

# ZION KIPROTICH RUTO

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## Objective

As a recent graduate, I am seeking a role which allows me to continue learning and perfecting my skills as I provide high-quality work, and encourages me to flourish as an analytical chemist.

## Experience

- **WEST VALLEY SUGAR COMPANY** 1/9/2023 -
  - DM PLANT, RO PLANT , WTP AND ETP OPERATOR
  - DM PLANT
    - Multigrade Sand Filter (MGF)
    - Remove suspended solids, turbidity from water.
    - Water passes through layers of sand, gravel, and other media.
    - Likely for treating process water or boiler feedwater.
  - Activated Carbon Filter (ACF)
    - Remove organic compounds, chlorine, and odors from water.
    - Water passes through activated carbon, adsorbing impurities.
    - Often used for improving water quality for tea processing or boiler use.
    - SAC: Strong Acid Cation (resin) - removes cations (e.g.,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ).
    - SBA: Strong Base Anion (resin) - removes anions (e.g.,  $\text{Cl}^-$ ,  $\text{SO}_4^{2-}$ ).
    - Mixed Bed: Combines cation and anion resins - for final polishing, producing high-purity water.
  - Purpose in DM PLANT
    - Prevent scaling, corrosion.
    - Ensure water quality for boiler
  - RO PLANT
    - The UF-RO plant uses a two-stage process:
      1. Ultrafiltration (UF): A semipermeable membrane (0.01–0.1  $\mu\text{m}$  pores) removes suspended solids, bacteria, viruses, and macromolecules under low pressure (1–5 bar).
      2. Reverse Osmosis (RO): A tighter membrane (0.0001–0.001  $\mu\text{m}$  pores) removes dissolved salts, heavy metals, and other contaminants under high pressure (10–15 bar).
    - The UF-RO plant delivers high-purity water for:
      - Drinking water (municipal/industrial)
      - Boiler feed (power generation)
      - Semiconductor manufacturing
      - Food/beverage processing
      - Pharmaceuticals
      - Wastewater reuse
    - Water Treatment Plant (WTP)
      1. Removal of impurities: Physical, chemical, and biological processes.
      2. Disinfection: Kill pathogens, make water safe.
      3. Pretreatment: Remove large particles, adjust pH.
      4. Coagulation and Flocculation: Chemicals added to remove dirt, particles.
      5. Sedimentation: Particles settle, removed as sludge.
      3. Filtration: Sand, carbon, or membrane filters remove remaining impurities.
      6. Disinfection: Chlorine, ozone, or UV kill bacteria, viruses.
    - Common Chemicals Used:
      1. Coagulants: Alum ( $\text{Al}_2(\text{SO}_4)_3$ ), ferric chloride ( $\text{FeCl}_3$ ).
      2. pH Adjusters: Lime ( $\text{Ca}(\text{OH})_2$ ), soda ash ( $\text{Na}_2\text{CO}_3$ ).
      3. Disinfectants: Chlorine ( $\text{Cl}_2$ ), sodium hypochlorite ( $\text{NaOCl}$ ).
      4. Scale Inhibitors: Phosphates, polymers
    - Effluent Treatment Plant (ETP)
      - Components & Purpose:
        1. Oil Skimmer: Removes floating oil, grease - prevents clogging downstream.
        2. Equalization Tank: Balances flow, pH, and pollutant load.
        3. Tube Settler: Enhances settling of suspended solids.
        4. Anaerobic Tank: Breaks down organics without oxygen.
        5. Aerobic Tank: Further breaks down organics with oxygen.
        6. Clarifier: Settles sludge, clarifies treated water.
        7. Lime Adding: Adjusts pH, aids coagulation.
        8. MGF & ACF: Polishes treated water - removes remaining impurities.
      - Chemicals & Purpose:
        1. Lime: pH adjustment, coagulation.
        2. DAP & Urea: Nutrients for microbes in biological treatment.
        3. Sugar, Cowdung, Molasses: Food for microbes - boosts treatment.
        4. MLSS: Monitor biomass in aerobic tank - indicates treatment health.

- **JAMES FINLAYS TEA COMPANY (CHANGANA TEA FACTORY)  
GENERAL WORKER (COMBINED WITH INDUSTRIAL ATTACHMENT)**

09/05/2022 - 15/09/2022

During this period when I was in attachment, I secured a seasonal contract job spanning a period of three months, though I was stationed at Withering and CTC, it was rotational to all departments of tea processing and I did the following;

Green tea leave counting

Assessing leave size, uniformity and quality of leave and helps determine its grade and value

Withering and discharging

Withering reduces moisture content, make leaves pliable as well as spreading leaves thinly, allow natural air circulation.

It also helps leaves lose weight, become soft, and develop flavor precursors.

Discharging

Stop oxidation, preserve flavor and color.

Applying heat that steam to inactivate enzymes.

Leaves become dry, crispy, and develop final flavor and aroma

CTC

CTC stands for Crush, Tear, Curl 😊. It's a tea processing method that produces strong, bold teas.

CTC Process:

1. Withering: Leaves are withered to reduce moisture.

2. Maceration: Withered leaves are crushed, torn, and curled using rollers.

3. Oxidation: Macerated leaves are left to oxidize, developing flavor and color.

4. Drying: Oxidized leaves are dried to stop fermentation

Fermentation

Fermenters and CFUs (Colony-Forming Units) are terms often used in microbiology and food processing 😊.

Fermenters

- Containers or vessels used for fermentation processes

Provide controlled environment for microbial growth and fermentation.

In tea production, fermentation involves enzymatic oxidation

Quality control

Quality control is crucial in tea production 😊

Check tea leaf quality, size, and moisture.

Monitor withering, rolling, oxidation, and drying.

Taste, smell, and assess liquor color.

Check moisture, particle size, and density.

Analyze theaflavins, thearubigins, and other compounds

Dryers

Dryers are a crucial part of tea processing 😊.

How Dryers Work:

1. Purpose: Reduce moisture content, preserve tea quality.

2. Process: Hot air is circulated through the tea leaves, evaporating moisture.

3. Types: Fluid bed dryers, tray dryers, or continuous belt dryers.

Hot air transfers heat to tea leaves.

Evaporation occurs, reducing moisture content.

Continuous airflow removes humid air, speeding up drying.

Sorting

Sorting is a key step in tea processing

Separate tea leaves by size, shape, and quality.

Use sieves, screens, or machines to categorize leaves.

Types of Sorting:

1. Size Sorting: Separate by leaf size (e.g., whole, broken, fanning).

2. Grade Sorting: Categorize by quality, appearance, and color.

Why Sort Tea?

Consistency: Ensures uniform product.

Quality: Removes unwanted particles or debris.

Market Value: Different grades fetch different prices.

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## Education

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- **MURANG'A UNIVERSITY OF TECHNOLOGY  
BACHELOR OF SCIENCE ANALYTICAL CHEMISTRY  
SECOND CLASS HONORS (LOWER DIVISION)**

29/09/2023

- **KAPSOIT SECONDARY SCHOOL  
KENYA CERTIFICATE OF SECONDARY SCHOOL  
C+**

2018

- **CHEPSOO PRIMARY SCHOOL  
KENYA CERTIFICATE OF PRIMARY EDUCATION**

2015

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Skills

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- Division making Team building ,Problem solving ,

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Personal Details

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- Date of Birth : 15/06/2000
- Gender : MALE

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Reference

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- SHADRACK ROP - JAMES FINLAYS TEA COMPANY (CHANGANA TEA FACTORY)  
FACTORY ASSISTANT  
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- Dr WAREN ANDAYI - MURANG'A UNIVERSITY OF TECHNOLOGY  
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