

SOP No: SOP-DRY-001	SOP Description: Dessicant Drying
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SOP-DRY-001: Dessicant Drying

Scope:

This procedure utilizes silica gel packets to dry research-scale rough rice samples.

Principle:

Silica gel is a highly absorbent, non-toxic material that is used to control free moisture in food and non-food matrices. Silica gel packets can be used to dry a substrate, such as rice, by calculating the amount of moisture to be removed and the number of packets of known absorptive capacity required to absorb that amount of moisture.

Supplies:

Silica gel packets

Plastic zip-lock storage bags

Procedure:

1. Determine the mass of moisture removed during drying from initial moisture content to final moisture content using the following equation:

$$m_i \times (1 - MC_i) = m_f \times (1 - MC_f)$$

or

$$m_x = m_i - m_f$$

Where: MC_i = rough rice initial moisture content

MC_f = rough rice final moisture content (approx. 12.5%)

m_i = mass of rough rice at initial MC

m_f = mass of rough rice at final MC

m_x = mass of moisture to be removed to dry from MC_i to MC_f

2. Determine the mass of silica gel required to dry the sample:

$$m_s = m_x / 0.15^*$$

Where: m_s = mass of silica gel required

m_x = mass of moisture to be removed to dry from MC_i to MC_f

*0.15 is the assumed absorptive capacity determined from a preliminary study. The absorptive capacity can range from 0.15 – 0.30.

3. Add the rough rice and the calculated number of silica gel packets to a zip-lock storage bag and intimately mix the rice and gel packets.
4. Let stand for eight days at ambient temperature* in order for complete moisture migration to occur.

*NOTE: This procedure is applicable under ambient temperature conditions. Storage of samples at extreme high (ex. warehouse) or low (ex. refrigerated) temperatures during drying will alter results.

Reference: pending publication