

RESEARCH OF POSSIBILITIES TO ENSURE THE QUALITY OF DERMATO-COSMETIC AND COSMETIC PRODUCTS THROUGH APPLICATION OF MODERN QUALITY MANAGEMENT TOOLS

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Abstract

By applying the new tools of quality management: affinity diagram, relations diagram, tree diagram, matrix diagram and PERT (Program Evaluation and Review Technique) chart it has been obtained a more effective control of quality of the cosmetic and dermato-cosmetic products made by Farmec Company in Cluj-Napoca, Romania. Affinity diagram was used to recognize the critical points that can affect product quality, relations diagram to clarify the causes that lead to hazards on the quality, tree diagram to identify the ways to ensure the quality of cosmetic products. Matrix diagram was applied to clarify the responsibilities of the various functions within the company in achieving a product and PERT chart was used to establish a quality assurance plan of a cosmetic and dermato-cosmetic product.

Rezumat

Prin aplicarea unor tehnici noi de managementul calității: diagrama afinităților, diagrama relațiilor, diagrama arbore, diagrama matriceală și diagrama PERT (*Program Evaluation and Review Technique*) s-a urmărit un control mai eficient al calității produselor cosmetice și dermato-cosmetice realizate la compania Farmec din Cluj-Napoca. Diagrama afinităților s-a utilizat pentru recunoașterea punctelor critice care pot afecta calitatea produselor, diagrama relațiilor pentru a preciza cauzele ce determină apariția riscurilor privind calitatea, diagrama arbore pentru identificarea modalităților de asigurare a calității produselor cosmetice. Diagrama matriceală a fost aplicată pentru a clarifica responsabilitățile diferitelor funcțiuni din cadrul companiei în realizarea unui produs, iar diagrama PERT s-a utilizat pentru a stabili planul de asigurare a calității unui produs cosmetic și dermato-cosmetic.

Keywords: Cosmetic and dermato-cosmetic products, quality management tools: affinity diagram, relations diagram, tree diagram, matrix diagram, PERT diagram

Introduction

The classical instruments of quality assurance are: histogram, cause and effect diagram, Pareto diagram, correlation chart, control chart, data stratification and brainstorming [2]. The "7 tools", as they are known in

corporate practice, form a basic system of knowledge and analysis of the causes that determine the variation of the characteristics of a product or process that adversely affect their quality. Once known, the causes can be corrected in the desired direction based on the solutions established by using appropriate methods. These classical instruments of quality management focus on existing aspects, starting from facts, which then they seek to improve and refine to ensure quality of the cosmetic products. The appearance of new instruments like affinity diagram, relations diagram, tree diagram, Matrix diagram, arrow diagram, diagram of alternatives and main components analysis, also called the "7 new tools of quality" [1] allows a better control of quality products. Unlike traditional instruments, modern tools of quality management focus on prospective prevention of problems that may arise in the process of preparation of cosmetic and dermato-cosmetic products. The emergence of these new tools of quality control allows better quality products. Their application in Farmec Company in Cluj-Napoca, is part of the company's global policy to ensure continuity in a more and more aggressive competition and uncertainty, by optimizing the possibilities of providing quality cosmetic and dermato-cosmetic products. This is made by a Performing Management (PM) that is the link between employee's and company's objectives [3].

Materials and methods

The technological process of cosmetics production in Farmec Company in Cluj-Napoca was used as working material.

As working methods there were used: affinity diagram, relations diagram, tree diagram, matrix diagram and PERT (Program Evaluation and Review Technique) chart [2].

These methods have been used to:

- identify the major problems to be solved and their causes (affinities diagram and relations diagram);
- determine solutions to problems (Matrix diagram and tree diagram);
- establish concrete programmes for solving problems (PERT diagram).

The practical applications submitted were performed by the team at Farmec Company in Cluj-Napoca, as a group activity, involving the following persons: quality assurance manager, purchasing manager, production manager, head of cosmetic department and the person responsible for quality assurance.

Results and discussion

Affinity diagram

The steps taken were:

- selecting the issue that needs to be investigated: **"What are the critical points that can affect the quality of cosmetics and dermatocosmetics"**;
- collecting data and transferring it on "post-it" files;
- positioning files randomly on a large sheet of paper;
- grouping the files, having as a criterion the affinity that exists among them;
- setting the title of the groups and chart completion.

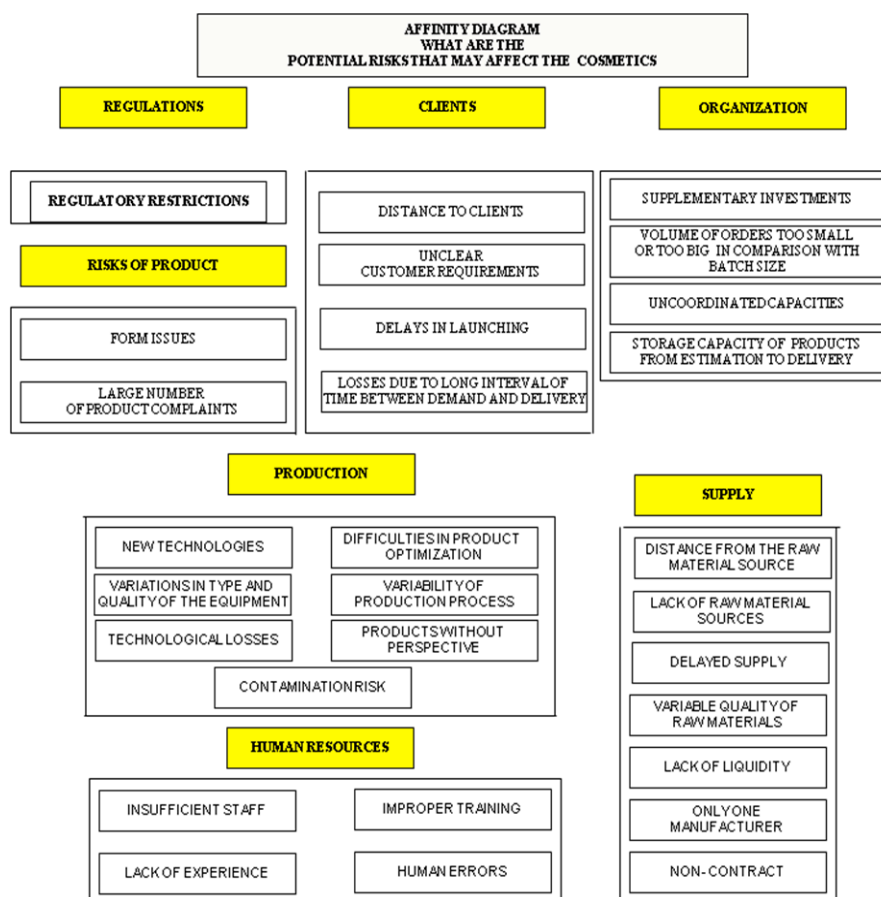


Figure 1

Affinity diagram with the theme "What are the potential risks that may affect the cosmetics"

The following categories of risks have been identified:

- risks of regulatory type related to legislative restrictions. After the market launch of a product there can appear modifications in the list of ingredients allowed in cosmetic industry;
- risks related to customers: the distance from clients, requirements, market type, release time and financial losses due to delays;
- risks related to organization, investments, costs, production capacity and storage correlated to the number of orders;
- risks related to supply: sources of appropriate materials, delays, quality problems;
- risks related to product and production activity: new technologies, difficulties in process optimization, technological losses, problems with product formulation (stability etc.), quality;
- risks related to human resources: insufficient staff, lack of experience, human errors.

Relations Diagram

The necessary steps to draw up the relations diagram were:

- defining the problem: **"The risks regarding the quality of cosmetics and dermato-cosmetics"**;
- each member of the group expressing freely its opinions on possible causes of the problem, which were marked on "post-it" files;
- searching cause-effect relationships, indicated by an arrow pointing to the effect;
- deepening the problem by trying to answer the question "Why?" or "What for?" for each of the factors;
- during the next session the following activities were conducted: re-charting, making necessary corrections;
- identifying key factors.

There were identified the following risks regarding product quality: non-compliance with the specification, unstable formulation, large number of deviations in process, inappropriate packaging, disregard of the special requirements of customers, complaints, product safety affected by contamination, counterfeiting or product tampering.

It followed the identification of the main causes of each of these quality problems in order to be eliminated to the possible extent.

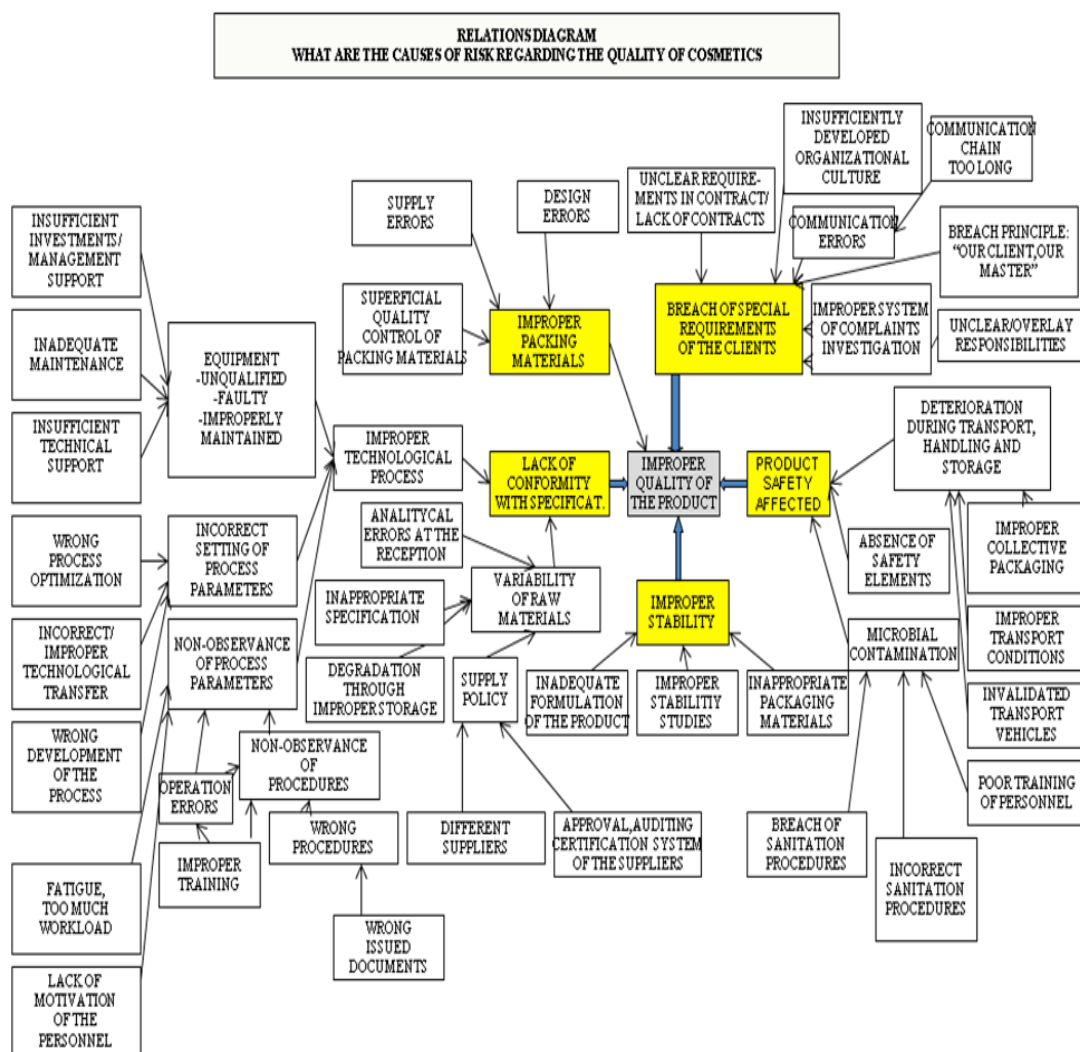


Figure 2

Relations diagram with the theme "What are the causes of risk regarding the quality of cosmetics"

Tree diagram

The steps taken in drawing up this chart were:

- establishing the objective: **"How can it be assured the quality of cosmetics and dermato-cosmetics"**;
- "brainstorming", answering the questions „What?, Who? Where?, When?, Why?";
- identifying the means and writing them down on "post-it" files;
- grouping the files by the similarity of the proposed means;

Starting from identifying the risks concerning the quality of products through the affinity diagram, relations diagram specifying the causes thereof, through the tree diagram there were identified ways to ensure the quality of cosmetics. The basic means of ensuring quality were identified as follows: compliance with the approved specification, formulation stability, product safety, proper packaging, compliance with specific customer requirements, reduced number of minor complaints.

These means have become, then, aims to establish high rank means, even down to the actual activities to be considered: compliance with legal requirements and provisions of registration dossiers, proper optimization of the technological process, appropriate control on the technological flow, stability studies, continuous improvement.

Matrix Diagram

It was applied an L matrix which is an array with two entries, one set being placed on the column and the other on line.

The steps for implementing a matrix in L were:

- defining the purpose and objective of the chart;
- defining the elements of the first set of factors and then the elements of the second series;
- drawing and placing matrix elements;
- defining the type of correlation / connection between the two groups of factors.

Matrix diagram was applied to clarify the responsibilities of the various functions within the company in the stages of achieving a cosmetic product. Table I shows the degree of involvement in activities to achieve a cosmetic product ("help", "be informed", "not involved") of the following functions:

- management of the company (M);
- marketing office (MK);
- research compartment (C);
- quality assurance compartment (AQ);
- quality control compartment (CC);
- technical-production office (TP);
- production department (P);
- acquisition department (A);
- financial department (F);
- design office (D);

Table I
Matrix diagram of activities and responsibilities
to eliminate of errors and causes of risk.

	M	MK	C	AQ	CC	TP	P	A	F	D
Decision establishing product, nomination of product responsible	X	O	O	O	O	O	O	O	O	O
Customer requirements evaluation	O	X	O	O	O	O				O
Down the formula, packaging	O	X	X	O	X	X	O	O		X
Assessment of required and available technology	O	O	X	X	X	X	X			
Development of technological documentation	O	O	X	X	X	X	X			
The acquisition of materials needed	O	O	O	O	O	O	O	X	O	O
Pilot batch	O	X	X	O	X	X	X			
Optimization of technological process	O		X	X	X	X	X			
Production	O	O	O	O	X	X	X			
Stability studies	O	O	X	X	X	O	O			
Control of changes	O	X	X	X	X	X	X	X		O
Monitoring processes	O	X	X	X	X	X	X	X		O
Product analysis in valid period	O	O	X	X	X	O	O			

Legend: X – contribute to the activity; O – is informed of the work that is carried out;

PERT (Program Evaluation and Review Technique) Chart

The steps taken were:

- defining chart theme: "**What are the activities required to ensure the quality of cosmetics and dermato-cosmetics**"; a number of actions are proposed and recorded on files;
- clarifying and combining the actions, determining those that will be undertaken;
- ordering the files of the actions decided on and highlighting the links between them;
- determining, according to deadlines, the moments at which you must start the action at the earliest t1 and no later than t2;
- marking the critical path on the diagram.

PERT chart was applied to establish the quality assurance plan of a cosmetic product. Figure 4 presents PERT chart for the project of quality assurance of a cosmetic product. The meaning of symbols used is:

Analysis of new formulas = Activity description

8.05.2009 = Date scheduled to commence the activity

11.05.2009 = Actual date of commencement of activity

2.05.2009 = Planned date for completion of activity

5.05.2009 = Actual date for completion of activity

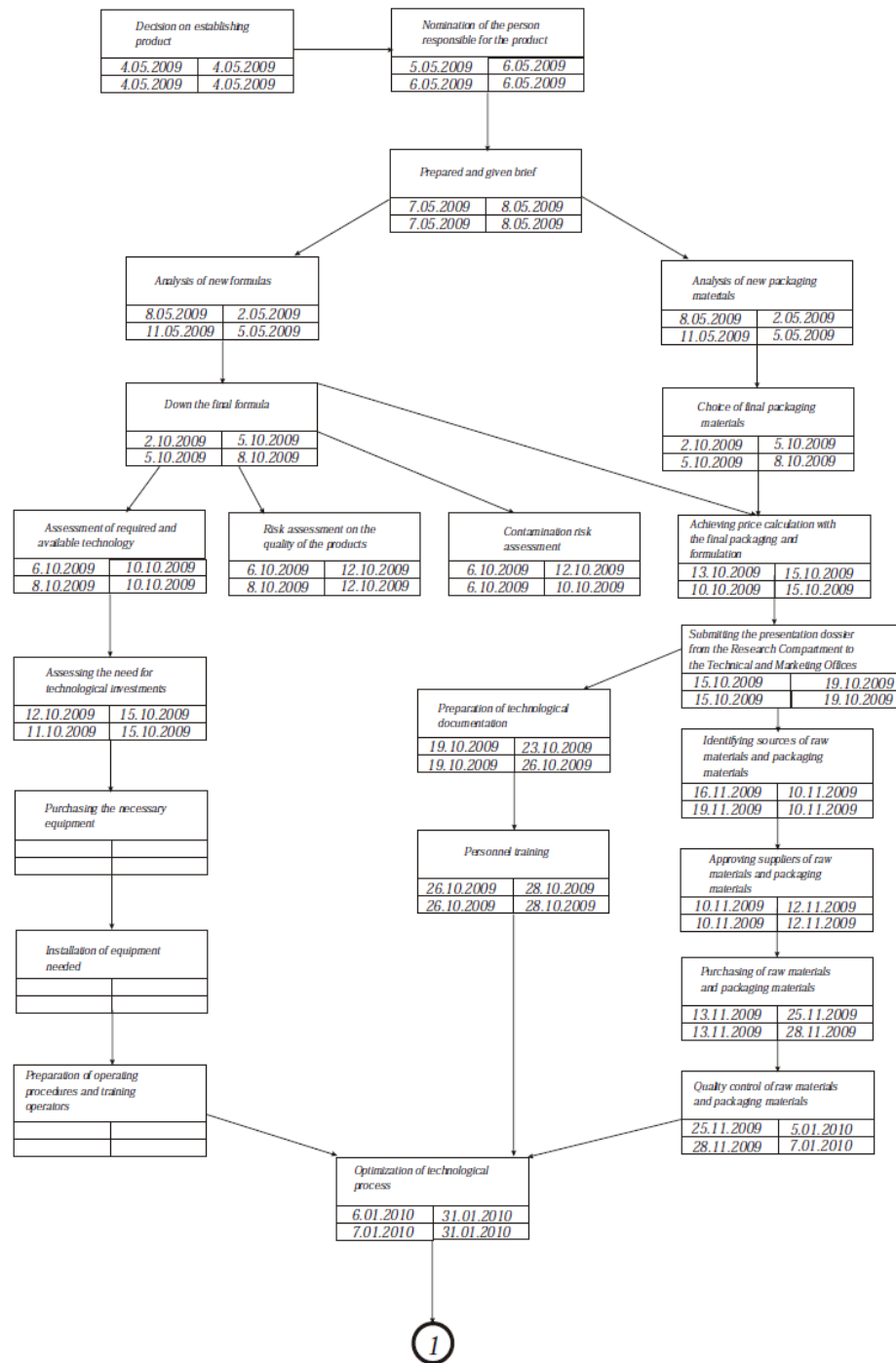
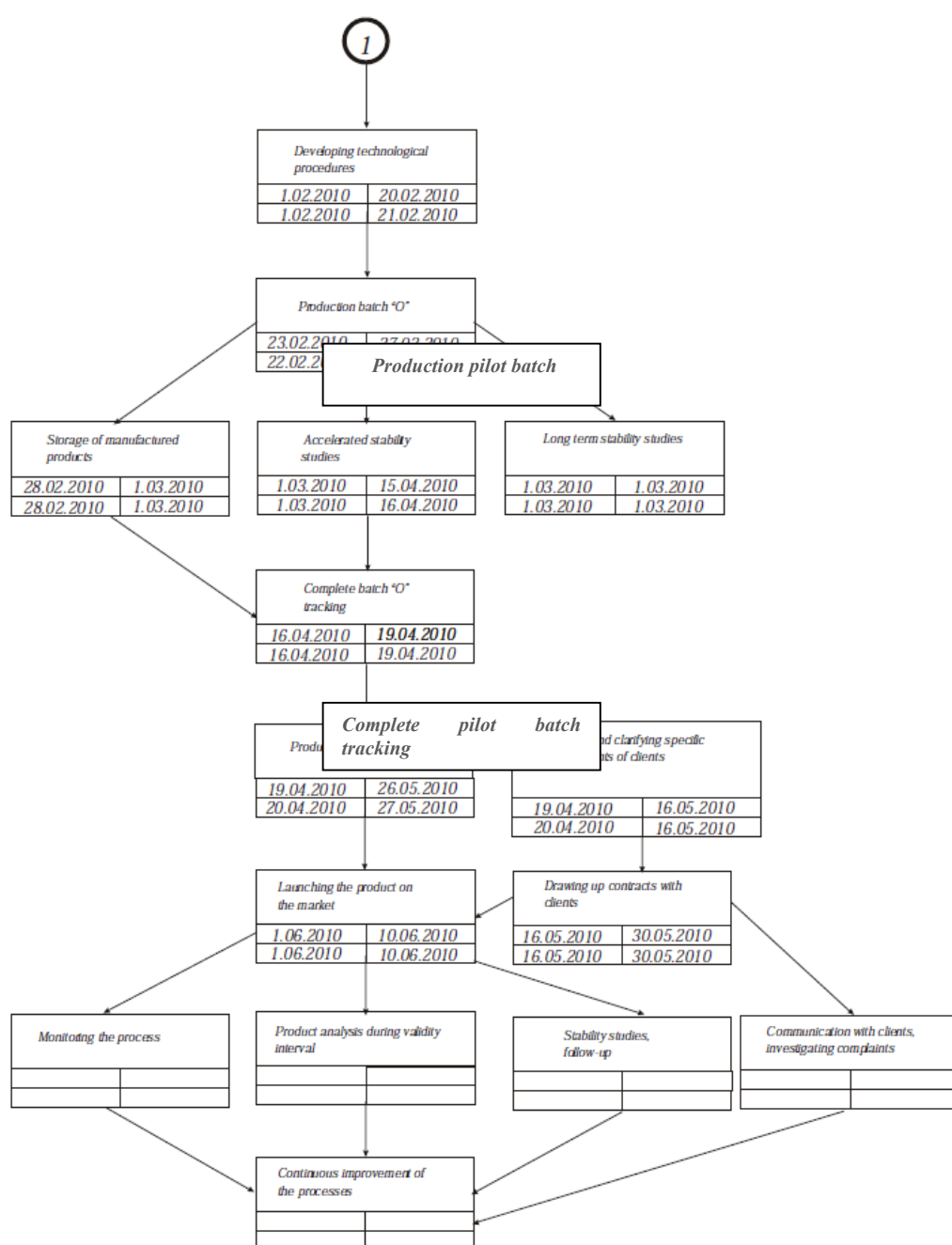


Figure 4 (part I)

PERT Chart regarding the project of achieving the quality of a cosmetic product

**Figure 4 (part II)**

PERT Chart regarding the project of achieving the quality of a cosmetic product

Conclusions

In order to optimize the possibilities of ensuring the quality of cosmetic and dermato-cosmetics, Farmec Company in Cluj-Napoca, Romania has applied modern techniques of quality management.

Affinity diagram was used as a group method to identify critical points that can affect the quality of cosmetics and dermato-cosmetics. There were identified regulatory risks and risks related to the market, organization, supply, product and production activity.

Relations diagram was applied to assess the causes that can lead to risks regarding the quality of cosmetics and dermato-cosmetics. The following risks regarding quality have been identified through teamwork: non-compliance with specification, problems with product formulation, a large number of deviations in process, improper packaging, complaints, contamination. For each of these critical points the main causes were identified through relations chart in order to eliminate them.

The tree diagram evaluated the ways to ensure the quality of the products. Some activities are related to the quality assurance system of the company and others to specific activities such as compliance with legal requirements and provisions of product registration dossiers, proper optimization of the technological process, strict observance of technological process parameters, analysis of products during the validity interval and application of preventive and corrective actions.

With matrix diagram the activities and responsibilities of various departments of the company were established in order to eliminate the errors and causes of risk.

Setting the specific quality assurance plan of cosmetic and dermato-cosmetic products was achieved by applying PERT chart, allowing the critical activities and the timeframe planned for each stage to be watched, thus evaluating the individual contribution of the various functions within the organization to meet the deadlines.

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