DEVICE FOR THERMAL PROTECTION AND TRANSPORT OF CRYSTAL MATERIALS

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Abstract

The present invention relates to container devices for the protection and transport of crystalline materials, especially those obtained by vapor diffusion methods, without risks of manipulation or external disturbances, and without risks due to thermal damage, from one place to another, even on transcontinental routes.

Background

The present development is a continuation and improvement of a container device (Patent Application: MX/a/2016/008614 DEVICE FOR THE THERMAL PROTECTION AND TRANSPORTATION OF BIOMACROMOLECCULES) that protects biological material during its transportation, even intercontinental, where its design and material prevents temperature changes and disturbances that may affect the stability of biomacromolecules.

Description

The present invention relates to container devices for the protection and transport of crystalline materials, especially those obtained by vapor diffusion methods, without risks of manipulation or external disturbances, and without risks due to thermal damage, from one place to another, even on transcontinental routes. The device is especially focused on those crystals obtained in various crystallization plates by diffusion techniques in vapor phase (hanging drop and sitting drop). Once the crystals are produced at the appropriate temperature in its plate, it is introduced into the device, which is sealed to isolate them from temperature changes. They can be transported in hand luggage, since they meet all the requirements of safety and innocuousness, which means that this is a transport of samples without eventualities.

Stage of research

The device has been subjected to tests in relevant environments. It has been designed and constructed from a special polymer material, suitable to minimize disturbances from the outside, protecting the crystals obtained through crystallization vapor diffusion methods. After its design and production, the operation of this device has been tested in intercontinental trips, transporting thermolabile protein crystals with high success. Currently, it is used by some members of the Thematic Network of Users of the Synchrotron Light (REDTULS) in Mexico, which currently registers a total of 142 people among researchers and students, according to a 2015 report that involves transporting samples for synchrotron analysis in the world.

Applications fields

The device of the present invention can be used to transport protein crystals safely, easily, without the need for liquid N2, without risks of manipulation or external disturbances, without risks because of temperature, and without the need to load large and heavy vessels like a Dewar. This container device can protect and allow the transportation of crystalline materials, however, it is not limited to crystalline samples, it can even protect and transport other materials, such as biological macromolecules and cells. The largest field of application of this invention is found among academics, researchers and industries that use the crystallization of proteins and / or other macromolecules as a source of relevant information to their research and development process.

Advantages

Its approach, particularly focused on vapor diffusion crystallization techniques, makes it a complement to automated techniques to directly produce the crystals in the plates and introduce them to the protection device for its transfer to its analysis site. In this way not only one, but several of the crystals produced in the crystallization well are safely transported, which, together with its thermal protection, increases the probability of success in a sample analysis after transferring it from a place to another. This device provides protection to crystals (or molecules) during transfers, increasing the chances of success in an analysis, for example, X-ray diffraction, while its design allows it to be coupled to both automated methods and other more traditional methods of crystallization. In this way, the time invested in a research is improved, as well as the resources allocated to it, since the greater amount of sample produced is protected, the probability of success is increased and other possibilities of experimentation are opened by changing the conditions for obtaining samples with automated systems, to which this device can be coupled in a complementary manner to protect all samples obtained.