



Application data sheet #07

Strong shaker for separating funnel **STRONG SHAKER SR-2ES**

Proposal of a strong shaker for mojonnier tubes

Comparing results of lipid measurements when a mojonnier tube is shaken by hand and with this product

Overview

Nutrient ingredients of food are mainly analyzed for the purpose of quality control and composition indications. Lipid content is measured by extracting lipids out of food and measuring its weight. Depending on the forms and types of lipids in food as well as any influence from coexisting materials, different extraction methods are applied, with mojonnier tubes used in the acid digestion method. To be more precise, a food sample is heated with hydrochloric acid to perform a hydrolysis, and a mojonnier tube is used to extract lipid with diethyl ether ("ether") and petroleum ether. At the time of extraction, a mojonnier tube must be shaken strongly for a certain period of time, but due to its special form, there was no shaker to support this. The operator shakes the tube by hand in reality, and there were concerns about safety and the amount of parallel processing (Centrifugal machines are available on the market). We thus introduced a shaking rack for mojonnier tubes that can be mounted in a strong shaker for separating funnel STONG SHAKER SR-2ES ("Product") that has been widely used for residue pesticide, soil elution, and other tests associated with strong shaking of separating funnels and glass centrifuge tubes. This article introduces this Product as well as comparative test data with conventional hand-shaking.

For reference, according to the Notification to the Food Labelling Standards (#139, Food Labelling, 2015, Consumer Affairs Agency), "Attachment: Methods of Analysis of Nutrient Ingredients, etc.," the acid digestion method is "applied to foods that contain relatively abundant lipids that are combined or contained in the tissue (compound lipids) such as crops, bread, macaroni, potatoes and starch, seeds, and fruits that contain a small amount of lipids, beans, vegetables, eggs, mushrooms, algae, cooked and processed food, etc."

Test method (overview) and results

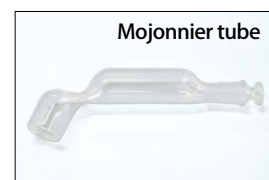
■ Comparison of results of lipid measurements by acid digestion methods when shaken by hand and with this Product

For further details, refer to the standard method as described in the notification. Only an overview is given here. The use of this Product and a centrifugal machine is not described in said method, but as General Rule #3 of said notification states, "As far as the essential qualities of the test are not affected, details of the test method may change..."

【Test method】

1. Food samples (W) were placed in a beaker, and properly mixed with ethanol added.
2. After adding hydrochloric acid, the beaker was heated in a constant temperature tank for a certain period of time with occasional agitations. After naturally cooling, the content was moved to a mojonnier tube.
3. The beaker was cleansed with ethanol and ether. The cleansed liquid was moved to a mojonnier tube in 2.
4. The tube was strongly shaken for a minute (40 mm amplitude and 230 r/min. when shaken with this Product).
5. Petroleum ether was added and then shaken in a similar manner.
6. The tube was centrifuged with a centrifugal machine supporting a mojonnier tube. The ether layer was moved into a flask whose constant weight* (W0) had been measured beforehand.
7. A mixture of ether and petroleum ether was placed into the mojonnier tube. Similarly, the tube was shaken, performed centrifugal separation, and the ether layer was put into a flask in 6.
8. Operation 7 was repeated.
9. The ether in the flask was distilled with an evaporator, and then the flask was dried using a constant temperature dryer until a constant weight* (W1) was obtained.
10. The lipid content per 100 g of food sample was calculated as: $(W1 - W0) \div W \times 100$.

(*) Weight that does not change even when dried.



Mojonnier tube

● Measurement results of lipid contents (g/100 g): Shaking by hand versus this Product

Food sample	Shaken by hand	Shaken by shaker (Product)
Premixed powder A	7.3	7.5
Premixed powder B	2.2	2.4
Premixed powder C	1.4	1.7
Premixed powder D	1.4	1.5
Doughnut A	17.8	17.6
Doughnut B	17.8	17.7
Doughnut C	18.5	18.0
Pasta sauce	30.1	28.2
Flour	5.8	6.1
Dough	2.1	2.1

【Results and discussion】

Out of food stuff to which the acid digestion method was applied, ten items are selected as samples. We compared the measurement results of lipid content between conventional shaking by hand and shaking by this Product. In this test, the results were rather different between doughnut C and pasta sauce, but overall, we achieved results that were comparable to conventional shaking by hand. The advantages of this Product include solving of concerns in terms of occupational safety for operators, improved parallel processing with simultaneous shaking of six mojonnier tubes, and a reduction of variations depending on operators and tests. The test results confirmed that this Product can replace conventional shaking by hand. It is our sincere hope that this method will be utilized by those who regularly perform lipid measurements.

Now on sale

Strong shaker for separating funnel Strong shaker SR-2ES

A strong shaker that vertically shakes a separating funnel in a reciprocal manner. Suitable for various extraction operations. When the chassis is placed sideward by 90 degrees, the shaker can be mounted with a newly released shaking rack for mojonner tubes or a shaking rack for centrifuge tubes to perform reciprocal shaking in a horizontal manner. The shaking rack for mojonner tubes can firmly fix six mojonner tubes with unique shapes (supporting SANSYO 15/25 and 19/28; for other mojonner tubes, please contact our company). This is a first-in-the-industry type shaker that enables the shaking of mojonner tubes, which are conventionally shaken by hand.



Shaking rack for mojonner tubes
(M shaking rack for SR-2ES)
Example of application
(Container not included)



Shaking rack for centrifuge tubes
(C shaking rack for SR-2ES)
Example of application
(Container not included)



Shaking rack for separating funnel (1L x 3)
(HE-3 shaking table for SR-2)
Example of application
(Container not included)

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