



Universität Stuttgart
Germany

EAC PT evaluation workshop

Arusha
18-19 February 2008



Report on the EAC Proficiency Testing Evaluation Workshop with Training Course on Basic Statistics, Control Charts and Corrective Actions

Arusha, Tanzania, 18 – 19 February 2008

Prepared by Dr.-Ing. Michael Koch

Summary

The workshop covered the evaluation of the 2nd Proficiency Testing rounds on the analysis of edible salt, wheat flour and drinking water, provided in 2007

The result of the PTs showed that in most cases the standard deviations of the results are much too high, so that there is a need to improve.

To facilitate this a training session was included in the second day which mainly covered the basics of statistics, the use of control charts, how to do corrective actions and some aspects of method validation.

Most of the participants are enthusiastic and are also willing to contribute to the PT scheme, e.g. by paying a fee for the participation.

As the result of the evaluation questionnaire shows, the laboratories benefit very much from an exchange with colleagues from other labs. Some participants recommend to establish an association of laboratories in the way it was done in connection with the SADCMET Water PT scheme.

Introduction

The workshop reported here followed the 2nd PT rounds of the EAC PT schemes for edible salt, wheat flour and drinking water. After the 1st round separate evaluation workshops were held in the Tanzania, Uganda and Kenya.

The PT rounds were organized with support from Physikalisch-technische Bundesanstalt in Germany.

The workshop covered the report from the experiences of providers as well as participants and the evaluation of the results.

Besides this the opportunity of the workshop was used to provide training courses on basic statistics, control charts and corrective actions.

Participants and Organisation

The workshop was attended by 39 participants from the following countries:

- Kenya 20
- Tanzania 13
- Uganda 6

In addition the three PT providers were present and a representative from UNBS responsible for the SADCMET microbiology PT.

A complete list of participants is given in annex 1.

Monday, 18 February 2008

Opening and Evaluation of and experiences from the 2nd PT rounds

- **K. Mbwambo / M. Koch:** Opening and Introduction
- **All participants:** Introduction
- **K. Mbwambo:** Background
- **K. Mbwambo:** Experiences from the salt PT
- **F.K. Nyakoe:** Experiences from the wheat flour PT
- **P. Kaviiri:** Experiences from the water PT
- **P. Kaviiri:** Change from water to edible oil
- **P. Kaviiri / M. Koch:** Introduction to working groups
- **All participants:** Working group discussions
- **All participants:** reports from the working groups and plenary discussion
- **F. Nyakoe:** Agreements from this meeting
- **C.A. Odongwun / M. Koch:** Promotion of the SADC MET Water PT Schemes

Opening

The Workshop was officially opened by Charles Ekelege, acting director for the Tanzania Bureau of Standards.

The PTB representative Stefan Wallerath, the new SADC MET regional coordinator Donald Masuku and Mrs. Kezia Mbwambo as chair of SADC Water Lab also welcomed the participants.

All participants shortly introduced themselves.

Kezia Mbwambo – Background

K. Mbwambo gave a short presentation, why it is necessary for laboratories to participate in proficiency tests and about the background of the EAC scheme. The presentation is included in annex 2.

Kezia Mbwambo – Experiences from the salt PT provider

K. Mbwambo described her experiences during the last PT round. She explained the preparation of samples, the homogeneity check and she gave an overview about the participation and the characteristics of the PT round. She explained the evaluation of the results and their assessment and showed the results for all parameters. The PT round in total was successful, but there were some problems concerning communication with participants and – still – the standard deviations in the PT round were too high. An improvement of the analysis, which hopefully will be triggered by corrective actions in participants' laboratories after that PT round. The complete presentation is included in annex 3.

Felista Kerubo Nyakoe – Experiences of the wheat flour PT provider

F.K. Nyakoe presented her experiences in the PT round in a similar way. The problems faced were the same, difficult communication, much bureaucracy leading to

slow response and decision making. The standard deviations also were high, so that an improvement is indispensable. F.K. Nyakoes slides are included in annex 4. In the plenary the question about the best methods was raised. It was discussed how the laboratories could cooperate and how the methods used in the laboratories could be improved. F.K. Nyakoe's slides are included in annex 4.

Phenny H. Dentons Kaviiri: Experiences from the water PT

P.D. Kaviiri gave an overview about his experiences in the water PT in a similar way as his two colleagues. He had similar problems with communication and also in this PT the standard deviations were too high. The respective presentation is included in annex 5.

Phenny H. Dentons Kaviiri: Change from water to edible oil

P.D. Kaviiri explained, why the water PT will not be continued and replaced by a PT scheme for vegetable edible oil. He referred to the SADC MET water PT scheme, which is also sponsored by PTB and is open for all EAC laboratories. The new PT scheme will start with the following parameters:

- peroxide value
- acid value
- moisture and volatiles content
- iodine value
- refractive index
- relative density
- copper content
- iron content.

All participants: Working group discussions

The participants were divided into three working groups discussing nine questions. After 1 hour of discussion there was a report to the plenum and an overall discussion:

Question 1: Did you receive the samples in good time and good state?

The majority of the labs received the samples in time. There was one lab reporting difficulties. It was suggested to include more than one contact person in the communication and to inform the laboratories prior to sending out the samples

Question 2: Was the time given for analysis enough?

The time given for analysis was ok for all participants

Question 3: Was the sample quantity adequate?

The sample quantity was enough for the PT round, but more sample would be helpful for later corrective actions. It was discussed, whether it would be helpful, if the PT provider would sell additional samples after the PT round to be used as reference material for corrective actions. But this would depend very much on the stability of the samples, which should be checked for this long time period beforehand.

Question 4: Was the information given sufficient?

In general the information was sufficient. It was suggested to include the concentration ranges for the parameters in the announcement. But there was not a real agreement between participants, so that this question still has to be discussed. It was also

suggested to put a list of methods on the report form, so that the respective method only has to be ticked.

Question 5: Did you understand the PT report? – Is there something more to be included?

In general the PT report was understood. The question was discussed, if the analytical method used by the provider should be reported. In the discussion this was generally regarded as not useful since the PT provider does not act as a reference laboratory. It was also discussed, if a ranking of the participants according to their results would be helpful. But since such a ranking is influenced very much by random effects, this is not recommended by international guidelines.

Question 6: Was the participation helpful?

All participants agreed that participation really was very helpful.

Question 7: Any suggestions for the next round (e.g. parameters)?

The following suggestions were made:

- Salt PT: sulphate and lead due to East African requirements
- Wheat flour PT: gluten-index, gluten (wet and dry), micronutrients, colour

Question 8: Is a fee of 100 US-\$ affordable?

It was generally agreed, that a fee of 100 US-\$ would be affordable. The problem is to convince the management. On the other side a participation fee would also create more awareness.

Question 9: Evaluation meetings – jointly or separately for each country?

All participants agreed, that a joint workshop is more beneficial, because it gives more possibilities for networking.

Felista Kerubo Nyakoe – Summary

F.K. Nyakoe summarized the results of the PT meeting as described above.

Michael Koch: Promotion of the SADC MET Water PT Scheme for chemical analysis

M. Koch described the SADC MET PT Scheme for chemical analysis of water. on the basis of the content of the respective flyer. The slides are included in annex 6.

Charles A. Odongwun: Promotion of the SADC MET Water PT Scheme for microbiological analysis

C.A. Odongwun (UNBS) reported about the progress of the microbiological PT scheme for water analysis laboratories in SADC and EAC countries. He mentioned the training of staff in Germany and the internal training in his organisation and the items received from PTB that enable them to provide this PT. He spoke about the prepartation of stock cultures from a certified collection that includes the quality control. The problems during the trial phase were mainly due to problems of harvesting still at growth phase and observed counts being less than expected due to wrong media.

The future activities will be to solve packaging problems and to investigate effects of storage temperature. The announcement will be end of February.

Tuesday, 19 February 2008

Opening and Evaluation of and experiences from the 2nd PT rounds

- **K. Mbwambo:** Lab data base
- **M. Koch:** Basic statistics
- **M. Koch:** Control Charts
- **M. Koch / all:** Control charts exercise
- **M. Koch:** Control charts software
- **M. Koch:** Corrective actions / method validation

The whole was dedicated to training mainly about statistics and control charts. At the beginning K. Mbwambo introduced the participants to a internet website (<http://www.eac-quality.net>) about Quality Infrastructure in the East African Community, which also contains a laboratory database (<http://www.eac-quality.net/the-sqmt-community/directories/laboratories/testing.html>).

The content of the lectures of M. Koch will not be repeated here. All slides are included in the annexes 7 to 10.

Evaluation questionnaire

M. Koch distributed an evaluation questionnaire (annex 11) for the workshop to be filled out by all participants.

The results of this questionnaire were as follows:

The judgement of the participants regarding

- **The venue of the workshop:**
 - Very good 25
 - Good 15
 - Fair 2Mean: 1.45 (1 for very good, 2 for good, 3 for fair)
- **The content of the presentations:**
 - Very good 26
 - Good 16Mean: 1.38 (1 for very good, 2 for good)
- **The material distributed:**
 - Very good 27
 - Good 14
 - Fair 1Mean: 1.38 (1 for very good, 2 for good, 3 for fair)
- **The working group discussions:**
 - Very good 23
 - Good 17
 - Fair 2Mean: 1.50 (1 for very good, 2 for good, 3 for fair)

The judgement of the participants regarding the different parts of the workshop on a scale from 1 (very useful) to 5 not useful):

- **Evaluation of the PT**

1: 27

2: 10

3: 1

4: 0

5: 0

Mean: 1.32

- **Training**

1: 30

2: 11

3: 0

4: 0

5: 0

Mean: 1.27

The most important topics (in brackets the number of participants mentioning this point):

- Control Charts (38)
- Validation of Methods (35)
- Basic Statistics (30)
- Corrective Actions (24)
- Practical exercise Control Charts (19)
- PT providers experience and report (17)
- Importance of PT (4)
- Group discussions (4)
- The way forward - agreements from the meeting (3)
- PT results discussion (3)
- Statistical Treatment of Results (2)
- Future plans to introduce microbiology in PTs (2)
- Quality Control (2)
- Use of PT results (2)
- Evaluation of results (2)
- Standard addition (2)
- Challenges faced during PT analysis (1)
- Plenary discussions on wheat flour (1)
- Test on precision of analytical data (1)
- Introduction "Why PT?" - background and objectives (1)
- All topics (1)
- Experience sharing (1)
- Limit of detection (1)
- Limit of determination (1)
- Training in general (1)
- Sample preparation by PT providers (1)
- Introduction of SADC PT (1)
- Preparation of Controls and standards (1)
- Determination of errors, Trueness (1)

Did the workshop fulfil your expectations?

Yes: 39

No: 3

reasons for no or partly:

- More explanation of the PT was required
- The statistics not detailed
- The time was very short

What benefits did you draw from the workshop?

- The corrective actions that are performed when some results are above the range
- Sharing of knowledge and experience from my fellow colleagues from different countries
- How to evaluate my analytical data and when to intervene and do corrections on time
- Networking with other colleagues in the EAC region
- How to use control charts to identify any deviations before it becomes too late
- Exchanges of information from different participants useful in analytical methods. Basic statistics as a useful tool in analysis
- Networking, statistical methods of analysis, importance of urgent corrective actions
- Exchanging and sharing ideas with other laboratories in EA
- Networking with other laboratories
- I will be in a position to evaluate the data I get during analysis in the lab and know how my lab is performing
- Learning the challenges the other labs are facing and how they are able to overcome them.
In depth knowledge on application of statistics in QC
- Interaction between PT providers other participants and exchange of ideas. Participated in coming up with the way forward – agreements from the workshop which will contribute positively to improvement of the EAC PT scheme.
- Clearly understood the importance of PT as a basis for continual improvement in a laboratory
- Made me a better manager of the laboratory
- The use of control charts is now more clearly comprehensive than before
Statistical procedures well communicated
The interaction was useful
The sponsor and the PT providers were kind and helpful
- Improvement of accuracy in measurements
Networking
- Networking with fellow laboratory experts
Tools acquired during the training such as application of control charts
Importance of PT participation in laboratory field
- Learnt ways of doing Quality Control of Analysis in the lab
- Meeting contemporary laboratory staff who are participating in EAC-PT.
Knowledge of control charts and revision of basic statistics
- Networking with other labs
Deeper statistics understanding
- Control charts, typical use in the laboratory. Very useful in controlling the process in the lab

- The training component and the materials have been particularly useful
- Networking, new knowledge of trends in chemistry
- Experience sharing with colleagues
Knowledge of other scientists in the region
- I will draw attention on method used in determining parameters whereby I will make a follow-up on good method of determination
- Knowledge and practical exercise on control charts which will improve my in-house laboratory quality control
- The workshop has given me an insight on how to formulate pre-period data, draw control charts and use the control charts to control testing process.
- The workshop has fully sensitised me on quality assurance / PT importance and how to run quality control in the labs
- Increased knowledge of evaluation of analytical data. Good contacts with experts from other laboratories in East Africa
- Interaction with different lab personnel
To learn new things and very interesting to day to day lab work / activities
Common types of PT
- Control chart
Share ideas with others
- Interpretation of PT reports and use of statistics in analysis and quality control
- We shared a lot of experience from different laboratories
Training on control charts, corrective action will be useful when we go back to our respective laboratories and institutions
- Control chart types (drawing)
Common types of PT
- Quality assurance
Networking
Contacts
- Good knowledge based on analytical work and data evaluation
- Preparation of control charts and its importance in the laboratory
- Control charts are of help to my work
- How to go about correcting parameters failed in PT 2nd round
- Sharing ideas with colleagues from other labs and countries
Learning of new analytical techniques
- I have learned statistical evaluation of analytical tests
- I felt challenged to get my lab organized for accreditation
- PT is very important. I learned that corrective action is very important and method validation is important

Any other comments:

- It was very compacted (the program) and I could not relax in the course of the sessions.
Very grateful to PTB for the sponsorship and keeping our laboratories in network with other regional laboratories.
The facilitator knew what he was doing, very interactive and involving
- The arrangement next time should be better. This is because our employees were not fully informed hence taking many things for granted. It is the participants who bear the consequences.

- The EAC should organise a group to deliberate on other laboratory issues as Society for Professionals especially one involving laboratories
- The different laboratory managers from different regions should form a group where they can be consulting on various issues relating to the subject of the PT.
- Time was limited and we needed more time to study statistics and how they can be applied when analysing data
- Should be done more regularly. We hope that the PT-Fee was calculated to make this exercise sustainable and a full exit to donor subsidies. Such programs will only last when there is willingness to pay by participants, hence all costs should be factored to avoid making fee unnecessary(?)
- Extending the training time, one day not sufficient
- Next time give clear instructions for the programme, e.g. carrying of laptops in order to ease assignments.
Include and give ample time to practical subjects, like statistical application to data
- The workshop has helped me to see the importance of participation in PT programmes
The workshop has helped me to formulate analytical chemists network within my region.
- Congratulation to the organizers, PTB and PT providers, for your good, well organized workshop. This has been an important workshop, where EAC lab analysts have managed to come together, exchange knowledge and experience. And to be trained. Keep it up. God bless you
- The training duration was relatively short. To adequately cover the topics the facilitator needed a minimum of two days. He had to rush over some topics (useful) due to the time limit

Closure of the meeting

Kezia Mbwambo closed the workshop and thanked all participants for their cooperation.

Report prepared by Dr.-Ing Michael Koch
Stuttgart, 16.4.2008