

KPI-2

Good practices in grain storage

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Introduction

The agricultural production storage should be assumed basically as the agricultural product safe keeping and quality preservation. For good storage practice it should be considered the agricultural production seasonality and the dynamics of the consumption process in order to have efficient storage procedures for preventing or at least minimizing loss during the storage which was estimated in 20 % (Lorini, 1993), very high in terms of international level. It also contributes for grain safety and hygiene (Rezende, 2002).

Several factors should be taken into account to justify these serious problems that interfere in the expected results for a good storage practice. Among them we can point out the cares to be taken with the storage facilities structures, with the grain processing operations and, fundamentally, the continuously and systematically personnel recycling.

The stored grains should be assumed as raw material and not only as a commodity. Therefore, the agricultural product storage should be incorporated in the agricultural chain production concept which implies in adopting control and safety procedures in order to obtain product with quality, mainly to serve the food industries demand and also for consumers needs (Rezende, 2002).

Analysis accomplished among important grain storage facilities, differentiated by type, capacity and management, at different geographic

regions of the Brazil, it could be assure that the majority of the facilities (bulk or in bags), the “Hazard Analysis and Critical Control Point – HAPPC concept was not observed and the majority of them did not know about it.

The diffusion and the implementation of the HAPPC concept, an example practiced in food industries, it will guarantee the minimization of the losses and also to obtain the cost reduction of the final product, high quality and safe products.

The grain storage chain net is an essential element for incrementing the agricultural production which is composed by facilities destined for receiving the grain production, to preserve them in perfect technical conditions and to redistribute them later.

The Brazilian grain storage chain net is composed by grain storage facilities classified under three criterions: (a) facilities related to (state, cooperatives and privates), (b) localization (on farm, primary, sub terminals and terminals), and (c) type of structure (conventional and bulk). For the structure types, the conventional one is suite for storing the products in bags and the bulk one in metal, concrete or horizontal structures. The actual census of National Company of Food Supply – CONAB registered the existence of 15,752 storage facilities with total storage capacity of 114,962,150 metric tons, where 7,440 facilities are the conventional types with storage capacity of 27,323,590 metric ton and 8,312 facilities in bulk way with 87,638,560 metric ton capacity.

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Hazard Analysis and Critical Control Point System - HACCP

The increase of demand from the food industries for better raw materials it should alert the producers, grain storage facility owners and managers the conscience toward a professional posture and adoption of the systematic practice and procedures to be taken in their grain storage facilities.

Assuming the several factors related to the losses occurring during the grain storage process it could be pointed out some aspects that should be taken into account such as the facility structure care, the grain processing and mainly concern to the collaborators and also with the use of Good Manufacturing Practices, conveniently adapted to the necessity and peculiarity to the need of the grain storage facility representing gains for the sector.

The Good Manufacturing Practices–GMP and the HACCP are worldwide known and implemented in the food industries with the objectives of quality guarantee and safe food besides the loss reduction (Mortimore, 1996).

The grain storage facilities in Brazil, in contrary, there is no concern with the mentioned recommended procedures because it is more specific related to the food industries.

The quality management from the implementation of these concepts, in the grain storage facilities, it would allow, in short term, the loss reduction at highly significant levels according to the actual loss, besides the food safety and quality guarantee for the food industries.

By the other hand the constant food safety and quality demand from the importers up to the internal consumption market, due to the ISO standards, particularly the ISO 9000 and 14000 series, it is suggest to be necessary that actual grain storage facility managers start to have these new quality management concepts in their mind.

The “International Organization for Standardization” - ISO is an organization with

headquarter in Geneva, Swiss, well recognized and internationally accepted for establishing technical standards, recognized and evaluated the scope of competence within the different countries delegations. The ISO 9000 – Quality Management System was elaborated initially focusing on the need of “quality management”. In these standards a quality is understood as “every characteristics of a product or service demanded by the consumer” and the quality management as “what the organization needs to assure to its product deserve in conformity of consumers demand” (ISO 2000). This family of standards represents an international consensus in terms of good management practices in order to assure that a organization may offer products or services according to the client quality demand. These good practices represent a set of standard requirements for quality management system, doesn’t matter what an organization do, its size or if belongs to public or private sector. The ISO 14000 standard – Environmental Management was elaborated focusing the need for minimizing the harmful effects on environment caused by their activity and to get continuous improvement on environmental performance.

The current legislations for foods either, Consumers Code of Ministry of Health, State or Municipal Secretary started to establish in their Bylaws the articles with obligation to adopt terms related to Good Manufacturing Practices Handbooks (Giordano, 1999).

Assuming that the storage facility is the first step to handle foods in the chain, in particular, the grains, i.e., the raw material for food industries, with no doubt, the implementation of that demand is to be done immediately.

Within these perspectives, the Good Manufacturing Practices – GMP is traditionally used thoroughly in the food industries worldwide. It advocates the care needed to be implemented on the food handling and manufacturing with main objective on assuring the final quality of the food (Proficqua and SBCTA, 1995).

In a “Good Manufacturing Practices” the recommended procedures are inserted on the

hygiene principles and on the sanitary practices involved in all process.

From these stand points, the Good Manufacturing Practices assure procedures that start on conception of the plant facility step going through the personal hygiene, up to marketing point. So, the Good Manufacturing Practices involves the following steps (Proficqua and SBCTA, 1995):

- Facilities and Installations;
- Personnel;
- Production: Operation, Process;
- Equipments and Tools;
- Cleaning and Sanitization;
- Code;
- Storage and Distribution;
- Pests Control;
- Control and Quality Guarantee;
- Training and Supervision.

These procedures, besides propitiating the company to be inserted in a more and more competitive and demanding market they still allow production of better quality food and less losses, less accident risks and cost reductions.

Extrapolating into grain storage facilities plan, these benefits could be obtained in a clear way, mainly standing out the real participation of the grain storage segment in the “productive chain” of any food and so, the stored product safety will determine the quality guarantee of the manufactured product.

The matter of labor safety and health became of high relevant subject for the world society, not only under humanistic aspect, its main foundation, but also for economic aspect.

According to the International Organization for Labor, every year more than 1,1 million people dies in the world, due to the accidents or diseases related to the work. This number is higher than the annual average death due to the transit (999 thousands), by violence (563 thousands) and by war (50 thousands).

In Brazil, the numbers are alarming. The 393,6 thousand work accidents verified in 1999 had as consequence 3,6 thousand deaths and 16,3 thousand permanent disabled. From each 10 thousand work accidents, 100,5 are fatal, while

in countries like Mexico and USA this contingent is of 36,6 and 21,6, respectively.

The work accidents have a high obligation for the whole society, being its reduction a desire for everybody: of government, entrepreneurs and workers. Besides the social question, with death and workers’ mutilation, the economic importance is also growing. Besides causing damages to the productive labors, the accidents generate expenses as payment of social welfare benefits, resources that could have been used for another social politics. Urges, therefore, reduce the economic cost by means of prevention procedures.

Taken in consideration the current accelerated development of the globalized world, work safety starts to have fundamental importance for the attainment of the highest quality indexes and productivity, in all human activities. The methods of prevention of accidents are similar to the methods requested for quality control. It is very difficult to get the quality of a process or product, without an appropriate work environment that propitiates the worker to concentrate all its potentiality on the work that is being executed. Few executives understand that the same factors that cause accidents at work, also, cause the losses in the production and quality problems and cost.

In Brazil, the occurrences were reduced to one forth in comparison to average accidents and diseases registrations at work in the seventies. In spite of that, it remains a very high number. In 1970, out of 7,284,022 workers registered the occurrence of 1,220,111 accidents, where 1,199,672 in typical accidents, 14,502 as itinerary accidents and 5,937 as work disease. In 2003, out of 29,544,927 workers registered the occurrence of 390,180 accidents, where 319,903 as typical accidents, 49,069 as itinerary accidents and 21,208 as work disease (Anuário Brasileiro de Proteção , 2005).

As an auxiliary procedure to the Good Manufacturing Practices, the use of from Hazard Analysis and Critical Points of Control (HACCP) concepts, will introduce a new work philosophy in the grain storage units, where the warranty will

be the goal wanted for the sector.

Internationally well-known as Hazard Analysis and Critical Control Point System - HACCP, the system is known in Brazil as APPCC (Análise de Perigos e Pontos Críticos de Controle), originated in United States of America, due to the government's need, more precisely the NASA, to introduce a quality system in order to develop safe food for outer space programs, in 1959. Even though, just in 1973, it came to public knowledge the first document detailing the technique of HACCP, published by Pillsbury Company (Mortimore, 1996) that, in association with Natick (The Natick Laboratories of The U.S. Army) and the Group of Projects from United States Air Force, they elaborated the control methodology.

Nowadays the system of HACCP is worldwide known, including the World Health Organization (Codex Alimentarius, 1993) Report of The Twenty-Sixth Session Of The Codex Committee on Food Hygiene), for the National Division of the National Committee of Norms in Microbiology in Foods (NACMCF, 1992), besides the Brazilian Government, through the Regulation SVS / MS n°. 1,428/93, constituting in the best tool for developing control systems, and quality guarantee in the food industries, in particular.

Complementarily and concerned with the food safety, the private companies, through initiatives of organized institutions like SEBRAE, SENAI and CNI (1999), mobilized to create facilitating procedures for the development of the Hazard Analysis and Critical Points of Control methods, also based on legislations more and more demanding, as example of the mentioned Regulation SVS / MS n°. 1.428/93, and the Regulations CVS-8/1996, n°. 326/1997 from the Health Ministry and the Resolution n°. SS 38/ (Brasil, 1996).

Conceptually, the system Hazard Analysis and Critical Points of Control - HACCP is a tool that searches through the raw material components analysis and the process, to identify the critical points of control of the system, that should be under total control to guarantee the product

safety.

The HACCP system should involve the whole process and, in the case of the storage units, it should begin in grain receiving pit, passing through several of processing steps and storage, finishing in the dispatch step. The identification of the critical points of control of those several steps will guarantee the risk points checking and fast intervention in each one of them to guarantee the safety and the quality of the stored grains.

The involvement of the all personnel of the storage unit by a wide explanation work, training and awareness, will guarantee the necessary results. Therefore, to implement a system of that nature, as an example of housekeeping process, where is obtained the parameters of 5 S (five senses), it is necessary to absorb the concept of 5 C (Communication; Commitment; Conscientiousness; Creativity and Consent).

Recognized as a safe method, its implementation guarantees, including the final consumers, the safety of the quality of the products, highlighting the company user of the method as differentiated in its segment of performance.

On the other hand, in which counts the technological development of the grain storage sector, this still lacks professionalism and understanding of its productive food chain insertion, representing important link of this system, having the responsibility to guard and conservation, inherent to the system, demanding larger concern.

According to Merch and Gomes (1982), a grain storage unit constituted by an organized structure in a functional way to receive, process and preserve the quanti-qualitative integrity of a lot of grains.

Analyzing an storage unit, notices the several possibilities of dangers and risks involving the safety and the qualities of the grains may occur in several opportunities: in the reception, for example, the possibility to receive mold or damp grains, therefore, contaminated by toxins; the drying at high temperatures, interfering in the organoleptic characteristics, etc, allow to propose the adaptation of the HACCP method, used in the food industries, to the storage units, in order

to assure a raw material free from contaminations, of good quality and secure.

In this particular, should be pointed out the food safety concept that, according to FAO (Codex Alimentarius), is the guarantee in consuming food exempt from residues that harm or cause damages to the health. That concept reinforces the condition of raw material of the stored grains and not just a commodity.

Implementation of the hazard analysis method and critical control point - HACCP

Being an evaluated methodology that provides trust to the manager of a process, the HACCP method will allow to maintain the safety of the food with maximum priority, besides planning how to avoid the problems instead of waiting the same ones happen and then, control them (Mortimore, 1996).

Unlike the classic form for Final Quality Control on the finished product, where several analyses are accomplished to determine the quality of the finished product, the HACCP method, through the continuous monitoring and its logical sequence, based on documentations and registrations, will guarantee the integrity of the quality and safety of the product (Vitalli, 1999).

Seemingly, the HACCP method can seem to be complicated, however, its implementation just demands understanding of the products and process procedures, combine to the factors that can suggest a risk to the product safety. In itself the HACCP method is not more than a logical and direct system control, based on problems prevention (Mortimore, 1996).

Although some authors define the principles in six (Bryan, 1991), for the implementation of the HACCP method, others, define them in seven (Mortimore, 1996). All of them, however, converging to the same format.

Being rational (based in historical data), the HACCP method, based on these interrelated principles, should be followed systematically, in

any establishment type. It emphasizes the attention in the critical operations, where the control is essential, differing from the concept of traditional inspection, facing to problems of aesthetic nature or legislation, a lot of times with smaller meaning on the public health aspect (Bryan, 1991).

Still according to the authors of the Procedures Guide for Implantating the Hazard Analysis Method and Critical Points of Control (Bryan, 1991), the HACCP method is comprehensible because it analyzes the raw material, process and the subsequent use of the product. It is continuous, because the problems are detected when they happen or immediately after, making possible to adopt a corrective action immediately. It is systematic, because it is a complete plan, embracing step by step, each operation, procedures and control process.

Within this perspective, to proceed, I will try to determine the steps for implanting the HACCP method in a grain storage unit.

For implanting the HACCP method, were established seven steps or principles, accepted and also described by Codex Alimentarius (1993) and the National Division of the Norms Committee of Microbiology in Foods (NACMCF, 1992), as proposed by S. Mortimore and C. Wallace.

1st Principle: To Accomplish the Hazard Analysis on the Storage Unit

At this step, it should be elaborated a detailed flow-chart of the unit operations of grain storage unit (reception, pre-cleaning, drying, storage and expedition) where it will be looking for identifying all the hazards that can occur at each point, as well as to describe the necessary preventive procedures for its control.

During the construction of the flow-chart, different forms should be considered (moist and dirty, dry and clean products, etc.) in which the products arrive to the grain storage units, in way to determine the operational flow of each one, so that, the identification of the Critical Points will be different, or not, for each situation.

2nd Principle: To Identify the Critical Points of Control (PCC) of the Process

Assured all the hazard and control procedures, knowing the analysis of several flow-charts generated, it will be determined in which points the controls are critical to the product safety. Those will be the Critical Points of Control (CPC).

3rd Principle: To Establish the Critical Limits to the Preventive Procedures Associated with each CPC

Those limits will establish the difference for every CPC, among safe products and hazardous. There should be included measurable parameters.

On that moment, it is important to know the operational limitations and of personnel of the grain storage unit, in way to not induce very narrow safety limits, or, very complacent, making unfeasible the implementation of the own process.

4th Principle: To Establish Criterion for Monitoring CPC's

To establish the specific monitoring actions, in order to guarantee the control, starting from the process adjustment.

The monitoring will guarantee the performance of the entire process. Thus, the determination of the monitoring approach is a decisive factor for the success of the HACCP method.

5th Principle: To Establish the Corrective Actions

It is necessary to establish the corrective actions and the responsible people for solution, when the monitoring detects that a criterion was not reached.

Each Critical Point Control identified and monitored should have its corrective action established.

6th Principle: To Establish a Data Registration System for HACCP Documentation

The registrations of the occurrences and solutions should be systematized in way to guarantee the functionality of the method, as well as the warranty of products safety.

7th Principle: To Establish an Evaluation System for the HACCP System

This system, of auditor character, will have the responsibility of evaluating the development of the HACCP system.

The Principle of Evaluation of the HACCP System should be executed by a commission exempt of the one that is responsible for its implementation. It should have critical character.

The Good Grain Storage Practices process presented, at first, can denote an operational complexity for its implantation. However, the results are extremely compensator and irreversible, if we consider that the differentiation of the rendered service can determine larger gains to the grain storage unit.

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