

Quality Control and their CCPs

Beverage processing



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1. Introduction



- Quality control in the beverage industry is paramount for ensuring
 - Consistent taste,
 - Safety, and
 - Adherence to regulations
- Builds brand trust, satisfies consumers, and enhances operational efficiency.
- Significance of quality control in the beverage industry
 - ✓ **Consistent Product Quality**
 - ✓ **Brand Reputation**
 - ✓ **Regulatory Compliance**
 - ✓ **Customer Satisfaction**
 - ✓ **Cost Efficiency**

1.1 Beverage Processing



- Beverage Processing steps includes :

- ✓ **Blending,**
- ✓ **Pasteurization,**
- ✓ **Filtration/Clarification/
Deaeration, and**
- ✓ **Packaging**
- ✓ **Ageing**

That turn raw materials into edible drinks.

- Quality control guarantees
 - ✓ **Finished products' quality,**
 - ✓ **Flavor consistency, and**
 - ✓ **Adherence to safety regulations**

2. Pre-requisites of quality Control



3. Quality Control System

3.1 Tools of quality control system

A. Monitoring the Supply Chain

- For effective, & smooth production of goods and services
- Done from farm to fork
- To source high-quality ingredients, track potential recalls or warnings

B. Inspecting Raw Materials and Ingredients

- Done before beginning the production process, to ensure raw material safety
- Identify any possible safety issues and eliminate quality hazards as per SOPs assigned.

C. Chemical Testing

- Done throughout the facility's manufacturing process
- To ensure smoothness of the process as per guidelines.
- Results: inform potential recalls, production pauses, or recipe changes

3. Quality Control System

3.1 Tools of quality control system (Cont.)

D. Nutritional Investigating

- Done to confirm the nutritional information mentioned on label
- Beverage should contain nutrients as per the regulation (i.e., FSSAI)

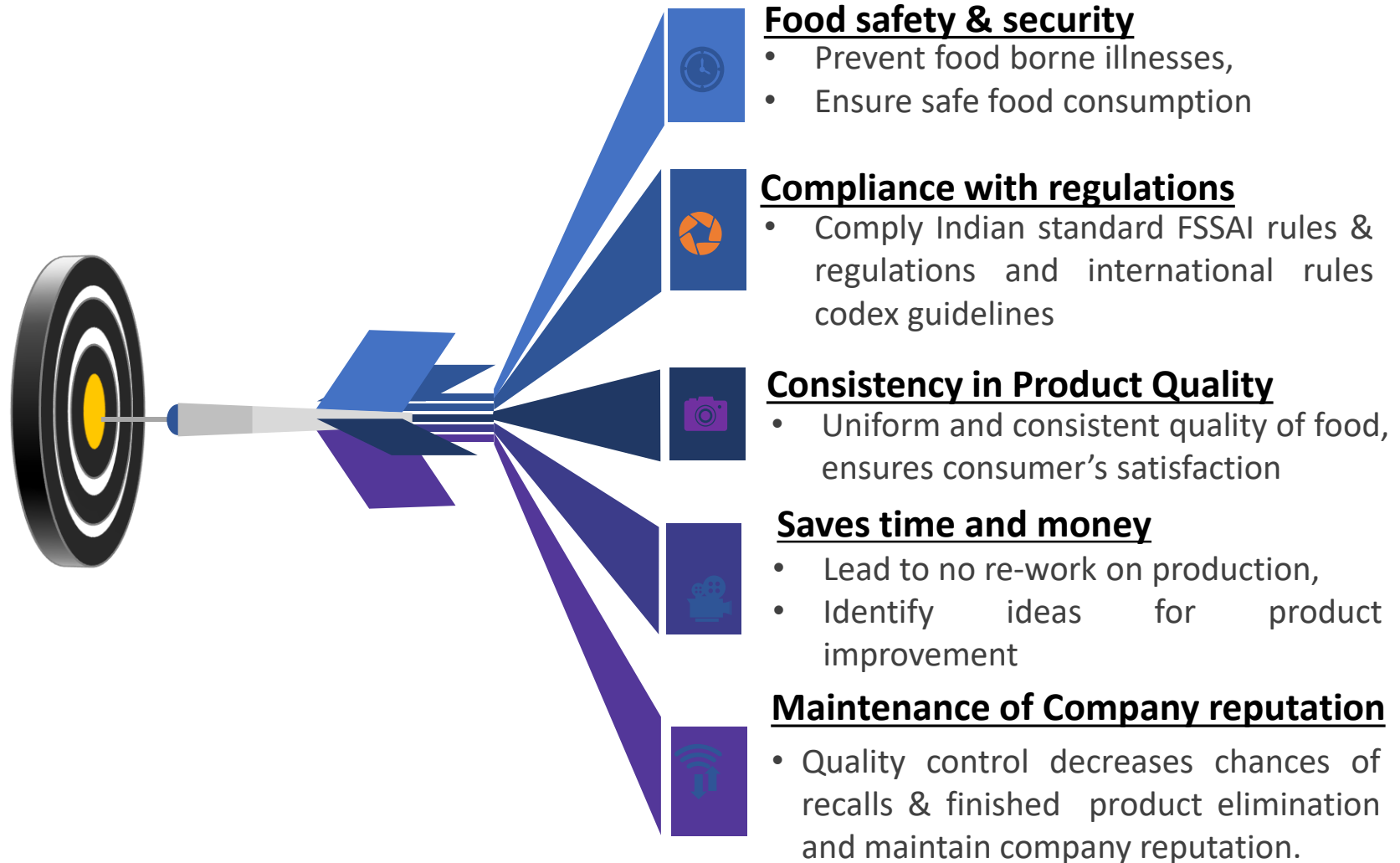
E. Ensuring Safe and Effective Packaging

- Sharp edges or unstable bottoms of pack
- No scratches or punctures
- Adequate sealing

F. Inspection using Senses (Sensory Evaluation)

- A taste, smell, and sight test
- Done by sensory panels
- Ensure replication of same sensory characteristics of beverage

3.2 Significance of quality control



4. CCPs in Beverage Processing



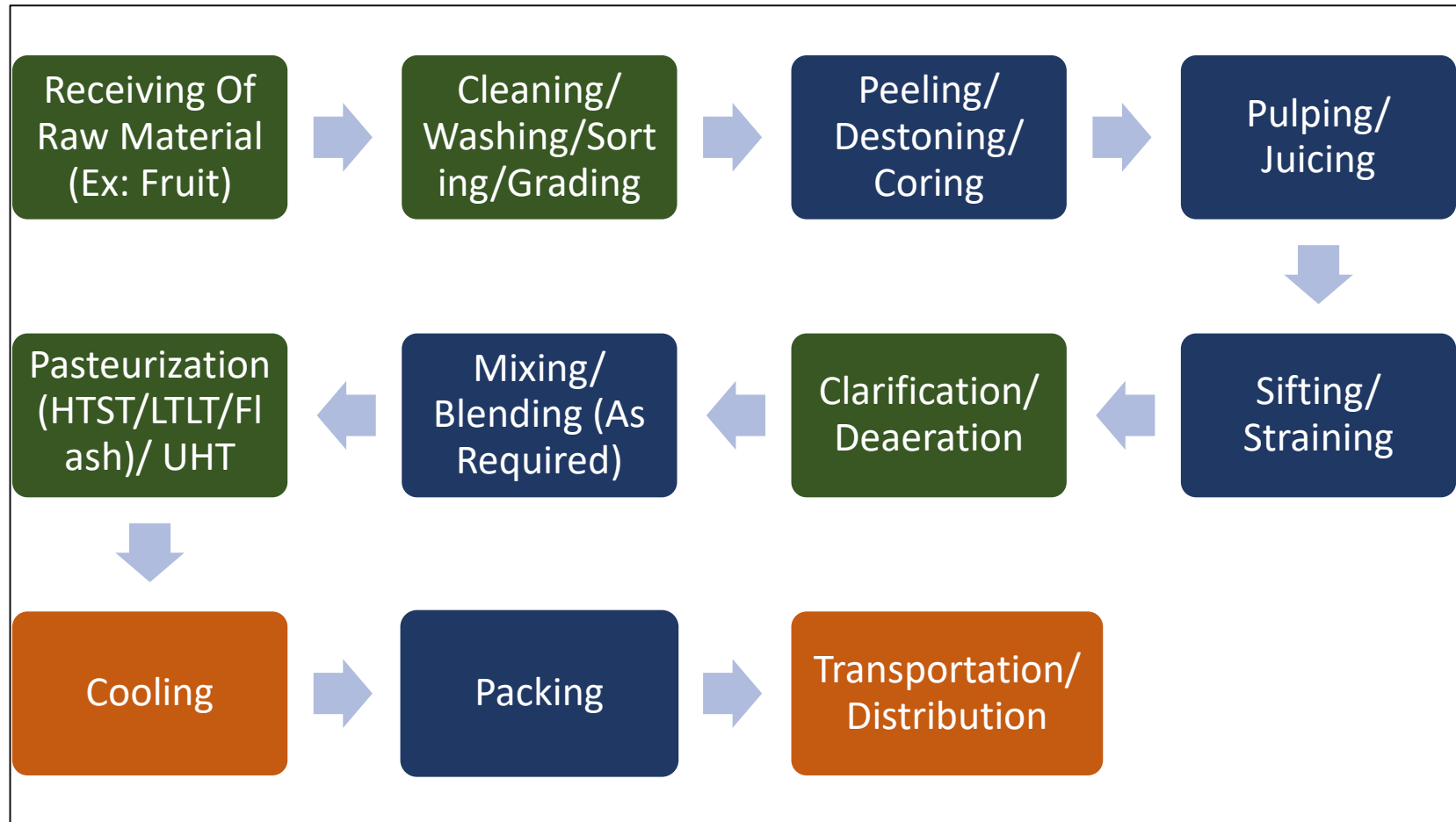
CCPs Definition

- Specific stage where control can be applied to prevent, eliminate, or reduce potential hazards to acceptable levels.

Identification of CCPs

- Thorough analysis of the entire food production process.
- Assessment of Potential hazards

4.1(a) Process Flow Chart: Non-alcoholic beverages



 critical control points

 critical points

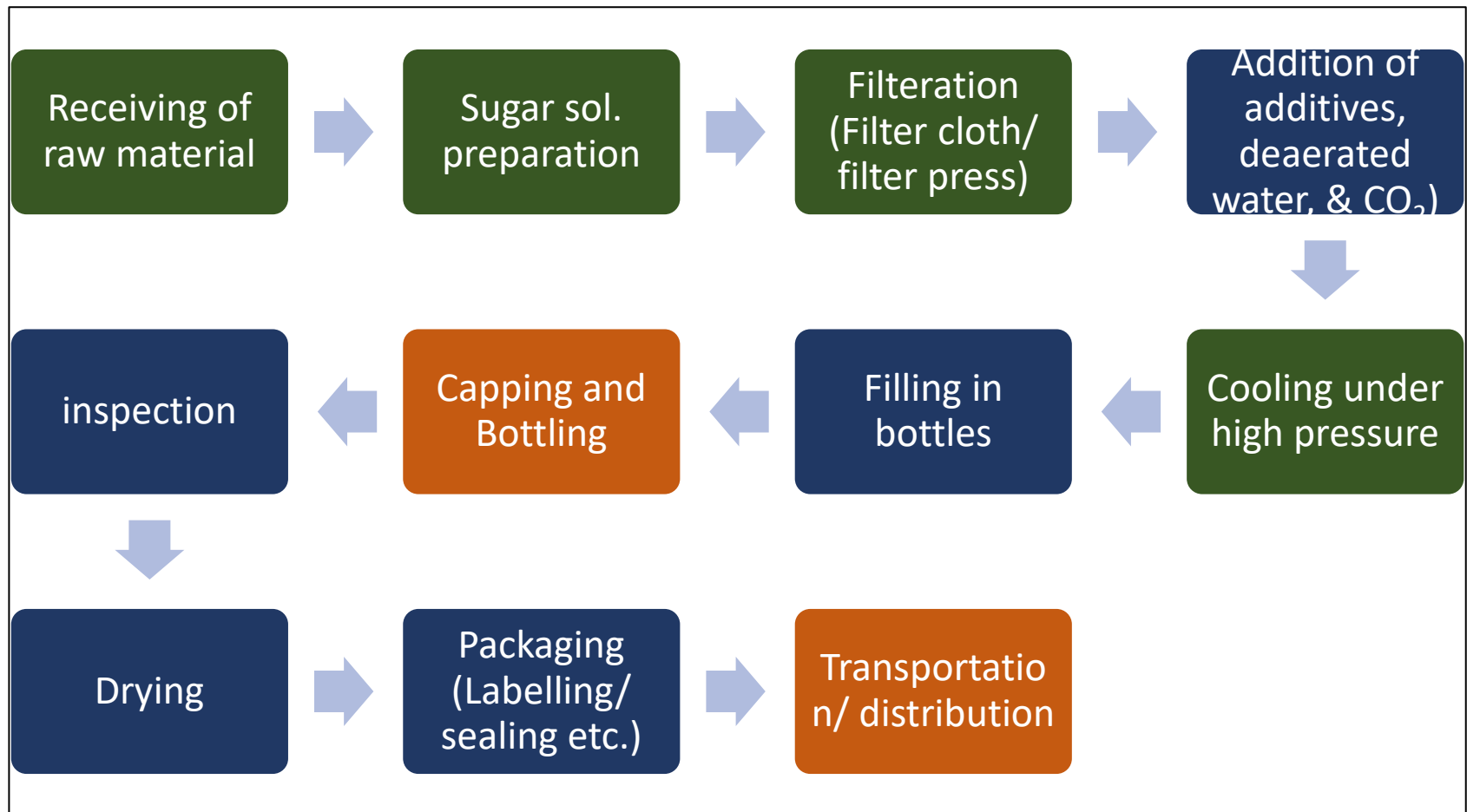
4.1(b) CCPs of Non-alcoholic processing

CCP Nos.	Processing step	Issues (if the CCP not achieved)	Effects of issues	Critical limits
CCP 1: Raw material	Receiving of raw material (mainly fruits)	Quality of raw ingredient (as required); affects final product quality	Bitter taste, sour taste in sweet fruit juice, etc.	Ideal & accurate quantity, generally ripe & firm quality fruits
CCP 2: Prepared Raw material	Cleaning, Washing, sorting/grading	Higher microbial count, presence of toxicants, non uniformity in finished product	Short shelf life, non uniform product quality	1. Pesticide residue: 0.01 mg/kg (FSSAI) 2. Microbial count (as per FSSAI): a) aerobic plate count: $\leq 10^6$ CFU/g, b) yeast and mold count ≤ 1000 CFU/g, c) E. coli O157:H7 & Salmonella absence in 25g sample

4.1(b) CCPs of Non-alcoholic processing (Cont.)

CCP Nos.	Processing step	Issues (if the CCP not achieved)	Effects of issues	Critical limits
CCP 3: Extract	Clarification/Deaeration	Oxidation of phenolic compound, sedimentation	Poor mouthfeel, product darkness (colour/odour defects), spoiled sulfuryl odour	Food grade clarifier, generally natural or enzyme-based clarifier i.e., pectin, tannin are recommended.
CCP 4: Beverage	Pasteurization (HTST/LTLT/Flash)/ UHT	Microbial load: Higher; Targeted microorganisms may present in beverages.	Lower shelf life, may become possible cause of food borne illnesses.	1. Temp: 85 – 95°C (Temp may vary as per pH of raw material. 2. Targeted microorganisms (i.e., Clostridium pasteurianum and Bacillus coagulans) should be absent.

4.2(a) Process Flow Chart: Non-alcoholic carbonated beverages with CCPs



critical control points

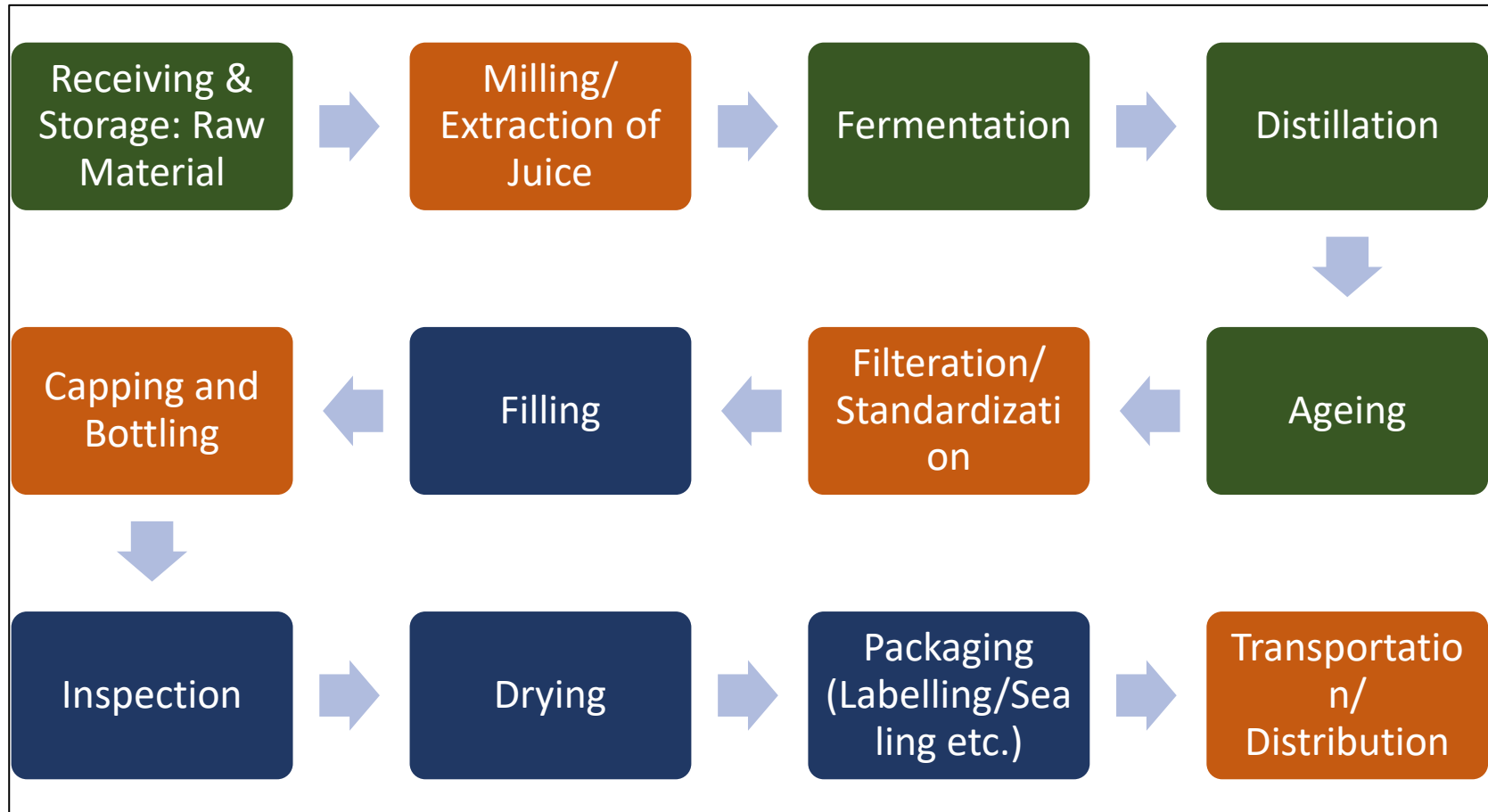


critical points

4.2(b) CCPs of non-alcoholic carbonated beverage with critical limits

CCP Nos.	Processing step	Issues (if the CCP not achieved)	Effects Of Issues	Critical Limits
CCP 1: Raw material	Receiving of raw material	Non-uniformity in product, oxidation	Capital loss, toxicity, poor sensory characteristics	Filter aid- perlite, diatomaceous earth or cellulose, No guideline for activated charcoal
CCP 2: Container	Sugar sol. preparation	Presence of chemical & microbial hazard	Toxicity, poisoning, company reputation loss	Temp: @78-82°C Sugar syrup strength: 40 – 60°Bx
CCP 3: Filter	Filtration	Non-uniformity	Product quality degradation	Pressure: 58 psi or 4 bar, MOC: stainless steel
CCP 4: CO ₂	Cooling under high pressure	Added CO ₂ will not properly solubilized	Less fizziness in beverage, low sparkling effect	1. Pressure: 30 to 50 psi 2. Conc. of CO ₂ : Min. 2500mg/L CO ₂

4.3(a) Process Flow Chart: Alcoholic beverages



 critical control points

 critical points

4.3(b) CCPs of alcoholic beverages processing with critical limits

CCP Nos.	Processing step	Issues (if the CCP not achieved)	Effects Of Issues	Critical Limits
CCP 1: Raw material	Receiving & storage: Raw material	Quality of raw material may degrade	Financial loss	1. Higher quality graded raw material 2. Storage at cold room ($< 10^{\circ}\text{C}$)
CCP 2: Extract	Fermentation	Production of toxicants	May lead to food borne illness or even death	1. Controlled time, temp. ($28-33^{\circ}\text{C}$, as required), and O_2 conc. (gen. absent) 2. Final sugar content: 14 % to 16 %
CCP 3: Distillate	Distillation	Presence of heavy metal, Presence of large amount of phenolic compound (or impurities may present)	Toxicity, poor sensory characteristics	1. Acetic acid: 2 % 2. Dimethyl sulfide (DMS): $\leq 2.84 \text{ mg L}^{-1}$ 3. $\text{Cu} \leq 5 \text{ mg L}^{-1}$ 4. Extremely mutagenic substance: 5 mg/L anhydrous alcohol

4.3(b) CCPs of alcoholic beverages processing with critical limits (cont.)

CCP Nos.	Processing step	Issues (if the CCP not achieved)	Effects Of Issues	Critical Limits
CCP 4: Beverage	Ageing	1. Adverse chemical compounds from wooden barrels 2. HPA and furfural formation	Toxicity	1. Certified and proper wooden barrels 2. Control of toasting intensity and temperature & Carbonization of wood. 3. Maturation: 50 % of spirit 4. Low counts of yeast, mold, and bacteria

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