

Why Adding Salt Reduces Ionisation

Mastering the Common Ion Effect & Le Chatelier's Principle

Start Lesson



The Principle of Disturbance & Resolution



1. The Baseline

Equilibrium is achieved. The system is stable.



2. The Disturbance

An external agent floods the system, breaking the balance.



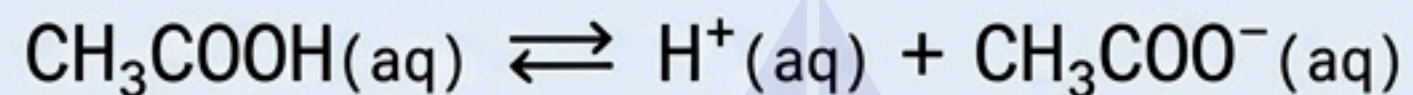
3. The Resolution

Le Chatelier's Principle: The system fights back to consume the excess and restore equilibrium.

Key Concept: When we add a common salt to a weak acid, we are artificially flooding the system. Watch how the acid fights back.

Step 1: The Baseline (Weak Acid)

Blue Formula Bank Panel



Acetic Acid
(Weak Electrolyte: < 5% Ionised)

Because acetic acid is weak, it only partially dissociates. A dynamic equilibrium exists between the intact molecules and the separated ions.





**You've Learned the Theory.
Let's Test Them Now.**

$$E=mc^2$$



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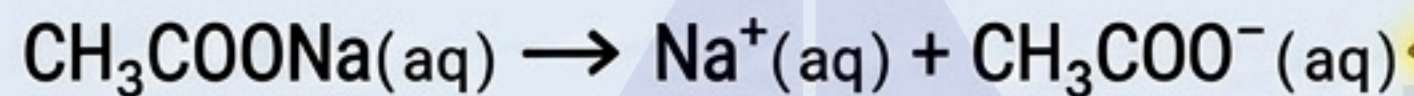
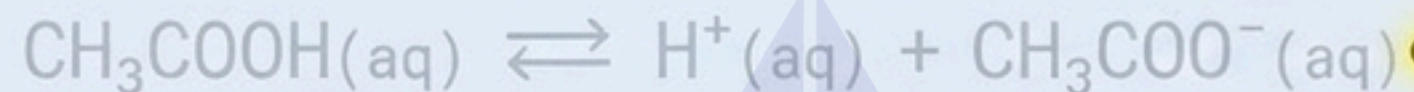
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Step 2: The Disturbance (Adding Salt)

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Sodium Acetate
(Strong Electrolyte: ~100% Ionised)

THE COMMON ION

Sodium acetate completely dissolves. The system is suddenly overwhelmed with Acetate (CH_3COO^-) ions from an external source.



Step 3: The Equilibrium Shift

Excess CH_3COO^- ions collide with the limited H^+ ions.



They recombine into solid/intact CH_3COOH molecules.

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Blue Explanation Panel

Le Chatelier's Principle in Action. To reduce the massive spike in Acetate, the system shifts backwards. It consumes the excess Acetate by combining it with H^+ , forming more intact Acetic Acid.

Result: Hydrogen ion concentration $[\text{H}^+]$ drops. Acidity decreases.

JEE Trap Alert: The Ka Illusion



The Trap: Assuming the Equilibrium Constant (K_a) decreases because the reaction shifted backward.



The Truth: The Equilibrium Constant (K_a) is independent of initial concentrations. It ONLY changes if the temperature changes.

$$K_a = \frac{[H^+][CH_3COO^-]}{[CH_3COOH]}$$

Because $[CH_3COO^-]$ spiked, the system MUST decrease $[H^+]$ and increase $[CH_3COOH]$ specifically so the final fraction K_a remains exactly the same number.

Exam Snapshot: Common Ion Effect

The Core Concept

- **Definition:** A shift in equilibrium caused by adding a substance that provides an ion already present in the dissociation equilibrium.

The Golden Rule:

Common Ion $\uparrow \rightarrow$ Ionisation $\downarrow$

The Application

- **Condition:** Works when a strong electrolyte is added to a weak electrolyte.
- **Mechanism:** Driven by Le Chatelier's Principle to minimize concentration changes.
- **Impact:** Decreases solubility of salts / suppresses dissociation of weak acids/bases.

Status: Concept Mastered. Ready for MCQs.



You've Learned the Theory.

Now Let's Test It.

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