specified in the individual monograph. Make any necessary modifications, including concentration of the analyte in the volume of the *Sample solution* taken. Use the *Medium* for preparation of the Standard solution and for dilution, if necessary, of the *Sample solution.*

TOLERANCES

Because of the diversity of chemical characteristics and solubilities of dietary ingredients pertaining to this category, general tolerances cannot be established. See individual monographs for *Tolerances*.

⟨2091⟩ WEIGHT VARIATION OF DIETARY SUPPLEMENTS

The following tests provide limits for the permissible variations in the weights of individual tablets or capsules, expressed in terms of the allowable deviation from the average weight of a sample. Separate procedures and limits are described herein for capsules, uncoated tablets, and coated tablets that are intended for use as dietary supplements.

CAPSULES

Capsules meet the requirements of the following test with respect to variation in weight of contents.

Hard Capsules

Weigh 20 intact capsules individually, and determine the average weight. The requirements are met if each of the individual weights is within the limits of 90% and 110% of the average weight.

If not all of the capsules fall within the aforementioned limits, weigh the 20 capsules individually, taking care to preserve the identity of each capsule, and remove the contents of each capsule with the aid of a small brush or pledget of cotton. Weigh the emptied shells individually, and calculate for each capsule the net weight of its contents by subtracting the weight of the shell from the respective gross weight. Determine the average net content from the sum of the individual net weights. Then determine the difference between each individual net content and the average net content: the requirements are met if (a) not more than 2 of the differences are greater than 10% of the average net content and (b) in no case is the difference greater than 25%.

If more than 2 but not more than 6 capsules deviate from the average between 10% and 25%, determine the net contents of an additional 40 capsules, and determine the average content of the entire 60 capsules. Determine the 60 deviations from the new average: the requirements are met if (a) in not more than 6 of the 60 capsules does the difference exceed 10% of the average net content and (b) in no case does the difference exceed 25%.

Soft Capsules

Proceed as directed under *Hard Capsules,* but determine the net weight of the contents of individual capsules as follows. Weigh the intact capsules individually to obtain their gross weights, taking care to preserve the identity of each capsule. Then cut open the capsules by means of a suitable clean, dry cutting instrument, such as scissors or a sharp open blade, and remove the contents by washing with a suitable solvent. Allow the occluded solvent to evaporate from the shells at room temperature over a period of about 30 minutes, taking precautions to avoid uptake or loss of moisture. Weigh the individual shells, and calculate the net contents. The requirements are as stated under *Hard Capsules*.

TABLETS

Tablets conform to the criteria given in the accompanying table.

Uncoated Tablets and Film-Coated Tablets

Weigh individually 20 whole tablets, and calculate the average weight. The requirements are met if the weights of not more than 2 of the tablets differ from the average weight by more than the percentage listed in the accompanying table and no tablet differs in weight by more than double that percentage.

Coated Tablets (Other Than Film-Coated Tablets)

Weigh individually 20 whole tablets, and calculate the average weight. If the coated tablets do not conform to the criteria in the accompanying table, place 20 tablets in a beaker of water at 37°, and swirl gently for not more than 5 minutes. Examine the cores for evidence of disintegration and repeat the procedure for a shorter time if disintegration has begun. Dry the cores at 50° for 30 minutes. Accurately weigh 20 individual tablet cores, and calculate the average weight.

The requirements are met if the weights of not more than 2 of the tablets differ from the average weight by more than the percentage listed in the accompanying table and no tablet differs in weight by more than double that percentage.

Criteria

Weight Variation Tolerances for Uncoated Tablets, Film-Coated Tablets, and Coated Tablets (Other Than Film-Coated Tablets)

Average Weight of Tablet, mg	Percentage Difference
130 or less	10
From 130 through 324	7.5
More than 324	5

⟨2750⟩ MANUFACTURING PRACTICES FOR DIETARY SUPPLEMENTS

GENERAL PROVISIONS

The principles included in this chapter contain recommended minimum current good manufacturing practices for the methods to be used in, and the facilities and controls to be used for, the manufacture, holding, packaging, labeling, and distribution of dietary ingredients and dietary supplements. These principles are set forth to ensure that such products meet the requirements of safety, have the identity and strength, and meet the quality and purity characteristics that they are represented to possess.

Excluded from this chapter are establishments engaged solely in the harvesting, storage, or distribution of one or more "raw agricultural commodities" as defined in Section 201(r) of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 321(r)), which are ordinarily cleaned, prepared, treated, or otherwise processed before being marketed to the consuming public.

The requirements pertaining to holding dietary ingredients and dietary supplements do not apply to holding those dietary supplements at a retail establishment for the sole purpose of direct retail sale to individual consumers. A retail establishment does not include a warehouse or other storage facility for a retailer or a warehouse or other storage facility that sells directly to individual consumers.

A glossary of terms used in this chapter is presented at the end.

ORGANIZATION AND PERSONNEL

Responsibilities of a Quality Control Unit

A quality control unit shall be established that has the responsibility and authority to approve or reject all raw materials, product containers, closures, in-process materials, packaging material, labeling, and finished dietary supplements, and the authority to review production records to ensure that no errors have occurred or, if errors have occurred, that they have been fully investigated. The quality control unit should be responsible for approving or rejecting products manufactured, processed, packed, or held under contract by another company.

Adequate laboratory facilities for the testing and approval (or rejection) of raw materials, product containers, closures, packaging materials, in-process materials, dietary ingredients, and dietary supplements should be available to the quality control unit.

The quality control unit should have the responsibility for approving or rejecting all procedures or specifications that impact on the identity, strength, quality, and purity of the dietary supplement. All responsibilities and procedures applicable to the quality control unit shall be in writing.

The designated person within the Quality Control Unit who conducts a material review and makes the disposition decision must, at the time of performance, document that material review and disposition decision.

Personnel Qualifications

Each person engaged in the manufacture of dietary ingredients and dietary supplements should have the proper education, training, and experience (or any combination thereof) needed to perform the assigned functions. Training should be in the particular operation(s) that the employee performs as they relate to the employee's functions.

Appropriate documentation of training shall be retained by the company.

Each person responsible for supervising the manufacture of a dietary ingredient, a dietary supplement, or both should have the proper education, training, and experience (or any combination thereof) to perform assigned functions in such a manner as to provide assurance that the product has the safety, identity, strength, quality, and purity that it is represented to possess.

An adequate number of qualified personnel to perform and supervise the manufacture of each dietary ingredient, dietary supplement, or both product should be provided.

Personnel Responsibilities

The company management shall take all reasonable measures and precautions to ensure the following:

1. *Disease control.* Any person who, by medical examination or supervisory observation, is shown to have, or appears to have, an illness, open lesion, including boils, sores, or infected wounds, or any other abnormal source of microbial contamination by which there is a reasonable possibility of an in-process or finished dietary ingredient or dietary supplement becoming adulterated, or processing equipment, utensils, or packaging materials becoming contaminated, shall be excluded from any operations which may be expected to result in such adulteration or contamination until the condition is corrected. Personnel shall be instructed to report such health conditions to their supervisors.
2. *Cleanliness.* All persons working in direct contact with raw materials, in-process or finished dietary ingredients and dietary supplements, processing equipment, utensils, or packaging materials shall conform to hygienic practices while on duty to the extent necessary to protect against adulteration or contamination of such materials. The methods for maintaining cleanliness include, but are not limited to, the following:
   - — Wearing outer garments suitable to the operation in a manner that protects against the adulteration of raw materials or of in-process or finished dietary ingredients and dietary supplements, or contamination of processing equipment, utensils, or packaging materials;
   - — Maintaining adequate personal cleanliness;
   - — Removing cosmetics from parts of the body that may contact raw materials, in-process or finished dietary ingredients and dietary supplements, equipment, utensils, or containers;
   - — Washing hands thoroughly (and sanitizing if necessary to protect against contamination with undesirable microorganisms) in an adequate handwashing facility before starting work, after each absence from the work station, and at any other time when the hands may have become soiled or contaminated;
   - — Removing all unsecured jewelry and other objects that might fall into raw materials, in-process or finished dietary ingredients and dietary supplements, equipment, or containers, and removing hand jewelry that cannot be adequately sanitized during periods in which in-process or finished product is manipulated by hand. If such hand jewelry and cosmetics cannot be removed, they may be covered by material that can be maintained in an intact, clean, and sanitary condition and that effectively protects against the adulteration of dietary ingredients and dietary supplements or contamina-