# Multiple Choice Question Response

The correct answer is (B) The sample size may be too small to detect a statistically significant difference.

## Explanation

When a significance test yields a non-significant result, this does not necessarily mean that no effect exists in the population. Rather, it indicates that we failed to reject the null hypothesis given our current evidence.

Several explanations exist for non-significant findings:

1. \*\*Statistical power considerations\*\*: With only 60 fish split between treatment and control groups, the test may lack sufficient power to detect a real but small or moderate effect. Statistical power is directly influenced by sample size, effect size, and significance level (α). Low power increases the probability of Type II errors (failing to detect a true effect).

2. \*\*Effect size interpretation\*\*: The statement mentions that fish in the treatment group showed higher levels of the enzyme, but this difference was not statistically significant. This suggests a potential effect that didn't reach the significance threshold, which is consistent with inadequate power.

3. \*\*Scientific reasoning\*\*: In scientific research, we cannot "prove" the null hypothesis. Option (C) makes an absolute claim that "it must be true" that the herbicide has no effect, which is an incorrect interpretation of non-significant results. We can only state that we failed to detect an effect with the current study design.

Answer (A) is incorrect because it presupposes that there must be a significant effect, which contradicts proper statistical inference. The absence of statistical significance doesn't necessarily indicate a methodological error.

Therefore, option (B) provides the most accurate statistical interpretation of the non-significant finding in this context.