



## **Unit V - Topic 3**

### **Sanitation and hygiene in beverage industry**

#### **Hygiene practices**

##### **1. Source of water and handling system for source water**

One of the most basic areas for the introduction of microbial contamination in food manufacturing plants. A wide source of microorganisms can be carried by source water into the plant. Food manufacturing plants must have detailed treatment plan for source water. The most effective treatment used for source water is anti-microbial treatment.

##### **2. Recycling of water and handling system for recycled water**

In food manufacturing process it is often essential to use process recycled water. The use of process recycled water in food manufacturing plant may increase the chances of increase contamination of water. Organic loadings and dirt & debris can contribute to increase microbial numbers in recycled water. To reduce the impact of this recycled water, engineering controls such as increasing circulation rates, adding filtration etc can be essential.

##### **3. Product which is recycled or raw recycled material**

Third process which involves recycling of product or raw recycled material, washouts of products, washouts of packaging systems, washouts of containers etc. these materials can have influence of redox potential because these streams are heavily loaded with solids. Hence, preservatives are generally effective.

##### **4. Storage and handling system for raw material**

In maintaining plant hygiene and food safety in food manufacturing plant, storage and handling system of raw material is an essential step. Comprehension of the physical and chemical properties of raw material and their handling history, treatment on their arrival, addition of biocide is also critical. Target results which are a standard analysis method should be properly assigned to each raw material. A treatment plant for each raw material should be established depending on the nature of the raw materials as some raw material will be easy to handle while some may possess little risk to the storage system.

##### **5. Reaction vessels, mixing vessels, milling vessels and their associated piping systems**

A quality food hygiene plant begins when all raw materials, stream water and recycled materials come together. In the final product the biological problem is more manageable, when the raw material is in good biological condition. The food manufacturing plant should be kept clean and dry to avoid the growth of airborne microorganism. For thorough cleaning and disinfection of the whole food manufacturing plant scheduled shutdowns should be used.

##### **6. System for product packaging**

After manufacturing, the next step is packaging of the final product so that it can be deliverable to the customer. Addition of biocide with proper food plant hygiene at this point is essential to eliminate and prevent contamination during packaging system.

##### **7. Transportation of products and their delivery systems**

Microbial clean product has been manufactured at this point due to proper food plant hygiene procedures. Problems occurred at this point could be off-loading issues due to extended use over time, refilling of the returned shipping containers. In packaging system, it is essential that the product has not been contaminated with microorganisms. Food plant with good hygiene can be possibly used to locate and eliminate problem areas in food manufacturing plant.



### **Requirement for hygiene practices in food safety**

A hygiene procedure must be established by the management to ensure hygienic practices is been followed by the employees. Pre-employment health examination must be considered to ensure person to be employed is in good mental and physical condition. At regular interval all employees who work with food should check with the signs of illness and infections. The important food hygiene rules and practices that should be conducted on the regular basis includes:

1. Practice of proper nutrition and physical cleanliness should be implemented to provide good physical health
2. Employees with illness before working with food must report so that adjustments can be made to prevent food from contamination
3. To eliminate potential food contamination and food borne disease hygiene work habits and protocols should be developed
4. After handling garbage or waste materials, after using toilet, uncooked egg products or diary products proper sanitation or washing of hand should be ensured by the employees
5. Employees working in plants should be restricted to touch food equipments
6. Rules regarding “no smoking” should be followed and strict action must be taken on employees who doesn't obey the precautionary measures.

### **Facilities in food manufacturing plant**

Construction of food manufacturing and processing equipments should be undertaken according to the regulations by the appropriate food regulatory agencies. Self-closing doors should be provided in the restrooms. Foot or knee faucets should be provided in hand washing stations that will have supply of water at 43°C and at 50°C. Bars of soap can increase the transmission of microorganism therefore liquid soap dispensers are recommended. For drying hands, disposal sanitary towels are recommended.

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### **Contamination reduction in food manufacturing plant**

1. **Preparation area:** In food production or preparation area, the elimination and prevention of foodborne illness and contamination is essential as it can serve as transmission source of disease-causing microorganism directly to the consumers.
2. **Utensils:** To maintain hygienic conditions, proper cleaning and washing of utensils are needed. Subjecting utensils to 77°C environmental temperature for 30 minutes can accomplish disinfection process.



3. **Reheating:** Pathogens can multiply and can cause food contamination and foodborne illness, if the food is not held at proper temperature for long. For the elimination of this microorganisms reheating can be considered as an important method. During cooking process, survived bacterial spores can be effectively reduced by the help of reheating process.
4. **Serving:** An effective personal hygiene management program is necessary so that employees who work with food doesn't be a carrier for the transmission of diseases. This program should include elimination of personal contact with food, personal cleanliness, maintenance of proper food temperature and control of contamination from customers.

### **Beverage sanitation principles**

There are six standard steps for cleaning or sanitation of beverage plants that includes:

1. Prerinsing for the removal of large debris and non-adherent soil.
2. Cleaning compound especially foam can be used to provide intimate contact with water to increase the effectiveness of wetting and penetrating properties
3. Inspect for cleanliness and hand details
4. For the removal of dispersed soil, post rinsing process can be carried and to increase the effectiveness of sanitizer, cleaning compounds can be used
5. Before exposing any cleaned area to beverage material, it must be rinsed with quaternary ammonium sanitizer, present in more than 200 parts per million.

### **Control of microbial infection in beverages**

It is essential to sanitize and clean the brewery equipment that process the wort because beer self-sterilize itself in 5-7 days and in freshly cooled wort, undesirable bacteria and viruses grows rapidly. Developing and maintaining a comprehensive sanitation program can be an effective mean to prevent contamination and infection in the beverage products. Ultraviolet (UV) light can be effectively used to control microorganisms and to eliminate airborne microbes. UV light is nonionizing and non-residual disinfectant therefore can also be installed in water treatment to obtain residue-free water.

### **Hygiene practices in beverage industry**

HACCP (Hazard Analysis and Critical Control Point) program should be implemented which ensures microbial and chemical monitoring to assure safe production of food products. System such as conveyor lubricant system can be installed to reduce microbial load. Interior and exterior of the beverage equipments, conveyors and fillers should be sanitized and cleaned on a regular interval. Walls and floors should also be foamed or gelled on daily basis.