Milk testing system organisation in Lithuania

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In the opinion of the PHARE project, which was executed during 1992-1997, it is sufficient to have one central raw milk research laboratory in such a small country as Lithuania, where high cost analytical equipment and professional specialists are concentrated, to make milk analysis services for various departments act as an arbiter in argumentation of various milk research questions. When an independent laboratory started the research of milk payments, their first step was in the conflict solution between the milk producer and dairy plants. The existence of a central milk research laboratory, allows a milk sample quality system, to control / calibrate the accuracy of milk counters in the laboratories of milk plants and to supply other qualified services. There are less labour costs when using a central milk research system, more accurate results are achieved, it is easier to correct mistakes and the control process is improved.

In 1993, the reorganisation of the Lithuanian National Livestock System was started in reorganisation of all existing laboratories and four laboratories were declined. Accomplishing a dairy research system reorganisation, improving livestock, the decision to establish one central dairy research system and to change old testing equipment to new ones, was made. For this purpose, all new equipment was concentrated in one authorised organisation, the State Milk Research Laboratory "Pieno Tyrimai". To avoid strategic mistakes in the farming branch, having such short terms of reorganisation, the Lithuanian Ministry of Agriculture decided to use the recommendations of another PHARE programme project, "Improvement of Cattle Livestock". The authorised milk research laboratory "Pieno Tyrimai", since 1995 has considerably improved its work. During 1996, the State Milk Research Laboratory "Pieno Tyrimai", conceived and developed a milk sample delivery and information data flow distribution system. All working places were fully computerised; the internal laboratory control system was developed and introduced. Many important problems, related to routine milk sample checking in the laboratory, were solved practically and effectively. Unfortunately,

during 1995-1996, all problems were not completely solved and the Lithuanian Ministry of Agriculture extended the terms of the PHARE project, "Extension of Human Resources and Improvement of Cattle Livestock". During 1997, the Ministry of Agriculture additionally assigned financial support from the Government budget to obtain new equipment and instruments and to settle the quality system of the authorised Dairy Research Laboratory. The experts of the PHARE project, Dr Peter Doubravsky and Mr L. Doering, paid a lot of attention and made great efforts for the laboratory foundation and cattle productivity control, but also on payments for milk.

The Ex-Soviet rural economy has divided the milk producers and milk plants into two separate camps, a lot of milk producing and processing problems were not solved until recently. Relations are strained, as the cooperation movement in Lithuania has not started yet. Even now, the existing dairy associations unite the milk producers and milk processing plants separately. Hygienic and quality problems are used in order to satisfy the interests of one or the other side and in the presence of incomplete legislation, controversy occurs frequently.

The milk quality and composition research and payments for milk were settled by the milk processing plants and the milk buyer organisations. The milk producers (farmers) were not satisfied with the control results they were receiving from the milk processing plants and are not convinced that the results are reliable. From the other side, milk plants were not satisfied with the milk quality they were buying, as the falsification of raw milk occurred frequently (mixing milk with water, using neutralisation substances, antibiotics, bad quality raw milk and milk received from sick or treated cattle. The milk producers (farmers) and raw milk plants were opposed to each other as selling / buying raw milk prices were not properly established and were divided into two groups: "Agriculture" and "Milk Processing Industry". Sometimes, the raw milk control quality made in milk buying organisations was dubious as was the low personnel qualification. During this time, neither raw milk buying organisations, nor milk processing plant laboratories, obtained the required instruments (equipment), to ensure the quality and composition of saleable raw milk, that demands a new "Cow Milk, Quality Demand" Standard LST1137 and ES92 / 46 instructions.

In 1992, the Lithuanian Ministry of Agriculture, based on the specialists from Denmark (Knud Jorgensen, MSc.Agr, the Danish Dairy Board, Gunnar Henriksen, MSc. Dairy Technology, STEINS AS Laboratory, Villy Toft, Product Manager, FOSS ELECTRIC and others) began to implement the project for Three Baltic States, prepared by PHARE, "CATTLE PRODUCTIVITY, THE MILK COMPOSITION AND QUALITY CONTROL FOR PAYMENT PURPOSES SYSTEM IMPROVEMENT IN THREE BALTIC STATES".

The Project was aimed at raw milk payments, based on independent laboratory data and looked for a better relationship between the milk producer, milk plant, breeding organisations, Government authorised control organisations, raw cow milk and the products processed from this milk improvement.

The Lithuanian Ministry of Agriculture agreed to the main conclusions of this Project and on 16 July 1993, issued an order, No.562a, "For the Founding of an Experimental Milk Quality Control Laboratory"; and founded an Independent State Experimental Milk Quality Control Laboratory, which received authorisation to make milk composition and quality control modulation in a separate central laboratory.

The expert group from the Lithuanian Ministry of Agriculture, selected a place in the central part of Lithuania, in the City of Kaunas. The Academy of Veterinary was chosen to ensure laboratory potential use effectiveness for agriculture profile, for student teaching process and popularisation of advantage milk research ideas. For rational use of equipment and premises (from Soviet times), the old Kaunas breeders' enterprise regional laboratory, was joined with a new experimental laboratory.

In 1993, the Ministry of Agriculture established a qualified group of specialists from different departments, who prepared a detailed plan for milk research system reorganisation and provided the next steps for the laboratory development.

In 1992-1993, the reorganisation plan for the milk quality and composition research system was made for the next five years. The plan included changing the relations between the milk producer and milk processing plant, giving an opportunity for a milk producer to efficiently manage his farm and allowing the milk processing plant to have more flexible milk prices, with the main attention given to the raw milk composition and quality requirements.

At the same time, a group of scientists from the Lithuanian Food Institute, Lithuanian Breeding Institute, including other organisations, received an order from the Lithuanian Ministry of Agriculture to prepare the new raw milk purchasing requirements, based on the ES 92 / 46 instructions, estimating not only the milk fat, but also protein and other obligatory quality requirements. In a short time, in 1994, a "Cow Milk, Quality Demand" Standard LST1137 was prepared and approved on 29.02.1996, by the Lithuanian Standardisation Department, but this standard has not to date been introduced.

In 1997, a group of scientists, together with the specialists of the Ministry of Agriculture and Forestry of Lithuania, prepared the first editorship of a new standard: "Milk Purchase, Quality Determination and Payment

Regulations". In the first quarter of 1998 this standard was approved and on 26.03.1998 the Ministry of Agriculture and Forestry of Lithuania issued an order, No.152, "Introduction of new methods for the milk quality estimation and payment systems", which changed raw milk quality and composition estimation rules in all of Lithuania. The milk composition and quality research functions were assigned to the independent, neutral organisation and authorised central laboratory State Enterprise "Pieno Tyrimai" ("Milk Research").

The State Enterprise "Pieno Tyrimai" ("Milk Research") has obtained the latest milk test equipment and the rational system of sample delivery and data transfer to the customers has been introduced. The State Enterprise "Pieno Tyrimai" has a new, well finished laboratory premises, new electric supply installation, water supply, sewerage, local and external computer network, refrigeration room and necessary laboratory test equipment. The enterprise owns six refrigerating cars and 2 500 special containers (80 jars in each) for sample delivery purposes. The laboratory equipment allows the determining in a short time and precisely (in one sample) of fat, protein, lactose, dry matter content, urea, citric acid, analysis of bacteria pollution, falsification with water, inhibitor substances and the somatic cell count. This enables the diagnosis of some virus diseases and pathogenesis. The State Enterprise "Pieno Tyrimai" has the most modern instruments in the country. A milk research and milk sample identification system has been established.

The laboratory makes more than three million milk sample tests per year. In 1998, when the milk composition and quality research was made under separate requirements for the purchase of raw milk, the number of tests was significantly increased.

The State Enterprise "Pieno Tyrimai" laboratories, working under "Good Practice Laboratory" regulations, is able to ensure qualified milk tests, cattle selection, payments for milk, sanitation and consulting services, without using any other technical or financial resources.

- The State Enterprise "Pieno Tyrimai", following the LST 1137-97 standard and seeking that the raw milk composition and quality determination were carried out in the neutral organisation laboratory, make milk quality and composition measurements which are carried out for payment for milk purposes: fat, protein, lactose, bacteria pollution, somatic cell count, freezing point and inhibitors. The frequency and order of these measurements is indicated in LST 1137-97 standard and "Milk Purchase, Quality Determination and Payment Regulations".

Table 1. The instruments/equipment used in the laboratory "Pieno Tyrimai".

Instrument	Producers' name	Quantity	Carried out Tests
Combi (Lactoscope 550+Somascope MK2)	Delta Instruments	4	Fat, protein, lactose, somatic cell count
Lactoscope 550	Delta Instruments	2	Fat, protein, lactose
SYNERGY (AEGYS Mi600+ SCC500)	Anadis Instruments	1	Fat, protein, lactose, urea, somatic cells
Fossomatic 215	Foss Electric	1	Somatic cells
Asterias Cobra 2024	Biocom	3	Total bacteria count
Astori SE / DE4000	Astori Oscar	3	Milk freezing point
EL 9000 OMNI	Biotec	2	Inhibitors, the rests of antibiotics in milk, diagnostics of virus diseases.
GUARDIAN dosing system	Zenyx Scientific	1	Dosator
Kjeldahl automatic system "Vapodest 40"	Gerhard	1	Protein (Nitrogen)
Gerber System	Funke Gerber	1	Fat
CETI POLARIS	Ceti	1	Lactose
ALFA automatic system		1	Amount of Nitrogen

Table 2. Quantity of tests in the milk laboratory.

Year / Tests	Quantity of tests		
	Fat	Protein	Somatic cell
1993	2 300	2 300	-
1994	223 362	223 362	10 000
1995	500 932	500 932	27 744
1996	1 096 462	1 096 462	32 775
1997	1 136 894	1 136 894	727 363

Table 3. Testing of milk samples for animal breeding and processing plants.

		F \ P	SC	BC	Inh	Freez. P.
1996	Breeding	1 096 462	40 720			
	Processing	9 626	1 215			
1997	Breeding	1 136 894	727 363			
	Processing	69 553	63 996		118	2 760
1998	Breeding	504 534	504 534			
	Processing	306 192	266 224	45 340	47 150	33 714

- The State Enterprise “Pieno Tyrimai” is a neutral and independent research organisation, having juridical status. Its structure and administrative jurisdiction is such, that interested persons or organisations cannot depend on the measurement results and objectivity.
- The State Enterprise “Pieno Tyrimai” has modern test equipment which is approved and used in EU countries for milk payment purposes. These instruments are included in the registry of the Measurement Instruments of the Lithuanian Standardisation Department; this equipment assures purchased milk quality and composition indices.
- The State Enterprise “Pieno Tyrimai” assures the milk sample collection, transportation of samples in positive low temperature and sample delivery to the laboratory from all Lithuanian milk processing plants, under the regulations and frequency of LST 1137-97 standard.
- The State Enterprise “Pieno Tyrimai” participates in international interlaboratory comparisons and seeks its accreditation.
- The International Audit was carried out by the German Sachsen-Anhalt, Land Quality Control Service (Landescontrollverband für Leistungs und Qualittatsprüfung Sachsen-Anhalt). During the examination (audit) the costs of milk sample tests were valued, the test results, data processing and the quality assurance are presented under GLP instructions and DIN EN ISO 9002 and DIN EN 45001 standards. The conclusion of the audit was positive.