March 2012

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Sanitary and Phytosanitary (SPS) - Pakistan

A quarterly Newsletter published by Trade Related Technical Assistance (TRTA II) Programme

EDITORIAL

Food contamination creates an enormous social and economic burden on communities and their health systems. One of our articles this month reports on the level of contamination of the milk supply in the Punjab with aflatoxins, which enter the supply chain as a result of poor storage of grains used for animal feeds. With the emerging realization that food safety is a critical public health issue and food borne disease has a major impact on health, the Federal and Provincial Governments of Pakistan are initiating efforts to improve the safety of the food supply and promoting the use of food safety management systems to the food industry. In this context, knowledge about the internationally agreed approach to food safety controls and its implementation underpinned by a good knowledge of the science and technology of food safety, as well as corresponding legislation of the country is essential. This demands that there is a corps of professional officers with appropriate qualifications and training. We have estimated that Pakistan needs at least 3,600 new food inspectors, who are appropriately informed and trained in all aspects of food safety management. Realizing that there was no suitable courses available in Pakistan which offered a unique suite of courses to meet the needs of food safety professionals, the TRTA II programme stepped in and after a thorough analysis, found that at least three universities in Pakistan with potential for initiating a pioneering Post Gradate Diploma programme in Food Control & Inspection. Therefore a new diploma course has been designed jointly by experts from University of Veterinary and Animal Sciences Lahore, University of Agriculture, Faisalabad and University of Karachi as well as with additional inputs from a number of government departments and International academics. The TRTAII programme has facilitated and managed this project (see the article below) and is subsidising the first 2 years of the courses. However more will need to be done. Most importantly, we call on all our readers to ensure that this opportunity is well utilized, and to encourage young qualified persons to attend this course to help establish a safer Pakistani food industry for all consumers, both domestic and in export markets.

SUMMARY

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The Ministry of Commerce is overall coordinator

The programme is implemented by UNIDO in association with ITC & WIPO

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Food Safety Training

In 2011, the UNIDO/TRTA II project conducted a strategic analysis of the Sanitary and Phytosanitary controls to identify the critical areas where improvements are required, which showed a significant skills shortage in the area of food safety and inspection. At present the only dedicated food safety training courses available in Pakistan are short courses (5-10 days) in HACCP and ISO 22000, focused on industry middle managers. To support the introduction of improved controls, the Project concluded that there is a need for the development of a dedicated training provision for food safety inspectors, which can provide opportunities for skills upgrading for existing staff, as well as providing for the expected manpower needs of a reformed food safety control system.

Based on a modest provision of 1 inspector per 50,000 population, this suggests a need for some 3600 inspectors to be trained to meet current needs, with an annual requirement for 100-150 per year in replacements. Training is required not only in technical food safety considerations, but also the control processes associated with an effective inspection process (legislation, enforcement procedure, rules of evidence, dealing with non- compliance, control and management, dealing with extra-professional influences etc). Business operators in the food supply chain will also need inputs of technical expertise to assist them with compliance.

Dr. Andrew Mathieson leads food safetytraining course

TRTA II experts and experts from the University of Veterinary and Animal Sciences, Lahore, National Institute of Food Science and Technology, University of Agriculture, Faisalabad and Department of Food Science and Technology, University of Karachi have come together to jointly design a new Post Graduate Diploma Course in Food Safety and Controls. A syllabus based on WTO SPS Agreement and the FAO (WHO Codex requirements has been drawn up for implementation with the aim of the first intake being made in 2012.

Working group deliberations in progress

The course intends to offers flexible opportunities for knowledge, skills and experience acquisition whilst progressing continuing professional development at postgraduate level. Graduates from this one year course will have higher level knowledge of the causes and solutions to the problems in food safety faced by the consumers in Pakistan. They will have the relevant scientific, technical and legal knowledge to detect fraudulent and dangerous foods and advise manufacturers and processors on how to improve food manufacturing and food safety standards in order to make food safer, increase productivity, and critically ensure compliance with legal SPS requirements both domestic and in export.

A workshop was held at the University of Veterinary and Animal Sciences (UVAS), Lahore, where the academics from all the three participating Universities met and finalized the details of the syllabus, teaching material, student support and assessment strategies. This exercise was facilitated by TRTA II programme international expert Dr Andrew Mathieson, from the Public Health Department, Bedford University, UK. This pioneering intervention will lead to the provision of trained human resource for food safety and inspection services that will support the farmers, transporters, manufacturers and retailers, and crucially ensure a supply of good quality safe food for export markets, realise the reduce the exposure of all consumers of Pakistani foods to food safety risks The first courses will start in September 2012, which will include a subsidy on course fees from the TRTA II programme, and interested applicants should contact the relevant Universities directly.

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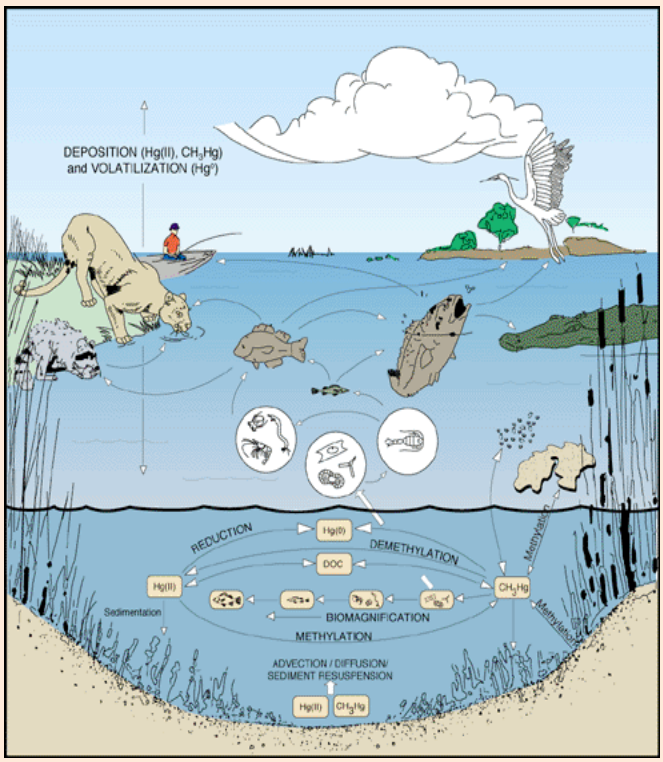
Risk of Methyl-mercury Associated with Seafood Consumption

by ***Dr. Shahina Naz***
Assistant Professor, Department of Food Science & Technology, University of Karachi
Email: naz.shahina@yahoo.com , shahina.naz@uok.edu.pk

Karachi is the largest city of Pakistan and the centre of industrial activities. Its coastal areas accommodate over 60 % of Karachi city's industries, including more than 6000 different industrial units such as chemical industries, textiles, pharmaceuticals, metal industries, oil refineries, petrochemical industries and tanneries. According to the research studies done in Nematological research centre, University of Karachi, huge quantities of industrial effluents and domestic sewage discharges amounting to more than 400 million gallons per day are directly discharged in the coastal areas via the Lyari and Malir rivers and many open drains. Extremely high levels of toxic heavy metals such as mercury have been documented especially in the coastal waters and sea near Karachi.



Mercury is a highly toxic element. The toxic effects depend on its chemical form and the route of exposure. Methyl-mercury [CH_3Hg] is the most toxic form. It affects the immune system, alters genetic and enzyme systems, and damages the nervous system, including coordination and the senses of touch, taste, and sight. Methyl-mercury is particularly damaging to developing embryos, which are five to ten times more sensitive than adults. Exposure to methyl-mercury is usually by ingestion, and it is absorbed more readily and excreted more slowly than other forms of mercury.

Mercury from industrial effluents is discharged into the sea. Bacteria in the sea water take up mercury in its inorganic form and convert it to methyl-mercury through metabolic processes. The conversion of inorganic mercury to methyl-mercury is important because its toxicity is greater and because organisms take considerably longer to eliminate methyl-mercury. These methyl-mercury-containing bacteria may be consumed by the next higher level in the food chain, or the bacteria may excrete the methyl-mercury to the water where it can quickly adsorb to plankton, which are also consumed by the next level in the food chain. Because animals accumulate methyl-mercury faster than they eliminate it, animals consume higher concentrations of mercury at each successive level of the food chain. Small environmental concentrations of methyl-mercury can thus readily accumulate to potentially harmful concentrations in fish, fish-eating wildlife and people.

It is not only the seafood that has to be assessed for the risk of mercury or methyl mercury intake, significant mercury levels (9.0-130.6 ppb) were detected in vegetables like Spinach, Lettuce, Carrot, Capsicum, Sweet pea, Potato, and Cabbage collected from the five districts of Pakistan viz Lahore, Kasur, Multan, Bahawalpur and Rahim Yar Khan. The study was performed by Food testing Laboratory, Health Department, Lahore.

FAO/WHO recommends as allowable upper limit of weekly intake of methyl-mercury of 1.6µg/kg body weight based on most sensitive toxicological end-point (developmental neurotoxicity). Food and drug administration (FDA) and Environmental Protection Agency (EPA) reference dose is 0.1µg/kg body weight per day.

However, because mercury can be concentrated as it moves up the food chain, contamination of fish and seafood is of a greater concern. In the EU the upper limit for methyl-mercury in fishery products is 0.5µg/g wet weight (1.0µg/g for tunas) in the edible part of the flesh. Several investigations and research reports have proved mercury contamination in Karachi coastal water and sea life. Owing to its acute and chronic toxic impacts on human beings, marine biodiversity and fish-eating birds it is essential to have more information about methyl-mercury, particularly in the near shore regions where we expect contamination to be heaviest. Until know we have not had any properly structured research to identify the species and fishing areas most at risk from this important toxin. There is an urgent need to support the launch of a structure monitoring programme, which takes annual samples of fish most at risk and assesses their safety.

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A Survey of Aflatoxin M1 in Milk and Sweets of Punjab, Pakistan

Authors: *Asma Sadia, Department of Chemistry,LCWU, Lahore, Pakistan, Makhdoom A. Jabbar, Department of Food and Nutrition, UVAS, Lahore, Pakistan, Youjun Deng, Department of Soil and Crop Sciences, TAMU, College Station, USA, Erum A. Hussain, Sauliha Riffat Department of Pharmacology and Toxicology, UVAS, Lahore, Pakistan, Saima, Department of Food and Nutrition, UVAS, Lahore, Pakistan, amd M. Arif Department of Food and Nutrition, UVAS, Lahore, Pakistan.* *The authors are grateful to Pakistan Science Foundation for providing funds to carry out this research work.*

A team of distinguished Pakistani and US academics in Lahore have just completed an major study of aflatoxins in milk and dairy products sold in the Punjab. Aflatoxins are a group of toxic, carcinogenic and immunosuppressive fungal metabolites. They are mainly produced by the fungi *Aspergillus flavus* and *A. parasiticus* which grow on different crops and feed stuffs such as corn, wheat, rice, and kitchen waste. There are 20 types of natural aflatoxins. The Liver is the principal organ affected by aflatoxins. High doses of aflatoxins result in severe hepatocellular necrosis; while prolonged low dosages result in reduced growth rate and liver enlargement and significantly increased rates of cancer. Globally approximately 4.5 billion people are chronically exposed to aflatoxins and this is one of the major food safety risks faced by Pakistan. Most developed countries have established maximum permissible level of aflatoxins in food and feeds and measures to ensure destruction of aflatoxin contaminated crops. When lactating mammals such as cows, sheep and goat are fed with aflatoxin contaminated feed, the toxin is excreted in the milk in the form of AFM1 (Aflatoxin M1).

Since milk and milk products are the major source of many nutrients for children and adults, the presence of aflatoxin M1 in milk and dairy products is a worldwide concern The European regulatory maximum level for AFM1 in liquid and powder milk is 0.05 µg/kg (European Commission 2001).

Pakistan is an agricultural country producing a variety of crops susceptible to aflatoxins. Its climate is very conducive to the growth of the *Aspergillus* fungi on the crops. Unfortunately, no strict systematic monitor or control has been implemented to prevent the mycotoxins from entering the food chain. Pakistan is the fifth largest producer of milk in the world with approximately 29 million tons annual production (Umm E Zia, 2007). The milk in Pakistan is mainly produced by small farmers at small scales. If liquid milk is contaminated with AFM1 then any product derived from it will also be contaminated because the residues of AFM1 remains stable when milk is heat treated, concentrated, or stored at low temperature (Yousef and Marth. 1985).

Punjab is a major milk producing province the authors therefore conducted a study with the aim of investigating the aflatoxin M1 contamination status in raw, shop milk and sweets (*mithae*) in samples taken in the 36 districts of Punjab Province.

Forty householder milk, 175 shop milk, 17 large scale dairy farm milk, and 138 burfi (a type of mithae) samples were collected from 36 districts of Punjab Province, Pakistan. All samples were analyses using an ELISA (Enzyme-linked immunosorbent assay) method.

The results showed the presence of Aflatoxin M1 in 232 milk samples with varying concentration ranged from 0.002µg/L to 1.9µg/L. Low level of AFM1 (≤0.05 µg/L) was detected in most of the milk samples (157). However some individual samples had high levels of contamination. About 32% raw milk, and 78% sweets samples had AFM1 concentration higher than the European Commission regulation limits. (Figure 1).

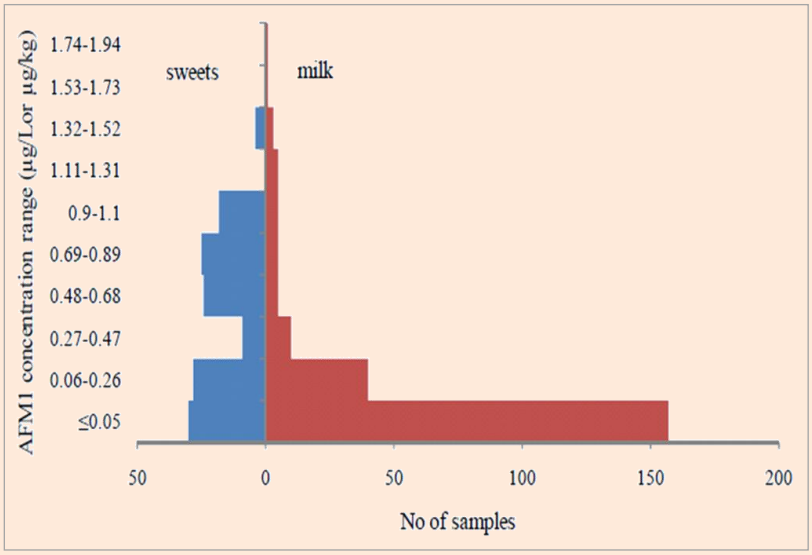

Figure 1: levels of AFM1 in milk and airy based sweets

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Negligible level of aflatoxin contamination (<0.02µg/L) was observed in milk samples of 13 districts while 2 districts showed high average incidence (>0.8µg/L) of aflatoxin M1 (see Figure 2). Average contamination level of milk samples from Attock, Bhakkar, Gujranwala, Kasur, Muzaffargarh, Narowal, Okara, Pakpattan, Shekhupura, Sahiwal and Vehari was also exceeding the EU limit (0.05µg/L).

Conclusions and implications

The study indicates that the high level of aflatoxin M1 in milk and sweets is a health hazard for the consumers of Punjab. The researchers recommend that animal feed should be checked regularly for AFB1. The finding of high level of M1 toxin from sweets suggested that these samples should also be screened for the presence of total aflatoxin (B1, B2, G1, and G2).

The researchers state that AFM1 analysis and control must be taken seriously by the dairy industry and food safety bodies in Pakistan with the aim of reducing Aflatoxin M1 contamination and improve the quality of milk and milk products. It is important to establish the maximum permissible levels for AFM1 in milk and milk products and regular monitoring should be practiced so that contaminated milk and milk by products cannot be sold in market. In addition there is a need on public education to increase awareness among farmers, dairy companies and consumers for the economic loss and toxic effects of aflatoxins.

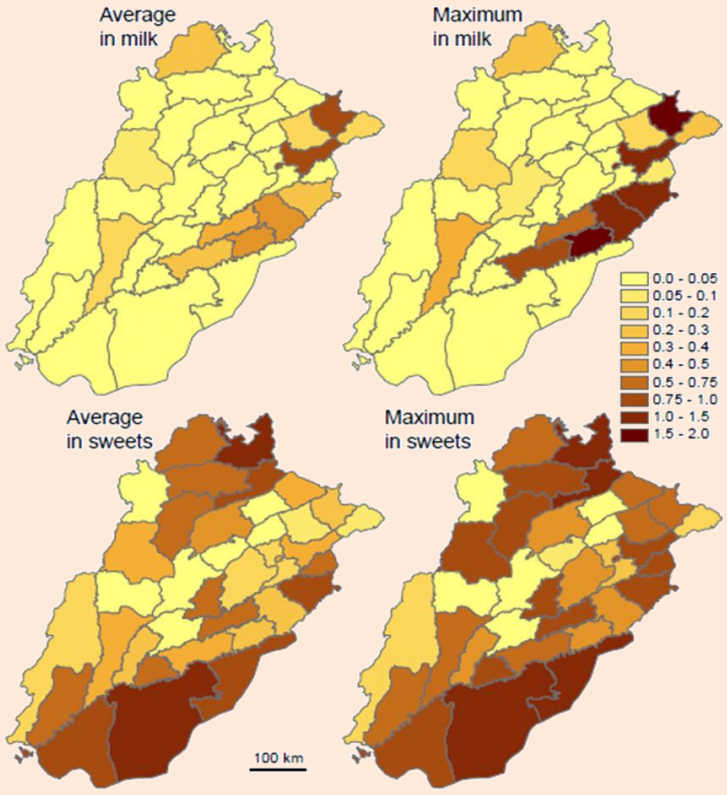

Figure 2: Average and maximum aflatoxin M1 levels in milk (µg/L) and sweets (µg/kg) from the 36 districts of Punjab, Pakistan.

MFD is Introducing New Legislative Conditions Concerning to Production, Processing and Distribution of Fish Meal, Fish Oil and Other Aquatic Animal Proteins

In order to meet the provisions of SPS Agreement and to bring the fish meal industry in line with international requirementw, the Marine Fisheries Department of the Ministry of Ports and Shipping is in the process of introducing new legislative conditions pertaining to production, processing and distribution of fish meal, fish oil and other aquatic animal proteins.

The new legislation for fish meal, fish oil and other aquatic animal proteins, will cover hygiene provisions during production, necessary premises and equipment, requirements applied to personnel, storage and transport conditions, quality control requirements and specifies compositional standards to be applied. It requires that fishmeal and fish oils be processed in adequate premises under the supervisions of a qualified person. There must be a suitable quality control system in place, based on HACCP principles. Pre-requisite programmes which maintain good hygiene, pest controls, checks on water quality, and remove waste, must also be implemented. Quality control and traceability documentation must be retained on site for official inspection. More details and copy of the draft legislation can be obtained from the Marine Fisheries Department.

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EU Food Veterinary Mission to Thailand finds Numerous Deficiencies

DG SANCO Food and Veterinary Office of the European Commission has reported on an inspection mission to Thailand in September 2011 to evaluate the controls systems for food safety of fishery products and live bivalves exported to the EU. Thailand is one of the most important Asian regional markets and suppliers of fish fishery products. The EU mission found that the CA had failed to identify some deficiencies in processing establishments and that some establishments, performing conditioning of bivalve molluscs were not under control. Furthermore import controls on fishery products to be further processed and then re-exported to the EU were not sufficient to fully ensure the EU eligibility of those products. The CA had not addressed the lack of accreditation in the testing laboratories noted on a previous mission, undermining the reliability of tests for biotoxins, histamine and heavy metals (in particular Cadmium).

There were shortcomings with regard to the classification of production areas for bivalve molluscs, and the frequency for monitoring and laboratory testing for marine biotoxins. There were also inadequate controls on scallops harvested outside classified production areas. However due to the fact that only thermally treated bivalve molluscs are exported to the EU and there have been no marine biotoxins detected the report considered to be no immediate health risk for the EU consumer. Nevertheless the Competent Authority was required to prepare a plan of corrective actions and submit it to the EU for approval. The EU expects to make a follow up visit to check on progress in the future.

Major EU Report Published on Veterinary Medicine Residues in Foods of Animal Origin

European Food Safety Authority (EFSA) has reported on the collation of the Member States' monitoring data from 2010 on the presence of residues of veterinary medicinal products and certain substances in live animals and animal products in the European Union. A total of 736,806 samples were reported to the European Commission. They consisted of 418,081 targeted samples and 30,659 suspect samples, 5,377 samples checked at import and 282,689 samples collected in the framework of national programmes developed under the national legislation. Most Member States fulfilled the minimum requirements for sampling frequency laid down in Council Directive 96/23/EC. There were 1,373 or 0.33 % of non-compliant samples out of the total targeted samples of all species in 2010, compared to 0.32 % in 2009. Out of 1,919 samples of aquaculture products, 0,05% were found to be non-compliant. Dyes were reported in 37 aquaculture samples, where the substances found were malachite green, leuco malachite green, crystal violet and leuco crystal violet. Until now, in Pakistan, there is no comprehensive, centrally coordinated study of veterinary medicine residues in foods, although there is a suspicion that in some sectors (poultry, eggs, dairy) consumers are exposed to a wide range of potentially damaging residues. The establishment of a national food safety authority would pave the way for a centrally coordinated monitoring, and the resulting data would allow proper risk management to protect the health of consumers, both in Pakistan and overseas.

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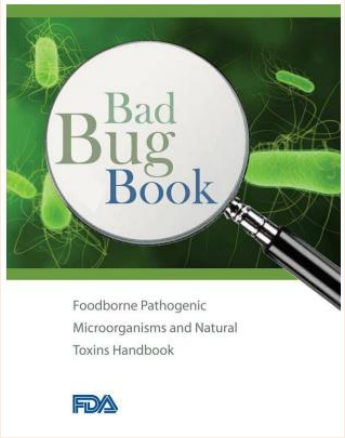
The views expressed in this publication do not necessarily reflect the views of the European Union

On April 3, 2012, the U.S. Food and Drug Administration posted on its web site the second edition of the "Bad Bug Book, Foodborne Pathogenic Microorganisms and Natural Toxins Handbook." This handbook is an excellent resource containing basic current information about the major known agents that cause foodborne illness including: foodborne bacteria, viruses, parasites, prions, and naturally occurring toxins. In addition to updated scientific information, the book includes five new chapters (on Cronobacter, Enterococcus, Francisella tularensis, phytohaemagglutinin, and venomous fish).

The information provided in this handbook is abbreviated and general in nature, and is intended for practical use by non-specialists. It is not intended to be a comprehensive scientific or clinical reference. Each chapter in this book is about a different pathogen which can cause food safety problems – a bacterium, virus, or parasite – or a natural toxin that can contaminate food and cause illness. The book contains scientific and technical information about the major pathogens that cause these kinds of illnesses. Each chapter also has a text box with information in a non-technical style for consumers to understand.

The information is helpful in increasing background knowledge concerning microbiological and chemical hazards of concern in seafood. Each chapter has a more or less structured outline which contains subject appropriate topics including:

1. Organisms (bacteria, virus, or parasites) or Toxin
2. Disease
3. Frequency of Disease
4. Parasite Life Cycle (in some chapters)
5. Sources and Prevention (including food sources and cross contamination)
6. Diagnosis
7. Treatment (in some chapters)
8. Target Populations
9. Food Analysis
10. Example of Outbreaks
11. Other Resources
12. Molecular Structural Data (toxins)



The updated edition of the Bad Bug Book (2nd Edition) is 264 pages and available for download on the FDA web site at:
http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/default.htm
Please check the FDA web site periodically, as more chapters will be added in future.

About TRTA II Programme

The TRTAII Programme is funded by the European Union and implemented by UNIDO. The overall objective of the programme is to contribute to poverty reduction and sustainable development in Pakistan. The programme activities are to be implemented through three components:

Component 1:	Trade policy capacity building; the expected result is increased relevance and effectiveness of trade policy
Component 2:	Export development through improvement of quality infrastructure; the expected result is improved compliance of export products with market requirements
Component 3:	Strengthening of the intellectual property rights system; the expected result is a modernized IP system that facilitates increased investment and trade in IP protected goods and services

EU funded TRTA II Programme; Contact Information in Pakistan

Ali Abbas Qazilbash
Laboratory Accreditation & SPS Compliance
Trade Related Technical Assistance (TRTA II) Programme
United Nations Industrial Development Organization (UNIDO)
7th Floor, Serena Business Complex
Sector G-5/1, Islamabad
Pakistan
Tel: + 92-51-8354805 (Dir)
Email: a.qazilbash@unido.org

Director General
National Animal dn Plant Health Inspection Serves (NAPHIS)
Nazimuddin Road
Sector F-8/1
Islamabad. Pakistan
Tel: +92-51-9208376; 9261342
Email: naphis.pk@live.com