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Powder Purity by Lycopodium Spore Method

Experiment 13 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To calculate an estimated powder purity from diagnostic-element counts and a known lycopodium-spore standard.

Principle

A weighed spore standard provides a particle-number comparison. In a uniformly mixed suspension, the ratio of diagnostic drug elements to spores estimates the number of drug elements per gram. Percentage purity additionally requires the established diagnostic-element count per gram of genuine drug; it cannot be obtained from spores alone.

Requirements

- Drug powder with a validated countable diagnostic element.
- Lycopodium standard with a stated spore count per gram, balance and approved mounting vehicle.
- Microscope, counting sheet and validated genuine-drug element count.

Procedure

1. Define constants

Record M, test powder mass in g; W, lycopodium mass in g; L, spores/g of the standard; and P, diagnostic elements/g of genuine drug.

2. Prepare a uniform mixture

Mix weighed powder and standard by the prescribed method. Disperse in the specified vehicle without selective settling or clumping.

3. Count representative fields

Count N diagnostic elements and S spores over the prescribed number of fields using consistent boundaries. Count both in the same representative preparation.

4. Estimate element concentration

Elements/g test powder = $(N/S) \times (W \times L/M)$. Check all mass units before calculation.

5. Calculate purity

Purity (%) = $N \times W \times L \times 100 \div (S \times M \times P)$. Repeat and report uncertainty or poor agreement as directed.

Introduction to Pharmacognosy

Observations and Record

Quantity	Meaning / unit	Value
M / W	Drug mass / spore-standard mass, g	___ / ___
L / P	Spores/g standard / elements/g genuine drug	___ / ___
N / S	Total diagnostic elements / total spores	___ / ___

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- Illustrative constants only: M = 0.25 g; W = 0.05 g; L = 94,000 spores/g; P = 11,750 elements/g. Counts: N = 100, S = 200.
- $\text{Elements/g} = (100/200) \times (0.05 \times 94,000 / 0.25) = 9400$.
- $\text{Purity} = 9400 \div 11,750 \times 100 = 80\%$. The value 94,000 must not be assumed for every spore-standard lot.
- Without a validated P value for the genuine material, report the estimated element concentration rather than a claimed percentage purity.

Result

Diagnostic elements/g = _____. Estimated purity = _____% only where validated P was available. Constants, counts and replicate agreement are recorded.

Precautions

- Use matching units: spores/g is different from spores/mg.
- Uneven mixing, settling and misidentified elements can bias the ratio.
- A microscopic purity estimate does not rule out chemical contamination or every form of adulteration.

Viva Questions and Answers

1. Why add a spore standard?

Its known particle count provides a quantitative comparison.

2. What else is required for percentage purity?

A validated diagnostic-element count per gram of genuine drug.

3. Why count both particles in the same fields?

The ratio should describe the same representative preparation.

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