of samples from each lot, in order to gather enough data regarding the analyte's variability. Very similar results were obtained for the average residue and average CV of the residues when the identical residue data population was sampled using either the fully nested experimental design or random composite samples with replacement 24. It should be noted that the lowest and highest CV values found were 0.205 and 0.365, step by step, which conforms with the confidence limits displayed in table 2. This is even if 30 pairs of random composite samples of size 10 were withdrawn 100 times from a data population with a CV of 0.28. It is important to keep in mind that the MRLs pertain to the residues present in the bulk sample when discussing sampling uncertainty. Therefore, any quantity of material meeting the minimal sample size is adequate for assessing compliance with an MRL, and the sampling uncertainty need not be considered. Conversely, in cases when a lot's compliance needs to be confirmed prior to shipment, the sampling uncertainty needs to be factored into the total enlarged uncertainty of the residue value that was measured.

SAMPLE PREPARATION AND PROCESSING

The specific value of the commodity that is analysis is referred to by the Codex MRLs for food commodities.14 Removing foreign material and specific portions of the sample material (such as nut shells, peach or mango stones, adhering dirt, exterior cheerless loose leaves in the case of natural materials, and peddles and plant remains from soil, etc.) may be necessary for the preparation of the analytical sample. The residual level may be considerably impacted by these treatments. To acquire similar results, the sampled preparation technique should be clearly documented and following without deviation as they can't be validate and their contribution to the incalculability of the results cannot

be calculated. There distribution of leftovers varies amongst agricultural units. To create a well-mixed material from which representative test sections can be extracted, the entire laboratory sample must be prepared, and the entire analytical sample must be chopped, crushed, or mixed. Due to the equipment's limited capacity, the large crops (such as five watermelons) that make up the laboratory sample might not be processed all at once. In these situations, it is best to cut representative sections from the different components while maintaining the same surface-to-internal ratio. The age, variety, and equipment of the crops all affect how effective the comminuting process is; however, the extraction method, analyte concentration, and type have no bearing on this process. The CVSp equation characterizes processing efficiency. Compared to soft fruits (orange), it is more difficult to generate a well-mixed matrix from plant materials with hard peal and soft pulp (tomato). The homogeneity (well-mixed status) of the processed analytical sample cannot be confirmed using the standard recovery studies; instead, it should be tested using samples that have been pesticide-treated in accordance with standard procedure29 or by treating a small portion of the crop's surface with appropriate test compounds.30 A third option is to use the test substance on a small section of the sample matrix and then combine it with the remaining sample.16

STABILITY OF RESIDUES

After the samples are taken, the pesticide residues could undergo various chemical reactions or evaporate. To ensure that the samples and the results are representative, it is best to minimize changes in residue concentration.

Stability during storage

Following collection, the supervised trial samples are typically deep-frozen and sent as soon as possible to the laboratory, where they are maintained deep-frozen until analysis. Because of activities including volatilization and enzyme reactions, the concentration of pesticide residues and their metabolites may decrease during this storage time. To show the stability of residues during frozen storage before analysis, storage stability tests are conducted using typical commodities. Included in the data set provided to support compound registration are the storage stability investigations. Information on the stability of residues during storage is also included in the FAO/WHO Pesticide Residues – Evaluations18. A storage stability test should be performed if it is anticipated that the samples will need to be kept in the laboratory for more than a month and there is insufficient information on the stability of residues on representative sample matrices under conditions similar to those in which the samples will be kept. The fundamental ideas20,33 that should be taken into account while organizing storage stability investigations are outlined in brief below.
If the storage circumstances are similar, stability data on a single commodity from a commodity group (see to section 5.5 Method validation) can be extrapolated within the same group. Samples with field-incurred residues may be used for the study provided that the material's appropriate homogeneity has been previously confirmed (CVSp< 0.25 – 0.3 □ CVA). Alternatively, each test segment that was taken out of the homogenized, untreated sample matrix needs to be spiked separately. The same procedures should be followed while preparing and storing untreated test material. For at least 8 • 4 treated and untreated test sections for analyses, there should be enough treated and blank test material, plus some extra as a backup. If an extension of the study period is deemed required, then a greater total number of exam components ought to be administered. If spiking test portions are utilized, the active ingredient and any metabolites or degradation products listed in the residue definition ought to be examined independently. If the concentration of the residues drops during storage, the initial concentration should be high enough to allow for an accurate assessment of the residues. Typically, evaluations at Typically, five time point evaluations are adequate. To confirm the initial concentration, the first test should be run on day 0; the other tests should be chosen roughly by geometrical sledding (e.g., 0, 1, 3, 6 and 12 months or 0, 2, 4, 8 and 16 weeks if the cancel of residual are predicted). Two treated test sections and a minimum of one recently spiked untreated sample ought to be analyzed at every interval. Individual residue concentrations (mg/kg) measured in treatment stored samples (survived residues) should be reported, along with concurrent recoveries expressed as a percentage of the spiked amount and an independently determined standard uncertainty of the measurement as part of the analytical method validation. The ideal individual recoveries are those that fall inside the method's defined warning ranges. Should that not be the case, further recovery studies and residue analyses in further test parts of the preserved samples should be conducted.
It is reasonable to expect that residues would be stable in different matrices if the storage stability analysis, conducted using samples from representative commodity groups, shows that the residues are stable.

Stability of residues during sample processing

Even though laboratory sample preparation can significantly increase bias and uncertainty in outcomes, it has historically gotten disproportionately less attention. Supervised trial samples are typically received and processed at room temperature by monitoring laboratories, but they are typically transported, stored, and processed at deep freezing conditions. The analysts removed the homogenization step from the procedure and were aware that dithiocarbamates or daminozide would decompose quickly if they came into contact with the macerated samples. However, they did not test the stability of other residues or link the loss of residues to their potential decomposition until some publications

revealed that certain compounds (such as dichlofluanid, phthalimides, thiabendazole, and chlorothalonil) would decompose substantially (50–90%).15, 34 Subsequent research showed that processing at or below -20 oC in the presence of dry ice (cryogenic milling) decreased or nearly eliminated the loss of all insecticides that broke down at room temperature.35 Additionally, cryogenic processing could result in a more uniform sample matrix and lower processing uncertainty. It is noteworthy that the amount of pesticide breakdown in test parts increased following sample homogenization, however this did not significantly impact the majority of the compounds' recovery. The inactivation of the enzymes by the extracting solvent and the varying chemical concentrations in the diluted extract are likely the causes. Homogenization is important in helping to assure uniformity during the decomposition process, whose results are determined by sample composition. If intensive and extended comminution in a high speed blender is carried out when reducing the sample processing uncertainty, then this could introduce large bias due to decomposition of residues. Because the rate of decomposition depends on so many factors including lab equipment, variety and maturity of processed crop, there is no adequate knowledge at present to justify extrapolating from one laboratory to another.
The cryogenic processing applied successfully in some laboratories35 includes: In the laboratory, receipt of fresh sample; setting to work preparing portion covered by MRL (analyzed sample); placing in deep freeze as soon as is feasible; chopping and grinding until temperature drops below -20 oC at ratio 1 part dry ice to 1 small portion withdrawn test portions for various extractions; confirmation search of stability residues A combination mixture may be The comminuted material should be taken in portions of at least three; the extract to be analyzed twice. The required number of test portions, and the number of replicate analyses should be determined according to CVA (coefficient variation) of the analytical method, and according to what percentage decomposition should occur within a specific defined probability. The analysis is completed by comparing the residues that are detected to their predicted amounts. The one-tail Student t-test for differences can be used to determine the

METHOD VALIDATION

Parallel with the development of methods, validation has been worked on by AOAC International, EURACHEM, IUPAC Working Party and many national organizations. As the criteria specified by the various guidelines are for the most part similar, they can provide a basis of ensuring that methods validated in one or two cases of analyte-sample matrix combination can be truly reliable. Yet, these general directives are not relevant to analysis methods. But needs and limitations are beyond this. So as to assist analysts, national authorities and accreditation bodies in the provision of guidance on single-laboratory method validation, an International Workshop at Pretoria prepared a Guideline for Single Laboratory Method Validation. 36 The guidelines were then distributed worldwide through WHO's regional offices. incorporated into the Good Laboratory Practice CCPR.4 The Guidelines also include detailed information on spreading the method to a new analyte and/or sample matrix, and for adapting an accepted, full-scale validated method in another laboratory. As the Guidelines point out, to validatea method is not a non-stop procedure. Only those steps that are necessary at any particular time for its practical application need be validated. Actually this includes the performance verification during use of the method as well. In the process of developing or adapting an analytical procedure; assuring that performance is at an acceptable level; regularly performing quality control on methods used in the laboratory, providing data to AOAC as evidence of acceptable performance for its second or third generation method, or participation with others in a proficiency test study, it may be possible to obtain information which is necessary especially for the description Before a method is validated, the technique has to be optimized, and drawn up as an SOP in meticulous detail with all necessary steps described. The staff carrying out the validation should first become familiar with the method itself. Parameters to be studied are: residue stability in samples stored prior to analysis and during sample processing; efficiency of extraction; homogeneity of the analyte within processed samples; selectivity with which it can be separated from interferences by the concernsom method used; effectiveness with which an analyte is detected (specificity) on a chromatographic detectorthe calibration function at each concentration level should fit into, as including range, limit of detection (LOD), limit of quantitation (LOQ), and ruggedness.
Validation must be done for individual methods with the specified analyte(s) and sample materials, or through use of representative commodity (see Table 4), a minimum of two representative groups and two representative analytes each from these groups respectively; group specific methods with representative commodities (Table 4) and one comprising a minimum of ten analytes selected from those relevant to products belonging to Differentiate among commodities except where not necessary for purposes of method validation. For a method characterization with analytes, the concentration of these analytes should be chosen so that it will cover the analytical ranges of all analytes. Where appropriate, full method validation is necessary in all matrices and on all compounds specified.
If its performance meets the broad criteria set out in Table 5, the method can be considered to be applicable for an analyte. The repeatability and reproducibility criteria given in the table are based on the Horwitz equation: RSD = 2C(-0.1505) . In the formula, c is dimensionless; that is to say c = 1 mg/kg 2 x 10 V6. A comparison with early studies37 suggests that the Horwitz equation would exaggerate variations at low concentration levels (less than 0.1 mg/kg), so you can assume the tabulated data to be an upper limit of willingness to accept reproducibility.

Internal assessment of quality;

The validation and optimisation data allows a QC scheme to be designed.

The method should be periodatically tested within the internal quality control plan of the laboratory when used.The internal quality control /performance verification is carried out to:

Its accuracy under the actual conditions in which it is used; add together all those inevitable variations due to differences in sample composition, instrument performance, chemicals of unequal quality and varying analysts keeping different schedules with their own methods of working; Its performance characteristics are similar to those known during method validation, and the results of the application of the method are under “statistical control”. The uncertainty associated with its application is comparable to that established during method validation.

Information from internal quality control results is needed as a basis for confirming and refining the performance characteristics established during initial validation, and expanding the scope of application. The following describes certain important elements of the QC scheme. Analyte content should be compared to the previous standard or prepared in triplicate for the first time to confirm that analytical standards have been prepared correctly. Weighing less than 10 g of standard material should never be done on a balance with a 0.01 mg sensitivity. All standard solution dilutions should be done independently using weight measurements, with the exception of the final stage, which calls for the use of an A-grade volumetric flask.12 When evaluating the linear calibration function for GLC and HPLC data, weighted regression (WLR) should be used, particularly when examining the lower third of the concentration range. When using the weighted and ordinary (OLR) regression computation, the confidence bounds in the middle and upper calibrated range are roughly the same. The goodness of the calibration should be represented by the standard deviation of relative residuals (Srr), which is a much more sensitive indicator for confidence intervals about the regression line than the regression coefficient. (See Table 6.) The relative residuals (residuals/predicted response.

INTERLABORATORY STUDIES

Active participation in interlaboratory studies and proficiency tests is another main feature of quality assurance programmes, and indeed a prerequisite to getting accredited. These give laboratories the chance to display how they do business when they receive standard samples. The results of these studies are positive, but to prove their worth outside the laboratory can be highly problematic. Conducting internal quality control shows this. The harmonized criteria for laboratory performance testing were jointly developed by ISO, AOAC and IUPAC.39,40 Currently many organizations use these revised harmonized criteria to organize proficiency tests.41-43 These test programmes have still not been extended to other countries in Africa and Asia so players can adequately express themselves across the board.

Before they take samples, participants are informed of the pesticides sorts. As well, the carefully homogenised and tested material44 that researchers contact in field studies may have gotten there in one of two ways. The first is that residues from agricultural operations may actually be contained in it. Or, its resting place can simply house stable analyte mixtures designed to persist for the entire duration of any particular series of studies outside on occasions when researchers find they need A preliminary check is made to exclude apparent bad data, then Cochran test (as an indicator of analytical outlyingness) is performed. The results reported are first examined for instances of apparent bad data and then screened by the Cochran test or as major indicators of analytical outlyingness. Hence the value assigned 45 mean ( ) is easily computed by the robust average of results with spurious and outlying values removed. The unit, pCi/mL and the target standard deviation, □ should be derived according to normal practice or 'fit for purpose 'especially in respect of the analyte in question. This may be derived from the results of collaborative studies or estimated based on Horwitz equation37or those suggested by Thompson.38The z- score is calculated form assigned and reported value: The z-score is most important when it comes to Latin statistics. Ordinary laboratories that are working properly should give results within 2 □ z in the great majority of cases, but about one out of twenty times you can get between 2 and 3 multiple units z. Results over three multiple units z must be extremely exceptional (probability: Which only was less than half a percent, and is called for rechecking by superiors. In order to evaluate each laboratory’s overall performance, and taking into account all pesticides analysed, the EU proficiency test programme42 used three methods to combine the z-scores: Equating RSZ = ∑z□zi□/n, SSZ = ∑z2 and the weighted sum of z-scores as being (the weight is), (0 if z>3; if 2< z≤ 3 then multiply by three times the original value; any other input take is one times its own value), prof .

CONCLUSION

Checking quality is a key part of an organization's work. Companies can make sure their products and services are the best they can be by using proper tools and methods.

REFERENCES:

1. International Standard Organization, ISO/IEC 17025: 2005 General requirements for the competence of testing and calibration laboratories, 2005.

2. OECD Series on 'Principles of Good Laboratory Practice and Compliance Monitoring' No. 1-11, OECD Environmental Directorate Paris, 1998. http://www.oecd.org/document/63/0,2340,en_2649_34365_2346175_1_1_1_1,00.html
3. European Commission, Quality Control Procedures for Pesticide Residues Analysis, Document Nº SANCO/10232/2006, 2006.
4. CodexCommittee on Pesticide Residues (CCPR): Guidelines on good laboratory practice in residue analysis, CAC/GL 40-1993, Rev.1-2003, 2003 www.codexalimentarius.net/download/report/655/al29_24e.pdf
5. EURACHEM/CITAC, Quality Assurance for Research and Development and Non-routine Analysis 1998.
6. EURACHEM/CITAC, Selection, use and interpretation of proficiency testing (PT) schemes by laboratories – 2000, 2000.
7. EURACHEM/CITAC, Traceability in Chemical Measurement – A guide to achieving comparable results in chemical measurement, 2003.
8. King, B., Quality in the Analytical Laboratory, in *6th International Symposium on Quality Assurance and TQM for Analytical Laboratories*, ed. Parkany M., The Royal Society of Chemistry p. 8-18, 1995.
9. Miller, J.N. and Miller, J.C., *Statistics and Chemometrics for Analytical Chemistry*, 4th ed, Pearson Education Limited, 2000, chap. 1.
10. EURACHEM, EURACHEM/CITAC *Guide Quantifying Uncertainty in Analytical Measurements* 2nd ed. 2000. http://www.measurementuncertainty.org
11. International Standard Organisation, *Guide to the Expression of Uncertainty of Measurement*, 1995.
12. Ambrus, A., Reliability of measurement of pesticide residues in food, *Accred. Qual. Assur*. 9, 288, 2004.
13. Codex Committee on Pesticide Residues (CCPR): Proposed draft guidelines on estimation of uncertainty of results, in Report of the 38th Session of the Codex Committee on Pesticide Residues 2006 http://www.codexalimentarius.net/web/archives.jsp?year=06
14. Food and Agriculture Organisation, Portion of commodities to which codex maximum residue limits apply and which is analyzed. in Joint FAO/WHO Food Standards Programme Codex Alimentarius V. 2, Pesticide Residues in Food 2nd ed., FAO, Rome, 1993, 391.
15. El-Bidaoui, M., et al., Testing the effect of sample processing and storage on stability of residues, in *Principles and Practices of Method Validation*, eds. Fajgelj A. and Ambrus A., Royal Society of Chemistry Cambridge UK 2000, pp.75.
16. Suszter, G., etal., Estimation of efficiency of processing soil samples, *J. Environ. Sci and Health Part B*. 41, 1, 2006.
17. Meier, P.C. and Zünd, R.E., Statistical Methods in Analytical Chemistry, John Wiley & Sons, Inc. 1993, chp. 2.