



*Chemical Quality Assurance (DTC- 311)*



# Chemical Quality Assurance

Dr. Binita Rani  
Associate Professor  
Department of Dairy Chemistry  
SGIDT, BASU, Patna

# CONCEPT AND IMPORTANCE OF CHEMICAL QUALITY CONTROL IN DAIRY INDUSTRY

- ▶ The strict quality control → both
- ▶ **chemical** and
- ▶ **microbiological**
- ▶ will deter the **adulteration** of milk → improve the quality of raw milk.
  
- ▶ Improvement of **raw milk quality** through **regular checks** → improve the quality of milk products prepared from such milk.

- ▶ install **confidence** in national consumers, who are drifting away from the **indigenous milk products**.
- ▶ It will also **increase export potential** of Indian milk products
- ▶ finally the **National image** with reference to **Indian milk quality**.
- ▶ **strict quality control** will also **increase the revenue** of a dairy producer.

# Quality Control and Quality Assurance

- As per ISO: 8402 (1994): **Quality** is the totality of **features and characteristics** of a product or service that bear (determine) on its ability to satisfy **stated or implied needs (requirements)**
  - **Quality  $\propto$  1/variability**
- **Quality control (QC)** involves the *set of activities used to ensure* that the products and services meet / fulfill requirements for quality .

Traditionally Q.C. → **laboratory function** only and is related to

**analysis of samples** i.e.

- testing and judging of **raw materials** / and
- **finished products** for → acceptance or rejection.

### **Purpose & Aim:**

- To ensure that **products** are within the well defined and accepted standards thereby protecting the **legal and health rights** of consumers and **financial interests** of producers / manufacturers.

### **Limitations :**

- Recall of products is more because products are **tested in the**

## Quality assurance (QA):

The set of activities which ensures that → *quality levels of products* and services are *properly maintained* and → the supplier and customer quality issues are properly resolved.

**Quality assurance** gives **adequate confidence** that product or service will **satisfy given requirements for quality**.

## Purpose/Aim:

### Internal purpose:

- ❑ Within an organization → QA provides confidence to the management.

### External purpose:

- ❑ Outside the organization provides confidence to consumers or others.
- ❑ Compared to QC, QA is much wider in the sense, it demands
  - ❑ full control over the quality of raw materials,
  - ❑ control over the process at different levels and
  - ❑ control over distribution set up etc.
- ❑ Notion is that –Prevention rather than Detection.
- ❑ It is a proactive approach rather than a reactive approach.

# OBJECTIVES AND IMPORTANCE OF QUALITY ASSURANCE

1. To maintain **legal standards** and **legal requirements**
2. To fulfill customer's requirement in terms of various **attributes**
  - Physical (body, texture, colour, etc)
  - Chemical composition
  - Microbiological
  - Safety
  - ❑ Consumers should get **what they pay for**
  - ❑ This leads to **increased consumer satisfaction** and **less complaints**
3. To check **adulteration** in incoming material => **prevent substandard product, hazards or problems in the process** .



4. To check **efficiency of processes** : heating, cooling, removing hardness from water , effluent treatment etc.
5. To safeguard **nutritive value** of milk and milk products
6. To check **wastage** of material
7. To help in **research and developments**
8. To ensure general **cleanliness and sanitation** in factory premises

## BENEFITS

- Reduction in unit cost of production
- Reduction in wastage and scrape
- Less complaints from customer
- Avoids repeated inspection
- Increases production since rejection reduces
- Efficiency of unit goes up
- Management gets proud place in society
- Boost employee's morale
- Reduction in production bottlenecks

# ROLE OF QUALITY ASSURANCE DEPARTMENT

- **Sanitation**- defines requirements for **cleaning and sanitary activity** and their monitoring
- Sanitation standard operating procedure (**SSOP**)
- Standard operating procedure (**SOP**)
- Good manufacturing practices (**GMP**)
- **Foreign material control**
- **Quality control**- Chemical and Microbiological testing
- **Documentation** control
- **Pest** control

- Hazardous material control
- Allergen Protocol for controlling allergenic material
- Record control- identification and maintenance
- Calibration
- Water quality and water treatment programmes
- Sensory training and sensory evaluation
- Supplier certification and ongoing supplier evaluations
- Receiving, storage and control of raw ingredients and packaging material
- Control of non-conforming product and process

- Product identification traceability and Product recall
- Handling **customer's complaints**
- **Labeling**- application and control of labels
- **Preventive maintenance**
- Formalized management review process
- Wastewater (**effluent treatment programme**)
- **Training**
- **Corrective/preventive action** - root cause analysis and follow up evaluation to confirm effectiveness of action taken and
- **Internal auditing**

# Statistical Quality Control (SQC)

- During the World War II, there was a tremendous requirement for mass production of weapons and other materials, which necessitated the concept of **Quality control** by making use of **statistical tools**.
- This use of statistical tools in controlling the processes was termed => **Statistical Quality Control**.
- This was an **extension of the inspection phase** where inspectors provided with a few **statistical tools**, such as **sampling plans** and **control charts**.

- Most significant contribution was => **sampling inspection**, rather than total inspection.
- It is **collection, analysis and interpretation of data to => solve a particular problem.**
- SQC concept provides a basis for => determining a good or **acceptable process behavior model.**

Any deviation from the model can be traced, identified & eliminated from a process => so that it continues to **produce product of acceptable quality.**

## Deming's Philosophy:

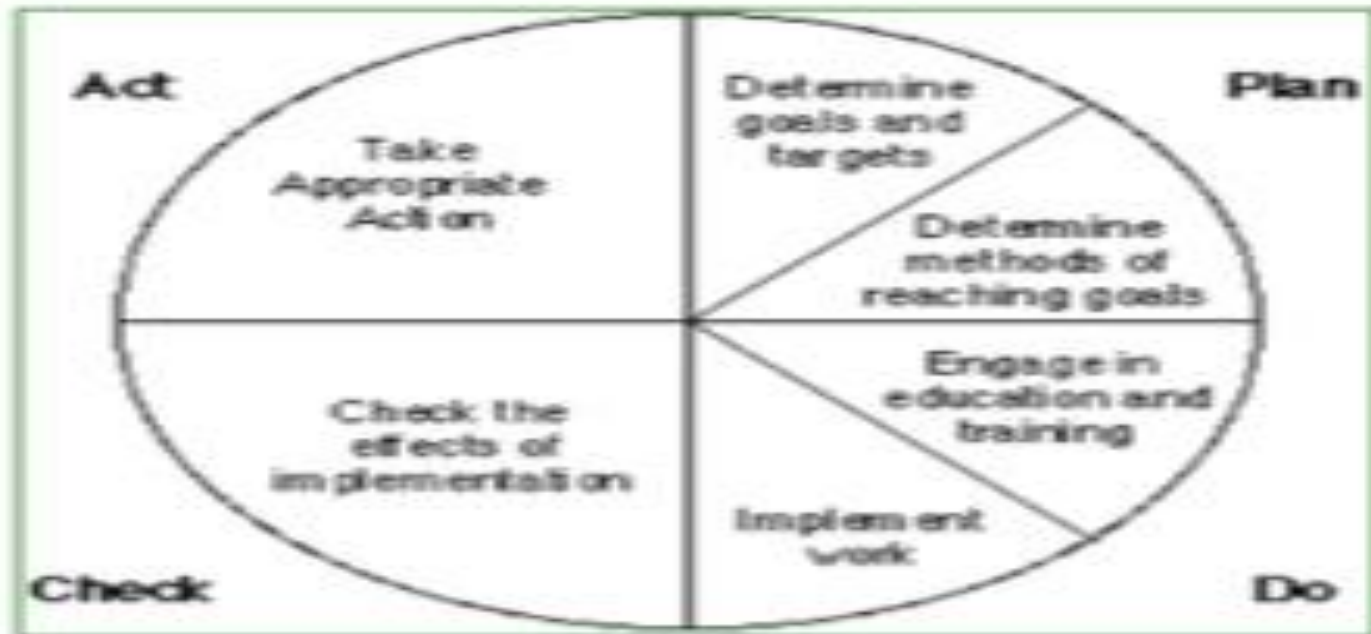
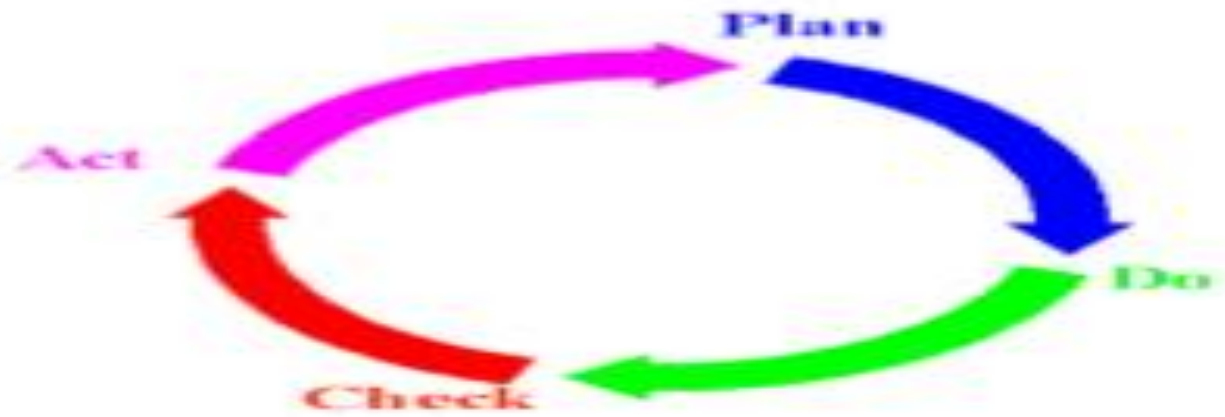
Adward Deming proposed **concept of quality assurance => involves both process monitoring and eliminating the causes of unsatisfactory performance at all stages.**

- name given to entire **cycle of activities** through which the fitness for use of **process, product or service** is achieved, with a view to carry out a company's **quality function** in accordance with the laid down **quality objective and policies.**
- has divided **quality control** into **four activities** i.e.
  - 1) Plan
  - 2) Do
  - 3) Check and
  - 4) Act.

known as Deming's **PDCA cycle/wheel.**



# Deming Wheel



## Plan

- Establish goals
- Standardize working procedures
- Train employees

## Do

- Carry out the work according to plan

## Check

- Verify for compliance with the plan

## Act

- In case of non-compliance => find out and remove its root cause(s)
- Deming's PDCA cycle applies to all situations and area where quality control is needed (wanted).
- **universal model** => covers all activities relating to *Quality Control* , *Quality Assurance* as well as *Quality Improvement*.

## Quality Control (QC)

- During the passage of time => a separate **Quality control department** came into existence in each factory.
- The QC department devoted itself primarily to => **quality functions**.
- Role of QC department => **examine the finished product** with a view to verify whether it fulfilled requirements for quality or not.

# Total Quality Control (TQC)

- Quality functions **cannot** be truly achieved by **QC department alone**
- Department depends on help rendered by almost **all other departments** of the company to => **achieve the goals** (7 departments)
- **Field force** determines => **quality needs** of the consumers (users)
- **Research and development department** creates => a **product concept** which can **meet these needs**
- **Chemist or design engineer** then prepare => **product and material specifications** suitable for => the required quality and **specify procedures and instruments** to measure the quality

- *Purchase department* **procure** => material of the right quality .
- *Plant operators* use processes and equipments to => **manufacture product** .
- *Inspectors* measure => **quality attributes** and determine **fitness of the product for use**.
- *Sales department* => **market** product and take care at **pre-sale stage, on-sale stage and after sale stage**.
- *Field force* gives **consumers' reaction** => it creates opportunities for the product improvement which in turn restarts the whole cycle of activities.

• **TQC** is an **integrated organizational approach** to delight customers by => meeting their **expectations** on a **continuous basis** through involvement of everyone in the organization.

• It is **an effective system of integrating quality development, quality maintenance and quality improvement efforts of various groups** in an organization to **provide product or service at the most economical levels** and which meet **full customers' satisfaction**.

• **It helps in minimizing rejection and rework.**

# Quality Assurance (QA)

- ISO:8402 (1994) - comprises **planned and systematic activities** implemented within quality system to provide adequate confidence that a given entity (process/product/service) will **fulfill requirements for quality**
  - All **QA activities** serve to **build confidence**
  - **internally** among => **management of organization** and
  - **externally** among its => **customers and authorities.**
- 
- ❑ To build confidence, quality assurance has to be built into the process => which includes **creating records, documenting plans, documenting specifications** and **reporting reviews.**
  - ❑ Such activities and documentation serves to => **control quality as well as assure it.**

# Total Quality Management (TQM)

- TQM => an *integrated organizational approach* in delighting customers by meeting their expectations on a continuous basis through everyone involved with the organization working on continuous **improvement in all spheres** namely- **process, products** and **service** along with proper **problem-solving methodology**.
- **Tools** = SQC, QC, TQC, QA : often solve problem in **one area of business** such as => **quality of supply** or **excellence in manufacturing**.

## **So what is required is**

- ❖ a process designed to focus on *customer expectation*
- ❖ *preventing problems*
- ❖ building *commitment to quality* in workforce
- ❖ *promoting open decision making*
- **TQM is a journey => it is the path as well as the goal.**



# Basic principles of TQM

- **Be customer focused** – place the customer at the centre of everything you do
- Do it right first time and every time - **quality first and always**
- **Continuous improvement** by using the tool of PDCA in **every aspect of work**
- *Communicate and educate*
- Improve communication - **tell the people what is going on**
- Educate - **train** the people and retain them

## *Measure and recorded*

- While finalizing the goals, the **Quality indicators** (measurements) should be finalized.
- Record the measures as per prescribed documentation
- It allows the company to **make decisions based on facts, not opinion.**

## *Do it together- introduce team working*

- Reduces conflict and in-fighting and increases trust and respect
- Biting problems with wider range of skill – therefore better and more balance solution

# Benefits of TQM

- TQM can bring **several benefits** for **consumers, company** and **employee**, if implemented properly.

## For customers

- Greater care
- Value for money
- Greater satisfaction
- Better availability
- Result in better customer loyalty.

## For company (organization)

- Continuous improvement in quality
- Reduction in cost
- Increase in productivity
- Better motivated work force
- Defects are reduced
- Faster solution of problems
- Result in increased cash flow and net profit

## For employees

- Empowerment
- More respect
- More training and better skill
- Appreciation and recognition
- Work satisfaction

The background features a white space on the left and a complex geometric pattern of overlapping triangles in various shades of blue on the right. The word "THANKS" is centered in the white area.

**THANKS**