

# Quality Control and Analysis in Chemical Products

## Part 1: Dialogue

**Context:** A Chemical Engineer who is performing quality control and analysis on chemical products before distribution.

### Characters:

- **Sophia:** Chemical Engineer
  - **Mark:** Quality Control Specialist
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**Sophia:** Mark, I just finished the **purity assessment** for this batch, and we might have a slight deviation from the standard.

**Mark:** That's concerning. Did you check the results against our **statistical process control (SPC)** charts?

**Sophia:** Not yet, but I ran a **titration** test, and the concentration is slightly lower than expected.

**Mark:** We should double-check with a secondary test before making adjustments. Any issues with **batch consistency** across different samples?

**Sophia:** Yes, a few samples had minor variations, but they're within the acceptable range.

**Mark:** If that's the case, we should proceed with **process validation** before distribution. We need to ensure all parameters meet specifications.

**Sophia:** Agreed. I'll compile the test results and compare them to the previous production runs.

**Mark:** Good idea. If we detect any trends, we can adjust the raw material input to improve uniformity.

**Sophia:** I'll also review the production logs to see if any process fluctuations could have contributed to the variation.

**Mark:** Sounds like a solid plan. Once we verify the data, we'll finalize the batch for approval.

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## Part 2: Comprehension Questions

1. What issue does Sophia identify in the batch?
  - (A) The production speed is too slow
  - (B) The purity assessment shows a slight deviation
  - (C) The packaging process has defects
  - (D) The chemical formulation is incorrect
2. What test does Sophia mention performing?
  - (A) A **titration** test
  - (B) A thermal stability test
  - (C) A viscosity test
  - (D) A pressure test
3. What does Mark suggest before distribution?
  - (A) Increasing the batch size
  - (B) Skipping quality control
  - (C) Performing **process validation**
  - (D) Changing the chemical formulation
4. What does Sophia plan to do next?
  - (A) Review production logs for process fluctuations
  - (B) Increase the chemical dosage
  - (C) Speed up distribution
  - (D) Discard the entire batch

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### Part 3: Vocabulary Definitions

1. **Process validation** – プロセスバリデーション（製造プロセスが一貫して品質基準を満たしていることを確認する手順）
2. **Statistical process control (SPC)** – 統計的プロセス管理（統計を用いた品質管理手法）
3. **Titration** – 滴定（化学試薬の濃度を測定する分析技術）
4. **Purity assessment** – 純度評価（製品の不純物や純度を確認する分析）
5. **Batch consistency** – バッチの一貫性（同じ製造ロット内で品質の均一性を確保すること）

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### Part 4: Answer Key

1. **What issue does Sophia identify in the batch?**  
 (B) The purity assessment shows a slight deviation
2. **What test does Sophia mention performing?**  
 (A) A titration test
3. **What does Mark suggest before distribution?**  
 (C) Performing process validation
4. **What does Sophia plan to do next?**  
 (A) Review production logs for process fluctuations