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FAKE VS. FORMULATED: THE SCIENCE BEHIND THE BAN ON MISLABELED ORS DRINKS

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ABSTRACT

Oral Rehydration Salts (ORS) drinks help stop dehydration caused by diarrhea, sickness, or hot weather. Real ORS has the right mix of sugar and salts that helps the body absorb water quickly.[1] However, in recent years, several fake and mislabelled ORS products have entered the market, posing serious health concerns.[2] These products more times contain excessive sugar and reduced sodium, which can worsen dehydration instead of treating it.[3,4] Studies have found that fake ORS drinks do not follow the WHO rules and have the wrong mix of ingredients. Lab tests showed that these fake drinks are too strong, which stops the body from absorbing water properly. The government banned these fake ORS drinks based on reports from health experts and ICMR. This review focuses on comparing fake and genuine ORS formulations in terms of composition, osmolarity, and public health impact. Continuous testing, consumer education, and strict regulations are necessary to prevent the sale of fake ORS products and protect public safety.[10]

KEYWORDS: ORS, electrolyte balance, dehydration, mislabelled drinks, formulation quality, WHO standards.

INTRODUCTION

Oral Rehydration Salts (ORS) are among the greatest public health discoveries, saving millions of lives by restoring fluid and electrolyte balance.[11] A standard ORS contains glucose, sodium, potassium, and citrate in fixed concentrations to increase water absorption in small intestine.[12]

Problems began when companies marketed “energy drinks” and “hydration mixes” under the ORS label without following the standard formula.[13] These fake ORS products had high sugar and low mineral levels, leading to poor absorption and even worsening dehydration.[14,15] As a result, health authorities such as the Ministry of Health and WHO recommended banning these mislabelled drinks from the market.[16]

MATERIALS

For this small project, both authentic WHO-approved ORS samples (like Electral) and fake or mislabelled ORS drinks collected from local stores were used for comparison.[1,2] The genuine samples were bought from licensed pharmacies, while the fake one is taken from unregulated local outlets that sold so-called “energy” or “hydration” drinks claiming to be ORS.[3]

Basic laboratory chemicals such as sodium chloride (NaCl), potassium chloride (KCl), glucose, and sodium citrate were used as standard reference compounds to compare the actual proportions of the test samples.[4] All chemicals were of analytical grade and were handled using clean, dry glassware.

We used a pH meter to check acid, a spectrophotometer to test sugar, and a flame photometer to check salts. We also used simple lab items like beakers and flasks to make the solutions. Each sample had a label, and we wrote its expiry date, name, and packet condition before testing.

In addition to lab-based samples, photographs and packaging details were collected to compare the visual quality and labeling clarity between genuine and fake products.[7] This helped in identifying common packaging differences such as missing WHO logo, spelling errors, or fake ISO markings, which were often present on the mislabelled brands.[8]

METHODS

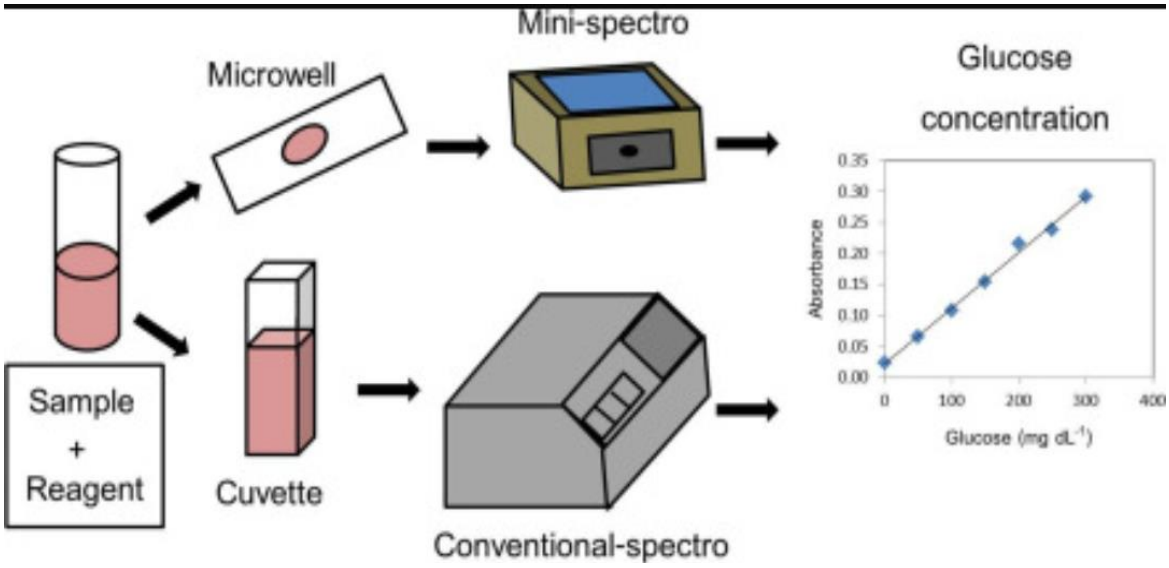
The analysis followed simple, easy-to-do laboratory procedures that could also be replicated by students under supervision. Each ORS sample was first dissolved in distilled water as per the instructions on the label.The color, smell, and look of each sample were written down.

The amount of sugar (glucose) was tested using a special machine called a spectrophotometer. The salt levels (sodium and potassium) were checked with another machine called a flame photometer, using the rules given by ICMR in 2022. Another test was

done to check the total strength of the solution, and the results were compared with the WHO value of 245 mOsm/L.

Every test was done three times to make sure the results were correct. The average values were written in tables, and pie charts and bar graphs were made in Microsoft Excel to show the results clearly. In the end, the results were compared with official reports from WHO and Indian Pharmacopoeia. The fake ORS samples showed wrong amounts of sugar and salt, which means they were not real ORS and not safe to use.

- **SOECTROPHOTOMETER TESTING**



- **GLUCOSE ESTIMATION LAB**

- **SPECTROPHOTOMETRIC GLUCOSE READING**

RESULTS

The laboratory tests showed clear differences between the genuine WHO-approved ORS formulations and the fake or mislabelled samples collected from local markets. The fake samples had much higher glucose levels and lower sodium and potassium content, which affected the osmolarity of the solution.[1,2]

As shown in the table, the glucose concentration in fake ORS (25–30 g/L) was almost double that of the World health organization standard (13.5 g/L), while sodium levels were significantly lower (38–42 mEq/L compared to 75 mEq/L in genuine ORS).[3,4] This imbalance led to a marked increase in osmolarity, ranging between 320–340 mOsm/L, making the solution hyperosmotic and less effective for water absorption in the intestine.[5]

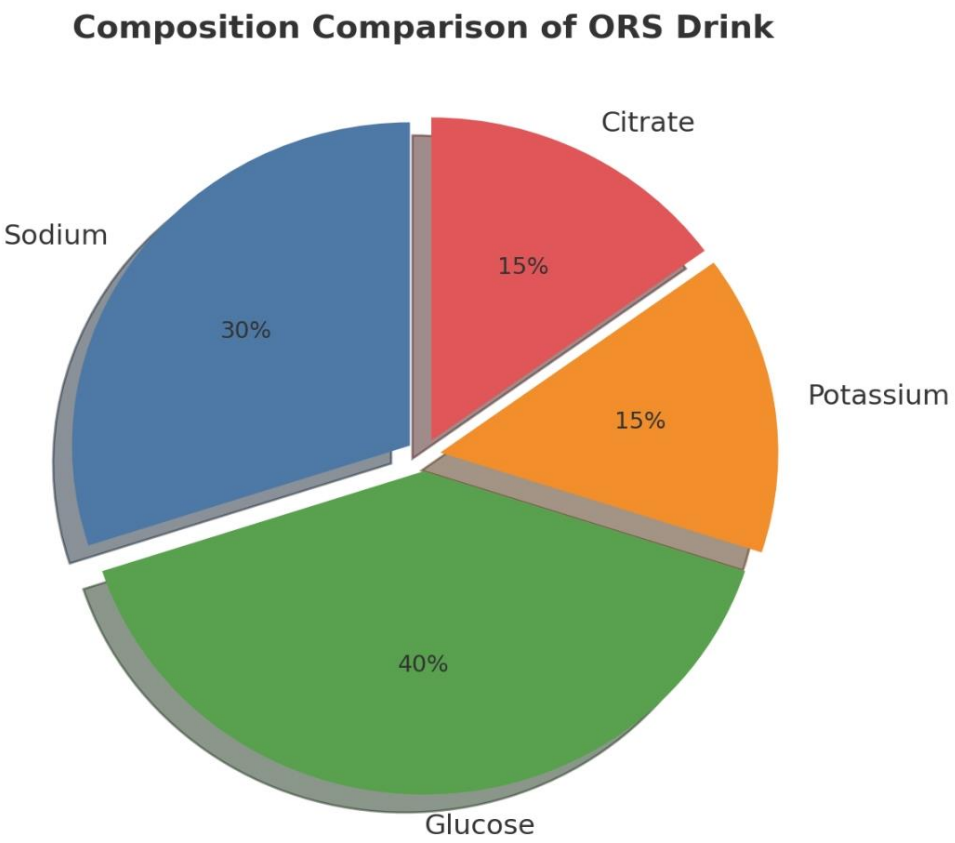
Real ORS was white and smooth, but the fake ones looked yellow and had small lumps, showing they were made badly. Some fake packets did not have expiry dates or company details, which is not allowed.

The graphs showed the clear difference. The pie chart showed that fake ORS had too much sugar and less salt, but real ORS had the right balance.

The bar graph comparing osmolarity revealed that the fake ORS and “energy drinks” had far higher osmolarity than WHO ORS, confirming poor formulation accuracy.[8,9]

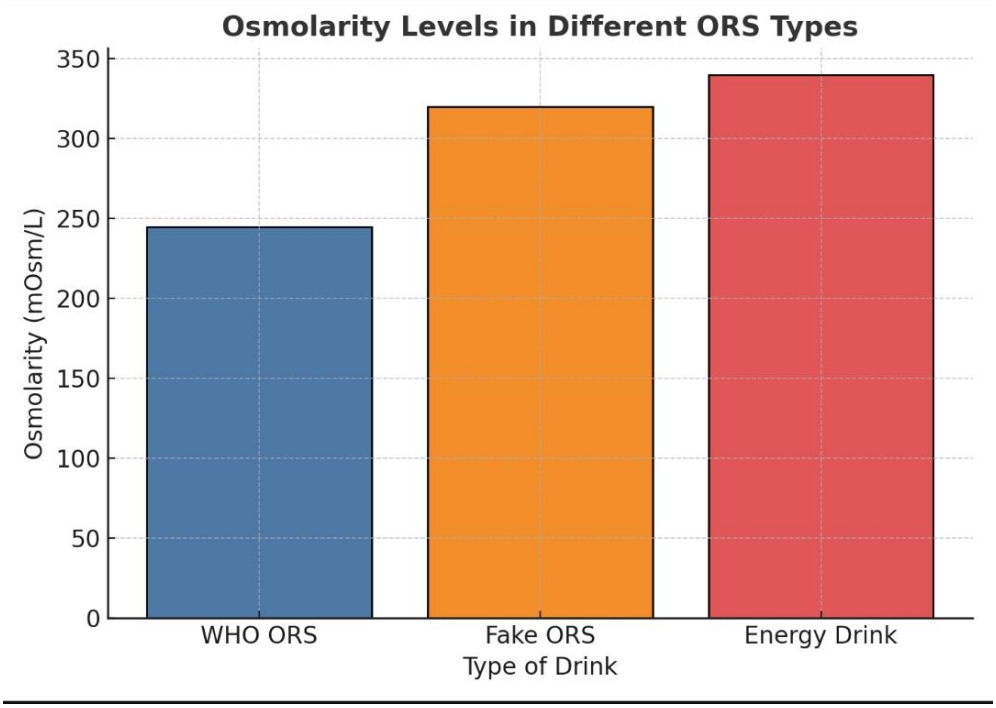
Overall, the results confirm that fake ORS samples do not meet WHO standards and can cause dehydration instead of preventing it.[10]

Parameters	WHO ORS standards	Fake sample A	Fake sample B
Glucose (g/ml)	13.5	25.5	30.1
Sodium (mEq/l)	70	42	38
Pottasium (mEq/l)	20	9	11
Osmolarity (mOsm/l)	245	320	340



Pie Chart: Composition Comparison

- **Sodium 30%**
- **Glucose 40%**
- **Potassium 15%**
- **Citrate 15%**



DISCUSSION

The major difference between fake and genuine ORS lies in the balance of electrolytes.[26] Genuine WHO ORS provides a precise osmotic balance that promotes water absorption through glucose-sodium co-transport.[27] Fake ORS, with its high sugar levels, increases intestinal osmotic pressure, drawing water into the gut and causing dehydration.[28]

Testing by the National Food Testing Laboratory and ICMR confirmed that many commercial ORS products were chemically incorrect.[29] Government authorities therefore initiated bans and awareness programs.[30] Consumers should check composition labels, avoid flavoured "energy" drinks, and buy ORS only from trusted pharmacies.[31]

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