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MANUAL FOR THE APPLICATION OF ACCEPTABILITY TESTS

IN THE NATIONAL SCHOOL FEEDING PROGRAMME (PNAE)

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Ministry of Education
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MANUAL FOR THE APPLICATION OF ACCEPTABILITY TESTS

IN THE NATIONAL SCHOOL FEEDING PROGRAMME (PNAE)

PREFACE

The National School Feeding Programme (PNAE) has undergone several positive changes since its inception in the 1950s. Today, its aim is not only to meet the students' nutritional needs during their stay in the classroom, but also to promote the adoption of healthy eating habits, which is one of the most important aspects for health, growth, learning, and school performance, and may contribute to education quality.

In addition to the technical staff of the Centre of Collaboration for School Feeding and Nutrition (CECANEs) and the National Fund for the Development of Education (FNDE), the preparation of this manual included nutritionist evaluation of school meals. The manual was sent to 623 cities in all five regions of the country. In addition to all the peculiarities of each programme management, it was fundamental to involve and gather suggestions from PNAE nutritionists, who will be the greatest users of this manual.

For all this to be accomplished, FNDE promotes and encourages several actions. A highlight among them is the creation of the Working Group "Application of the acceptability test on foods destined to the PNAE", formed by members of the Technical Coordination of Food and Nutrition (COTAN), FNDE, teachers and sensory analysis professionals. The main objective of the group was to discuss the application of the acceptability test in the school environment. Based on these discussions, the CECANEs of the University of Brasília (UnB) and the Federal University of São Paulo (UNIFESP) were invited to develop a manual on the methodology recommended for the application of acceptability tests.

In 2017, the CECANE team from the Federal University of Rio Grande do Sul (UFRGS) was asked to review and update the material to comply with current legislation, as well as to adapt to recurring demands.

The manual you are reading now is a result of this initiative. It presents in a simple and didactic way how to apply acceptability tests in varied situations, proposing suggestions and effective alternatives to reach the main acceptability goal, which is student satisfaction when eating the food that is offered according to current recommendations.

Enjoy your reading!

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1

PRESENTATION

1 PRESENTATION

The National School Feeding Programme (PNAE), implemented in 1955, guarantees the school feeding of primary education students enrolled in public and philanthropic schools. Its objective is to contribute to biopsychosocial growth and development, learning, school performance, and to encourage healthy eating habits among students through food and nutrition education actions and the provision of meals that cover their nutritional needs during the school year. [1,2,3]

In 2006, in order to promote healthy nutrition at schools, the Ministry of Education and the Ministry of Health implemented the Interministerial Ordinance No. 10104, which establishes, among other points, the role of the Centre of Collaboration for School Feeding and Nutrition (CECANEs). Based on said ordinance, the National Fund for the Development of Education (FNDE) established the Collaboration Centers with the main objective of contributing to the implementation and consolidation of the National Policy on Food and Nutrition Security (PNSAN) in the school environment, generating knowledge that subsidizes decision making in the sphere of public Food and Health policies at schools and participating in its execution alongside the community in the extension actions.

The FNDE, responsible for the PNAE, by publishing Resolution CD/FNDE no. 15 of 08/25/2000 and later revised by Provisional Measure No. 2178-36 of 2001, established the application of acceptability tests by the executing entities as one of the procedures for quality control of the food served to students.

Resolution CD / FNDE nº 32 of 2006 and later the nº 38 of 2009 referred to the situations of the acceptability test application. Currently in force is Resolution CD / FNDE No. 26 of 2013[2], which presents, in article 17, the situations in which the Executing Entity (EEx.) should apply the acceptability test: whenever new foods or any other innovative changes are introduced to the menu with respect to preparation, or to evaluate the acceptance of frequently practiced menus.

According to PNAE legislation[2], the EEx. is responsible for applying the acceptability test, which should be planned and coordinated by the nutritionist, who is the PNAE responsible technician (RT). The Resolution of the Federal Council of Nutritionists (CFN) nº 465/2010[5], which deals with the nutritionist's actions in the PNAE, lists among the obligatory activities: to plan, coordinate, and supervise the acceptability test application alongside the clientele, in situations provided for in the PNAE legislation. For this, the professional must observe the recognized technical, scientific and sensorial parameters, as well as those established in the Programme regulations.

In addition, the nutritionist will be responsible for elaborating the report, which will include all stages of the acceptability test application, from planning to achieved result, and must file such information for a minimum of five years[2].

Thus, the PNAE and the CECANEs of the University of Brasília (UnB) and Federal University of São Paulo (UNIFESP) developed this manual with the goal of explaining the procedures in a practical way to apply acceptability tests in the school environment, in order to ensure compliance with Resolution CD / FNDE No. 26/2013[2], strengthening the quality control of foods offered in school meals. In 2017, the manual was revised and updated by the UFRGS CECANE, due to a need of adapting the document to current legislation.

2

ACCEPTABILITY TEST DEFINITION

2 ACCEPTABILITY TEST DEFINITION

The acceptability test, according to the Working Group, is a set of scientifically recognized methodological procedures intended to measure the acceptance rate of food offered to schoolchildren. The acceptability test is part of the sensory analysis of food, which evokes, measures, analyzes and interprets reactions to food characteristics as perceived by sight, smell, taste, touch and hearing[6].

Importance of the acceptability tests

Students' acceptance of a food is an important factor in determining the quality of school meals provided by schools. In addition, it avoids waste of public resources in the purchase of rejected foodstuffs.

The acceptability test is a fundamental instrument to verify the acceptance of some type of food, since its execution is easy and allows a verification of the average preference regarding the offered food[6].

Affective sensory methods do not require trained testers, since they only evaluate the acceptance and preference of the products. To verify the acceptability rate of a given food, one can also start from the waste-ingestion method, or evaluation of leftovers[7]. An accepted and healthy diet favors adherence to the school, improves student development in the classroom, and promotes good eating habits.

Difference between sensory methods

According to the Brazilian Technical Answers Service (2006), among the most used sensory analysis methods, the following stand out:

DESCRIPTIVE SENSORY METHOD:

Trained teams of tasters aim to evaluate the products' sensorial quality. Within this method the Quantitative Descriptive Analysis (ADQ) is used, which has a principle to evaluate the sensorial attributes of a given product, such as: flavour, texture, smell, colour, among other characteristics.

DISCRIMINATORY SENSORY METHOD:

It is intended to evaluate the sensory differences between two products or more. Among the methodologies are:

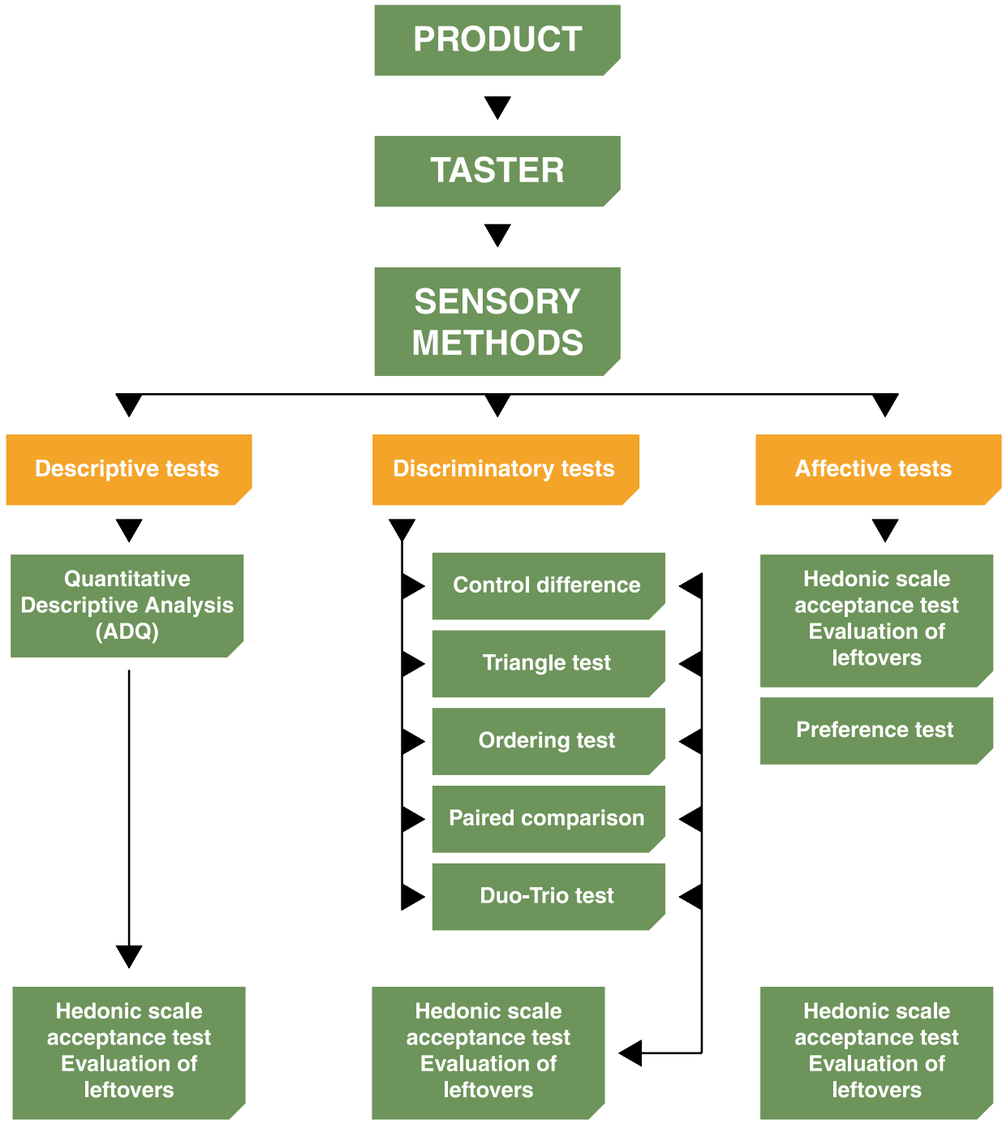
- Duo-Trio test: determines difference between a standard and a sample;
- Paired-comparison: determines a sensorial quality and analyzes if there is difference between two samples;
- Triangle Test: analyzes if there was change between two samples that underwent different processes;
- Ordering Test: makes comparisons between several samples to see if there is a difference between them;
- Multiple Comparison Test: analyzes the degree of difference between many samples and one standard sample.

AFFECTIVE SENSORY METHOD:

The goal of this method is to evaluate consumer preference and, consequently, their acceptance of one or more products. Two types of tests can be carried out through this method:

- Preference Test, which evaluates the preference degree of a product in relation to another product;
- Acceptance Test, which analyzes the product's degree of acceptance, that is, how much the taster likes or dislikes a product. The hedonic scale is one of the most used methods for this test. Source: SGS do Brasil. Available in: <www.beefpoint.com.br/bn/hotsites/sgs>.

Figure 1 – Process Flowchart for Sensory Analysis Methodologies



3

ACCEPTABILITY TEST

3 ACCEPTABILITY TEST

Which methods to use?

The Working Group adopted two methods to use when evaluating school feeding acceptance, which are the hedonic scale and the waste-ingestion (evaluation of leftovers). These methods were chosen because they are the most used in the country. In addition, they present several advantages, such as practicality.

When to apply?

- When foods that are atypical for local habits are included in the menu;
- When any innovative changes occur regarding the preparation;
- To evaluate the acceptance of frequently practiced menus.

Acceptability test for new preparations/foods, and for food atypical to the local feeding habits, as well as for preparations that have been modified:

To facilitate the acceptability test application in the above-mentioned occasions, the flowcharts presented in Figures 2 and 3 were created for hedonic scale and waste-ingestion (evaluation of leftovers) respectively, where the preparation/new foods can be tested for no more than 3 times. However, the test application for unchanged preparation/food should have a minimum interval of two months. Thus, the nutritionist must develop nutritional education activities, with sensory corrections in the preparation. Such corrections occur with any change of ingredient in the same preparation.

According to Resolution CD/FNDE No. 26/2013, in Article 17, the Executing Entity will apply acceptance tests to students whenever new foods or any other innovative changes are introduced to the menu with respect to preparation, or to evaluate the acceptance of the frequently practiced menus.

Figure 2 – Flowchart for applying the acceptability test for hedonic scale

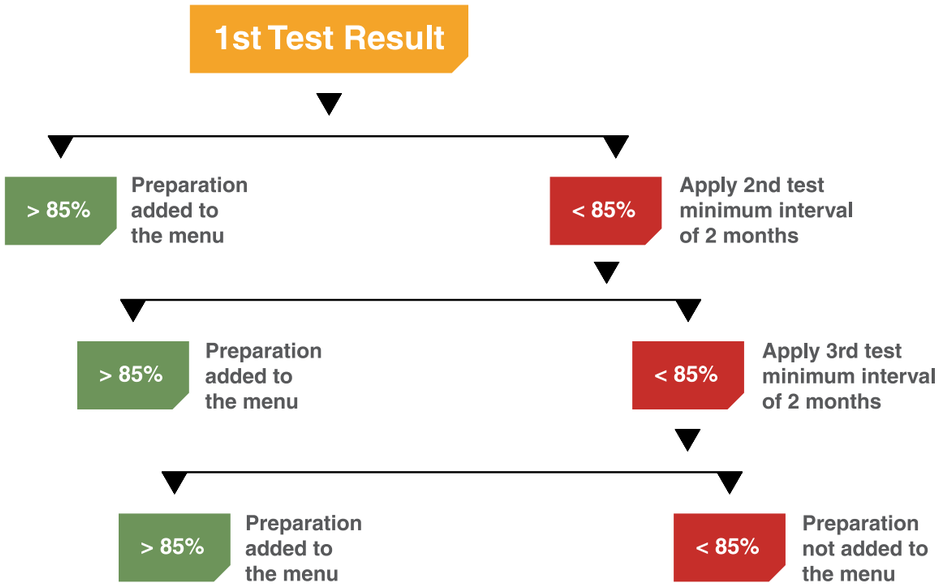
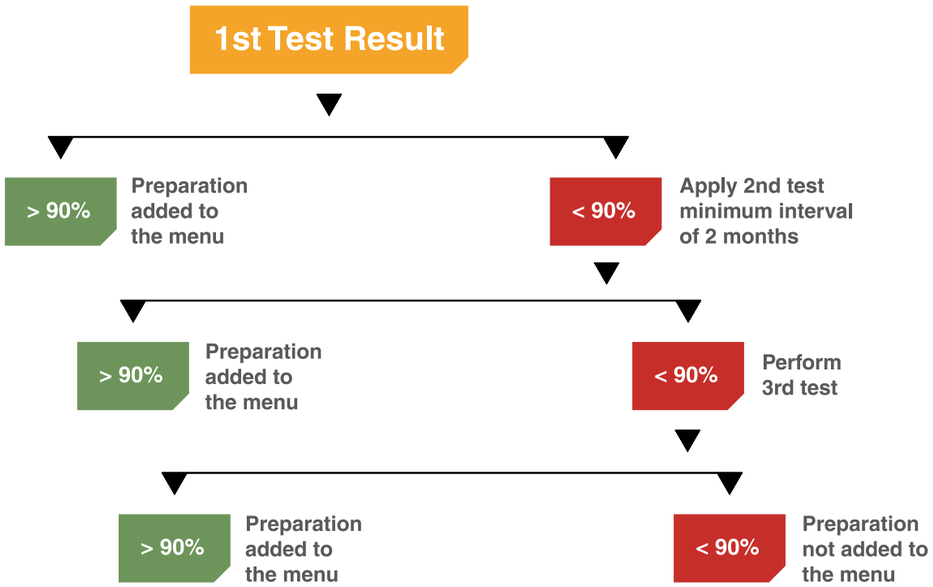


Figure 3 – Flowchart for applying the acceptability test for waste ingestion analysis (evaluation of leftovers).



Acceptability test to evaluate acceptance of frequently practiced menus

Acceptability tests to evaluate the acceptance of commonly practiced menus should prioritize the most frequent preparations on the menu.

Thus, one test per preparation should be performed and, if the acceptability rate is 85% for hedonic scale and 90% for waste-ingestion analysis (evaluation of leftovers), according to current legislation, the menu or preparation may remain in the school feeding.

If the acceptance rate is lower than 85% or 90%, the nutritionist may withdraw the food or preparation, or elect to alter/modify the menu or preparation method and, in this case, should apply a new test with a minimum interval of 2 months (as shown in Figures 2 and 3).

Municipality/State with a high number of repeated preparations during the school year

The criterion of choice will be through a raffle of the preparations that appear most frequently in the yearly menu. This draw should be carried out in a School Feeding Council (CAE) meeting with at least 2/3 of the counselors, together with the PNAE technical nutritionist. It is advisable to test at least three of the ten most frequent preparations at least once a year.

At the meeting to be held with the CAE, schools should also be chosen to carry out the acceptability test, giving preference to those that offer the three cycles of education (pre-school, elementary and middle school), observing the minimum sample required.

The test may be carried out in more than one school, avoiding repetition of those that have already participated in other tests.

Finally, this process should be formalized in a meeting minute signed by all the participants, containing the raffle description, the names of the preparations to be tested, the schools and the number of selected students.

TIP

To take better advantage of the acceptability test, it must be carried out in the year before the bidding, avoiding future waste - especially with industrialized foods, which cannot be added to many different preparations.

ATTENTION

The application of the acceptability test may be waived in the following situations:

- In kindergarten with children from 0 to 3 years of age (nursery);
- For preparations that are mostly made up of fruits and vegetables.

Regarding daycare centers, it is known that new foods should be introduced to the child's eating pattern from the age of six months, and that this should be done slowly and gradually, as the child tends to reject first offerings.

In addition, eight to ten exposures are recommended for the child to accept a new food. With this indicator, the acceptability test is invalidated for daycare clientele, since rejection in this case may not correlate acceptance or preference[8].

With whom to apply?

Typically, the right thing to do when performing sensory analysis is to interview 100 to 500 people, using the results to determine a population's attitudes. Interviews should be conducted in a central place, such as a school, a market, a shopping center, or in commercial, institutional, and industrial restaurants[9].

To define the sample, it is first necessary to verify if there is no need for stratification, that is, to separate the students according to intrinsic characteristics that may alter and influence the test's reliability, e.g. separating schools from different social realities, very different ages, rural and urban schools, etc. Then, you should test 100 or more people for each of the identified groups. In large municipalities, where there are many different areas, do not stick to the total number of students surveyed throughout the municipality, but to the number verified in each selected group.

Therefore, if you plan to assess acceptability at a school that has students in grades 2-9, you will need to ensure that your sample will have students from grades 2-5 as well as from grades 6-9. You can draw students from these two groups to compose the sample, and you can do so proportionately. One must also consider the method that will be used, adapting it to its public. The group with the largest number of students will be the group that will draw the largest number of tasters. This draw will then be proportional to the number of students, identifying their school years on the worksheets.

Groups must be selected randomly with a simple draw. The suggestion is to always select 20% more students than the number proposed to avoid a significant number of absences, which could reduce reliability. Always draw on the same day you apply the test to ensure that the selected students are present at school.

How to apply?

There are several situations for applying acceptability tests, varying between the method used and the application site (see Decision Flowchart on page 34). It is suggested that the team is composed of at least two members, who will be identified in this material as Applicator 1 and Applicator 2.
The steps for the application of acceptability tests according to the methods of waste-ingestion and hedonic scale are detailed below.

Method for waste-ingestion (evaluation of leftovers)

Initial procedures upon arrival at school:

1. Confirm the time of school feeding and, if the raffle method has been chosen, check the meal schedule;
2. Arrive at least one hour in advance to organize the activity;
3. For the preparation, use the standard recipe containing the ingredients and prep method;
4. Bring a form to take notes of the preparations' weight (registration worksheet);
5. Check the outlets' voltage to use the scale;
6. Check the scale calibration.

List of materials:
- A scale (if digital, do not forget to bring extra batteries);
- Registration Worksheet: see template in Appendices II and III;
- Ballpoint pens;
- Clipboard;
- Plastic bags to collect leftovers;
- Printed worksheets to document the test and its outcome.

ATTENTION
Check the voltage compatibility between the scale and the school's electrical grid. Assess the scale calibration by checking with a food of known weight. Example: a pack of 1 kg of sugar. Write down the scale assessment on the registration worksheet.

School that serves meals in the cafeteria

ATTENTION
Be careful not to allow non-participating groups into the cafeteria at the time of testing, unless you have defined the sample by adding different groups.

Activities for Applicator 1:
1. Weigh the fully ready preparation that will be served to participating students;
2. Write down the meal's weight on the registration sheet. Suggestion of registration worksheet (Appendix II);

ATTENTION
If the meal is distributed to the participating groups at different times, take note of the preparation's weight before each group is served or weigh at the beginning of the first interval and at the end of the last interval. If there is more than one preparation, do not forget to weigh all of them.

3. Supervise the portioning and guide the assistants to serve the students as usual;

ATTENTION
If more food is added to the dispensing container or a different container is used to distribute the preparation, do not forget to weigh and take note of such container's weight.

4. At the end of distribution, weigh all leftovers in the containers;
5. Record the leftovers' weight on the registration worksheet.

Activities for Applicator 2:
1. Supervise the return of the dishes, discarding the leftovers in a bin with a plastic bag (do not forget to weigh the empty plastic bag);

ATTENTION
Do not leave any bins accessible to students.

2. At the end of the distribution, weigh the leftovers of all the participating children;
3. Record the leftovers' weight on the record worksheet.

ATTENTION
If two preparations are served in separate utensils, such as bread and juice, weigh the remains separately too. In case of liquid preparations, weigh in jars, bowls or similar. Do not use the garbage bag for liquids.

If the preparations are served in the same utensil, such as rice, beans and meat, weigh all the leftovers together. In this case, the complete acceptability of the menu is verified, not of each separate preparation.

If the acceptability test is applied for only one of the preparations, there is no possibility of using leftovers as a form of evaluation. In this case, the Hedonic Scale is recommended.

Place other remains such as fruit peels (example: watermelon, melon, papaya) and the meat bones in another bin. In the case of the bones, remove the edible part (meat) and add to the leftovers. Remember to discount the weight of the bones from the leftovers weight.

Schools that practice self-service

The applicators should use the same procedures as the ones for schools with a cafeteria. However, to facilitate the test's execution, it is recommended to include in the sample all students enrolled in the educational units that serve school meals with a self-service modality.

Schools that serve meals in the classroom

Activities for Applicator 1:
1. Weigh 10 empty plates that will be used to see if they have similar weights, eliminating the need to weigh one by one at the time of portioning. Variations up to 5% may occur and are normal;
2. Supervise the server when portioning to each of the sorted groups;
3. Weigh the plate after the server places all the foods that make up the meal of the day;
4. Continue weighing each dish until the first room is finished;
5. Continue the process in other rooms that are part of the study;
6. Write down the weight of each portion in the registration worksheet

ATENTION
The school can be requested that the portioning of each of the sorted rooms be done separately. In this case, the preparation will be weighed before and after the rooms are portioned. This procedure should also be followed if there is a plate weight variation higher than 5%.

Activities for Applicator 2:
1. Weigh the empty plastic bag;
2. Supervise the delivery of each dish;
3. Supervise the return of the dishes, discarding the remains in a bin with a plastic bag in the room;
4. Do not leave any bins accessible to students in the room;
5. At the end of distribution, weigh all the leftovers;
6. Record the leftovers' weight on the registration sheet (Appendix III);
7. After distribution, weigh the inedible parts (if any);
8. Write down the weight of inedible parts on the registration sheet.

Place other waste such as plastic cups, napkins, and other disposables in another bin as there is no need to weigh those. Liquids should be weighed separately as explained for schools with cafeterias.

Result analysis

In any service modality, the applicators will have the following information: weight of food prepared for the participating students, weight of students' leftovers and weight of the surplus.

First, calculate the rejection percentage of the food offered:

Distributed meal weight =
Weight of the prepared food - Surplus

*Surplus is the food that has not been served.

$$\text{Rejection Percentage} = \frac{\text{Weight of rejected meal (leftovers on plates) x 100}}{\text{Distributed meal weight}}$$

The result of this formula will be the rejection percentage (%) of the preparation evaluated on the day. Then you must subtract that value from 100.

To calculate the acceptance rate, use the formula:

Acceptance rate = 100 – Rejection percentage

Conclusion: If the sample had a percentage (%) higher than or equal to 90%, the meal was accepted.

ATTENTION
The acceptability test result may be influenced by the portion of the preparation under test, since the portion served may not be in accordance to the amount of food each student usually consumes. For example: when testing rice, the portion was two serving spoons. However, some students are used to consuming only one spoon. Therefore, the leftovers on the plate do not indicate unacceptability of this food.

Method for applying acceptability test with facial, mixed and verbal hedonic scale

Initial procedures upon arrival at school:

1. Confirm the time of school feeding and, if the raffle method has been chosen, check the meal schedule;
2. Arrive at least one hour in advance to organize the activity;
3. For the preparation, use the standard recipe containing the ingredients and prep method;
4. Bring the hedonic scale sheets printed and cut;
5. Guide the food handlers (cooks/servers) to serve students as usual.

List of materials:
• Registration worksheet with test information;
• Ballpoint pens;
• Clipboard;
• Hedonic scale sheets (they may already have the preparation name written on them);
• Printed worksheets to document the test and its outcome.

ATTENTION
The applicators should also wear a protective hairnet during food distribution. Accessories such as rings, earrings etc. are not allowed.

School that serves meals in the cafeteria

Be careful not to allow non-participating groups into the cafeteria at the time of testing.

Activities for Applicators 1 and 2:
1. Distribute the sheets with the hedonic scale (appropriate to that school year), which must be answered before leaving the cafeteria or in the classroom;
2. Explain how the sheet should be filled;
3. Request the students or nutritionist to write the preparation name on the sheet;
4. Promote an environment of individual judgment, where there should be no conversation among the students;
5. Collect completed forms.

Schools that serve meals in the classroom

Activities for Applicators 1 and 2:
1. Distribute the sheets with the hedonic scale (appropriate to that school year), which must be answered before leaving the cafeteria or in the classroom;
2. Explain how the sheet should be filled;
3. Request the students or the nutritionist to write the preparation name on the sheet;
4. Promote an environment of individual judgment, where there should be no conversation among students;
5. Collect completed forms.

Worksheet templates

Figure 4 – Facial hedonic scale worksheet template that can be used with students from 1st to 5th grade.

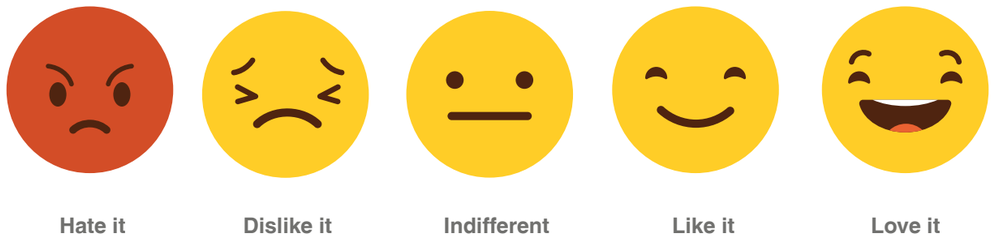
SCHOOL FEEDING ACCEPTABILITY TEST
Name: _____ Grade: ___ Date:
Check the face that most represents what you think of the _____

1 2 3 4 5

Write what you liked the most about the preparation: _____
Write what you liked the least about the preparation: _____

Figure 5 - Mixed facial hedonic scale model form which can be used with students in grades 4 to 5

Name: _____ Grade: ___ Date:
Check the one that most represents what you think of the _____



Hate it Dislike it Indifferent Like it Love it

Write what you liked the most about the preparation: _____
Write what you liked the least about the preparation: _____

Figure 6 – Verbal hedonic scale model that can be used with students in grade 6 or older

SCHOOL FEEDING ACCEPTANCE TEST
Name: _____ Grade: ___ Date:
Check the one that most represents what you think of the _____

( ) 5 – Love it
( ) 4 – Like it
( ) 3 - Indifferent
( ) 2 – Dislike it
( ) 1 – Hate it

Write what you liked the most about the preparation: _____
Write what you liked the least about the preparation: _____

Figure 7 – Braille hedonic scale model for literate students (in portuguese)

For illiterate visually impaired students, it is recommended to use embossed worksheets of their own making. This conduct facilitates understanding and perception of the options.

This suggestion is also recommended for students with no disabilities. The teacher may help in this process by creating an evaluation worksheet together with the students. They point out which is the best verbal expression for each of the five facial expressions presented to them. The students shall then use the resulting material, therefore the graphic representations (symbols) should be familiar to them, to facilitate understanding the test and making them closer to it, which favours the evaluation performance.

Method to apply acceptability test with Play Cards

Another validated option to evaluate acceptability is using play cards. These cards present the facial expressions found on the hedonic scale individually. The system is like an election in which each student expresses their opinion by choosing a card and placing it in a ballot box. The instructions to elaborate the Play Cards are on Annex III.

Initial procedures upon arrival at school:

1. Confirm the time of school feeding and when the selected groups will have the meal;

2. Arrive at least one hour in advance to organize the activity;

3. For the preparation, use the standard recipe containing the ingredients and prep method;

4. Prepare the Play Cards sets and the ballot box (see elaboration of Play Cards on Annex III);

5. Check if there are any visually impaired students;

6. Guide the food handlers (cooks/servers) to serve the students as usual.

Supply list:
- Registration worksheet for test information;
- Ballpoint pens;
- Clipboard;
- Play Cards sets;
- Ballot box;
- Printed worksheet to register test execution and results.

Schools that serve meals in a cafeteria or a classroom

ATTENTION
Be careful not to mix classrooms that will not participate in the test during its implementation.

Activities for Applicators 1 and 2:
1. Distribute Play Cards sets;
2. Ask children to choose, among the 5 distributed cards, one that they feel best represents what they think about the preparation;
3. Promote an environment of individual judgment, where there should be no conversation among the students;
4. Ask the child to place the chosen card inside the ballot box;
5. Collect unused cards.

SUGGESTION
After the test application, it is advised to discuss it with the students to review positive and negative aspects of each preparation.

Result Analysis

- Count the number of answers related to each facial expression (icon) from the scale presented on the cards;
- Calculate the percentage of each expression (icon). See example below:

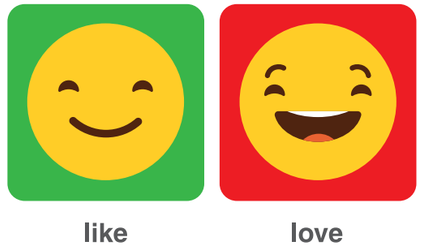
Image 8 – Example of calculation using the Play Cards

Calculation Example:
Number of children that answered the test: 100 (100%)
Number of children that picked each expression (icon)

Analyzing response to the test

Conclusion: If the sample presents a percentage equal to or higher than 85% for the “like” or “love” facial expressions, the tested preparation/food was accepted.

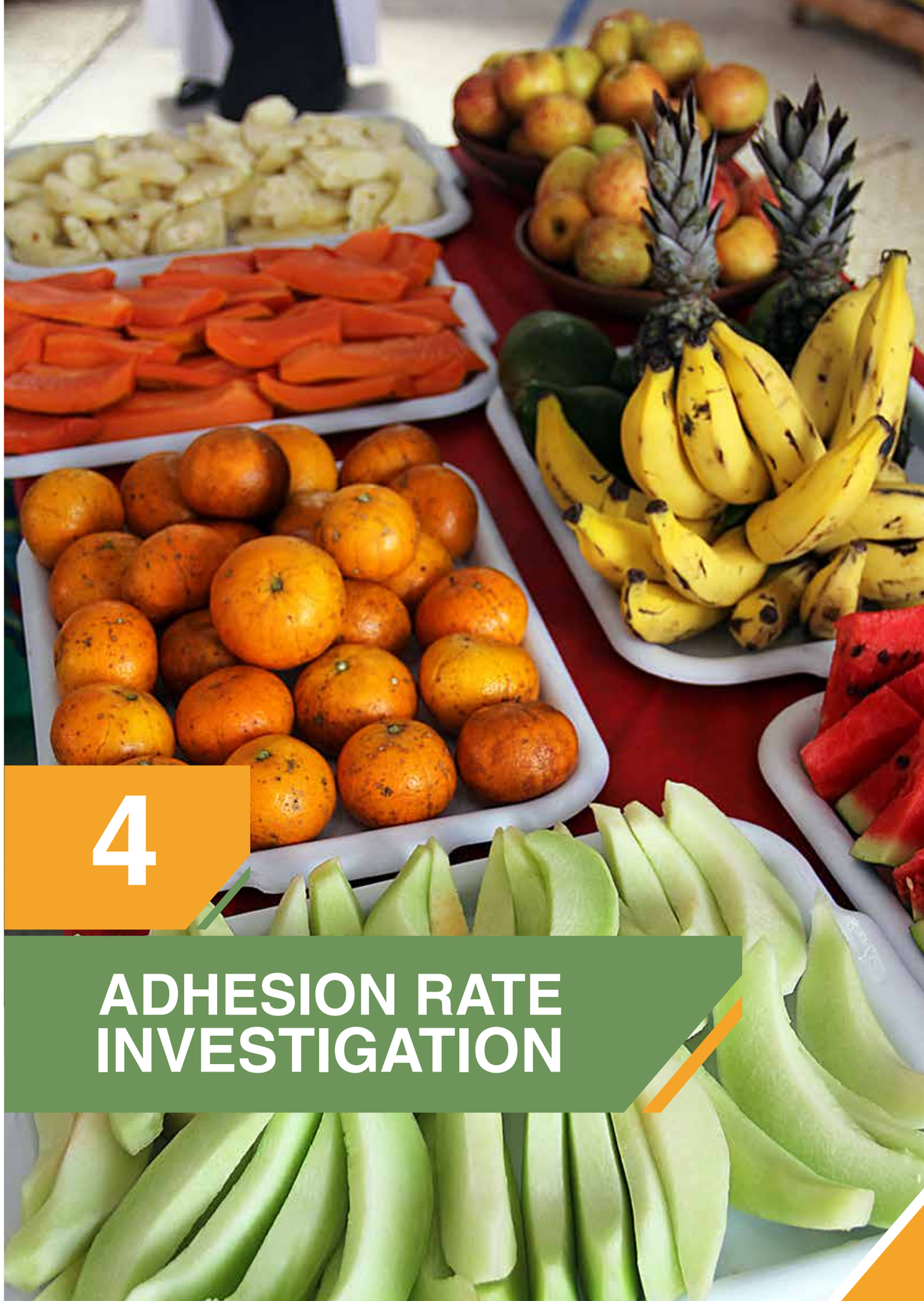
Image 9 – Play Cards “like” and “love”



Climate correlations x Acceptance of school feeding

The local nutritionist must identify if there is a correlation between low acceptance and the weekday in which the food preparation is being served, as well as the temperature and time.

Example: Verify acceptance difference of a soup served in hot and cold days.



4

ADHESION RATE INVESTIGATION

4 ADHESION RATE INVESTIGATION

Adhesion Rate Investigation

Aiming for the best functioning and enhancement of the PNAE, it is necessary to investigate student adhesion rate to the Programme, which corresponds to the percentage of students that have mentioned consuming meals prepared by the school.

To facilitate an investigation of the adhesion rate,it should be calculated on the same day of the acceptability test application, using the equation displayed below:

$$\text{Adhesion Rate} = \frac{\text{Number of students that consumed the meal} \times 100}{\text{Number of students present at the school}}$$

Considering the need to establish a reference criterion, PNAE will use as cut-off points the values obtained in a study produced by the food engineering team from University of Campinas. In that research, student adhesion was evaluated by the presentation of percentages classified in four categories: high (above 70%), average (50% to 70%), low (30% to 50%) and very low (below 30%).[10]

5

SAMPLE TEST

5 SAMPLE TEST

The FNDE defines in its Resolution[2] that the Executing Entity (EEx) can require, in an auction notice or a public call, the provisionally successful bidder's obligation to present product samples for evaluation and selection. The EEx will then submit the samples to necessary tests. This should be before the approval of the bidding result.

Suggestion:
The acceptability testing of products to be acquired can be done with the students before the bidding process, during the menu-planning step. For that purpose, the responsible party must talk to suppliers and request samples. It should be noted that this request shall not be formal, but an agreement between technical manager and suppliers, without the commitment of a purchase contract.

When purchasing products from smallholder farmers or a rural family entrepreneur, the product delivery for sample testing should also be required by public call. Also, only the winner of this stage should be tested.

Image 10 – Example of sample request in a public call

The product samples_____
must be delivered in the following address_____,
(street/number/City/State), from day_____ until day _____,
up to _____ hours, for evaluation and selection of products to be acquired,
which must be submitted to the necessary tests required by this public call
immediately after the habilitation phase.

In case the products fail the sensory test, the second best should be called. In this stage, the application of a test named “Standard or Non-Standard” that evaluates product attributes is suggested.

The sensory evaluation team from the bidding process must consist of at least 10 and at most 15 people, and all team members must sign a sensory evaluation report.

The report must display all analysed products and the corresponding results reached by the sensory analysis team, with no need to reveal the supplier’s name. For documentation purposes, one may include only the supplier’s commercial insurance number and state register (if any). The report template can be found in Appendix I.

It is recommended that the tasters at this stage be: members of the School Feeding Council (CAE), a school feeding nutritionist, school cooks, and people over 21 years old that participate in the school community – as long as they are duly registered as members of the sensory evaluation team in the bidding processes and/or in the purchase process related to smallholder farmers’ products.

Therefore, it is recommended that the tested product be considered fit for purchase through the smallholder farmers’ bidding or acquisition process only if 85% of participants classify the product as “standard” in the “Standard or Non-Standard” test.

To apply the “Standard or Non-Standard” test, a team of tasters is trained to evaluate certain important sensory attributes in a selected product by using references that represent acceptable and unacceptable attribute variations. This training must be done by the nutritionist in charge of the city’s school feeding for which the products will be tested.

After training, the team routinely evaluates product samples by verifying if they meet the attributes learned during training. At the end of each test, results are registered, and the product is approved or disapproved according to attributes established by the sensory evaluation team. This way, the “Standard or Non-Standard” test is a decision-making tool for quality control, helping the school feeding coordination to take action in approving or disapproving a product before it is bought and distributed to schools in the city.

How to do it?

Each product must be prepared by the Executing Entity according to the use instructions and in enough quantity so that each taster receives a portion of it (a cup or a shallow dish).

Important points:

• The analysis should be carried out one product at a time. Do not prepare or serve two or more product samples simultaneously. Tasters should not receive any information about the product brand or origin because it can influence their judgment and compromise the evaluation’s impartiality and exemption. Therefore, make sure the test is blind, meaning that only the person who is preparing the test should have access to the brand and to other product-related information.

• Do not analyse more than 3 products a day to avoid sensory fatigue (when many products are tasted, the last samples can be compromised due to weariness or even to adaptation of sensory organs, which become less sensitive to smell and flavour).

The nutritionist must define the attributes of each product jointly with the group of evaluators. It is necessary to always use attributes that are especially relevant to evaluate the product’s quality. Therefore, the sample will be inside or outside the standard set up by the team. Example: to test cookies, analyse flavour, crunchiness, colour, savoury flavour.

The attributes will be defined during a meeting before the test and should be documented at the end with the signature of every participant. Attribute suggestions are on Charts 3 and 4. There is no minimum or maximum number of evaluated attributes – quantity will vary according to the product and to what the team considers to be relevant.

See the following model of an “Standard or Non-Standard” test card:

Image 11 – Model of “Standard or Non-Standard” test card.

Taster name: _____ **Date:** _____
Product: _____

“Standard or Non-Standard” Test

Please evaluate the product sample you are receiving and mark the correspondent bracket if the sample is standard or non-standard, according to concepts and attributes learned during training.

Standard **Non-standard**
[ ] [ ]

Comment: _____
_____

Results

Tasters make their judgment, and the percentage of “Standard” and “Non-Standard” results are calculated. Based on these results, the school feeding coordination can make the decision to approve or disapprove the product. For example: a rice sample is tested by 15 tasters. The team was trained by the nutritionist to test the following attributes: flavour, colour, smell and texture, according to what was standardized by the training. Seven tasters judged the sample as “standard” and eight as “non-standard”. Therefore, the percentage of 46,66% was reached for the “standard” category.

According to the evaluation, the sample is not suitable for purchase by the school feeding coordination because the percentage is lower than the previously suggested 85%.

See Charts 3 and 4 for suggestions of attributes that can be evaluated by tasters.

Chart 3 – Suggestions of attributes for pasta, beef and milk.

PASTA

	STANDARD	NON-STANDARD
Appearance: Colour	**Slightly whitish**	**Very whitish**
Flavour:	**No residual flavour**	**With raw residual flavour**
Texture: Chewiness	**Easy chewing**	**Hard chewing** (long time required to chew)

BEEF

	STANDARD	NON-STANDARD
Appearance: Presence of fat	**Fat is not very visible**	**Fat is highly visible**
Smell:	**Characteristic smell**	**Non-characteristic smell**
Flavour:	**Non-rancid flavour**	**Rancid flavour**
Texture: Hardness	**Low hardness**	**High hardness**
Texture: Juiciness	**High juiciness**	**Low juiciness**

MILK

	STANDARD	NON-STANDARD
Appearance: Colour	**White**	**Greyish**
Flavour: Sour	**Weak sour taste**	**Strong sour taste**
Texture: Presence of lumps	**No presence of lumps**	**Lumps are present**

Chart 4 – Suggestion of attributes for rice, beans and sweet or savory cookies.

RICE

	STANDARD	NON-STANDARD
Appearance: Colour	**White**	**Yellow**
Flavour:	**No strange flavour**	**With strange flavour**
Texture: Cohesiveness	**Well-separated grains**	**Pasty grains**
Texture: Hardness	**Grains with hard core**	**Grains without hard core**

BEANS

	STANDARD	NON-STANDARD
Appearance: Colour	**Slightly whitish**	**Very whitish**
Flavour:	**Characteristic of cooked beans**	**Not very characteristic of cooked beans**
Bitter taste:	**Slightly bitter**	**Very bitter**
Texture: Broth formation	**Thick broth**	**Presence of rough granules**
Texture: Lumpiness	**No lumpiness**	**Low juiciness**

SWEET OR SAVORY COOKIES

	STANDARD	NON-STANDARD
Appearance: Colour	**Very characteristic**	**Not very characteristic**
Flavour:	**—**	**Slightly intense or Very intense**
Texture: Fracturing	**Very crunchy**	**Slightly crunchy**
Texture: Adhesiveness	**Low force to remove food that sticks to the mouth**	**High force to remove food that sticks to the mouth**

Definitions of mechanical characteristics of textures

Hardness:
Defined as the necessary strength to obtain a deformity. Strength needed to compress a substance between the molar teeth (for solids) or between the tongue and the palate (for semi-solids). Related sensory terms: soft, firm, hard.

Cohesiveness:
Strength of internal connections that gives substance to the product. Degree to which the substance is compressed between the teeth before it breaks.

Adhesiveness:
The necessary effort to overcome the forces of attraction between the food and the surface of other materials that the food gets in contact with (e.g., teeth, palate, tongue, etc.). Can be defined in a sensorial manner as the required strength to remove the material that adheres to the mouth during the normal eating process.

Fracturing:
Strength through which the material breaks. It is related to the primary parameters of hardness and cohesiveness. In breakable materials, cohesiveness is low, and hardness varies from high to low. Sensorially, it is the strength needed to shatter or break food into pieces.

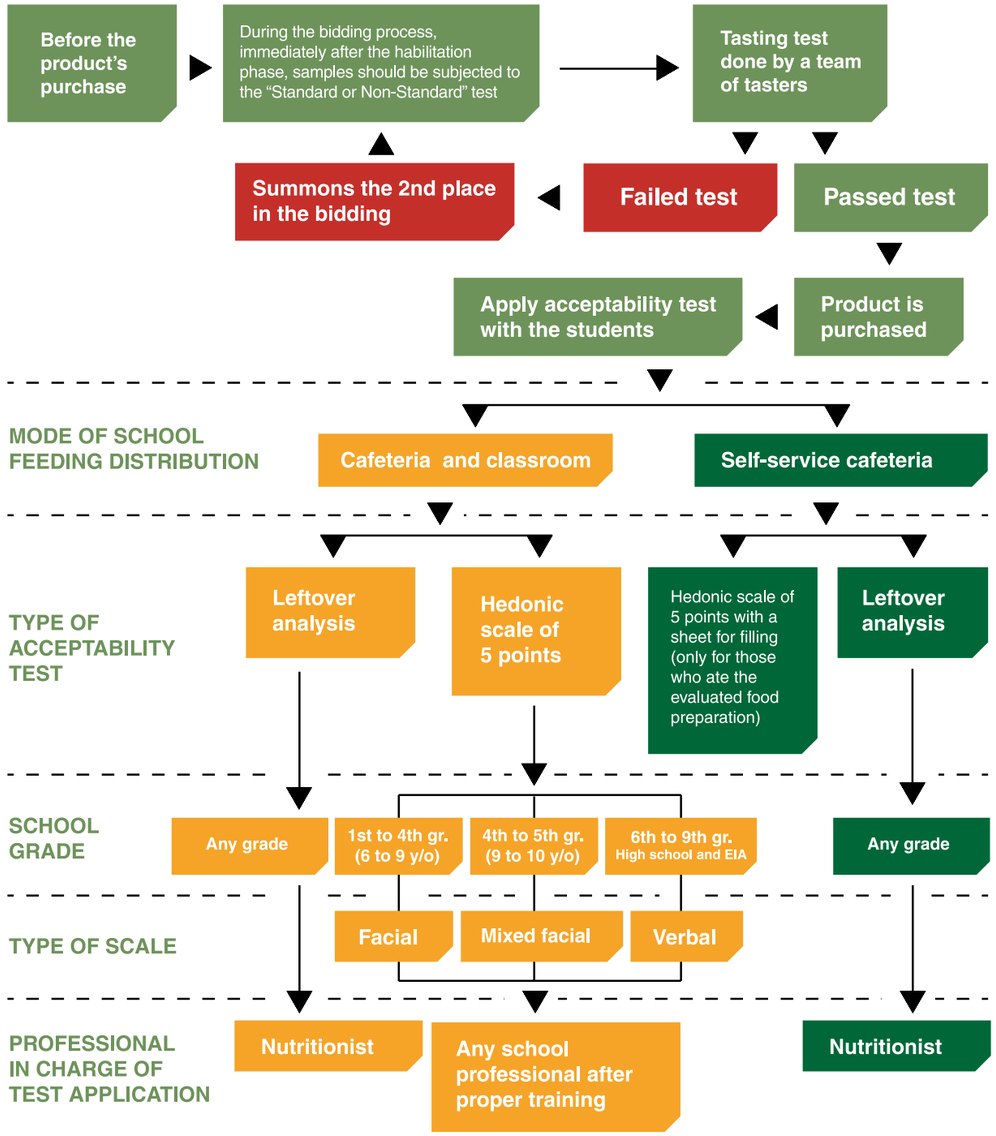
Chewiness:
Energy necessary to chew solid food until a state that allows it to be swallowed. Chewiness is a product of the primary parameters hardness x cohesiveness x elasticity. Sensorially, it is the time required for chewing a sample at a constant speed of force application using the jaws, in order to reduce it to the consistency needed for swallowing.[11]

6

DECISION TREE

6 DECISION TREE

An instrument called ‘decision tree’ was created to facilitate the acceptability test application, so that the test selected to be applied at schools takes into consideration the implementation of a bidding process, the school feeding distribution mode and the student’s school year.



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APPENDIX I

Suggestion of sensory analysis report for bidding process*

(Use letterhead from the City Hall and/or the Secretariat of education)

City: _____ **State:** _____

Supplier's commercial insurance number: _____

Date of test:_____ **Place of test:** _____

Tested product	Percentage of evaluations within standard

Through the sensory analysis tests applied during the day(s) _____ of _____, _____ the nutritionist _____ _____ and the sensory analysis team consider the products _____, _____, _____, _____ and _____ fit for purchase for school feeding in the city of _____ from this supplier, and that the products present all basic characteristics determined by the sensory analysis team.

_____ _____

Sensory analysis team:

_____ _____

(full name) **(signature)**

_____ _____

(full name) **(signature)**

_____ _____

(full name) **(signature)**

_____

(Signature and stamp from the nutritionist in charge)

APPENDIX II

Suggestion of registry charts for the Waste-Ingestion test

(Evaluation of leftovers)

Schools that serve meals in the cafeteria

(You may choose to repeat the chart for each classroom where the test is applied)

School: _____ **Date:** _____

Weight assessment: was there any difference in the weight that was previously known? ( ) Yes ( ) No. If yes, how much? _____

NAME OF PREPARATION	UTENSIL WEIGHT	WEIGHT OF MEAL PREPARATION PLACED ON UTENSIL	WEIGHT OF LEFTOVERS IN UTENSIL

Plastic bag	Weight of plastic bag for leftovers	Weight of leftovers within the plastic bag	Weight of plastic bag for inedible parts (bones, peel, etc.)	Weight of inedible parts within the plastic bag

APPENDIX III

Suggestion of registry charts for the Waste-Ingestion test

(Evaluation of leftovers)

Schools that serve meals in the classroom

School: _____ **Date:** _____

Tested meal preparation: _____

EMPTY PLATE	WEIGHT OF EMPTY PLATE	EMPTY PLATE	WEIGHT OF EMPTY PLATE
1		6	
2		7	
3		8	
4		9	
5		10	

Portioned dish	Weight of each portioned dish	Portioned dish	Weight of each portioned dish	Portioned dish	Weight of each portioned dish	Portioned dish	Weight of each portioned dish
1		26		51		76	
*		*		*		*	
25		50		75		100	

* Add lines according to the number of students that will participate in the test.

Plastic bag	Weight of plastic bag for leftovers	Weight of leftovers within the plastic bag	Weight of plastic bag for inedible parts (bones, peel, etc.)	Weight of inedible parts within the plastic bag

ANNEX I

Questionnaire to know the reasons for adhesion or non-adhesion to school feeding

Adapted and made available by:
Slater, B. (Coo.). Consumo dietético e atividade física como determinantes das mudanças do Índice de Massa Corporal de uma coorte de adolescentes matriculados na rede pública de ensino da cidade de Piracicaba. São Paulo. Research project. Finalized in 2006. FAPESP 02/09521-9.
Silva, M.V. (Coo.). Contrastes regionais nos custos, qualidade e operacionalização do Programa Nacional de alimentação Escola - PNAE e o seu impacto sobre os padrões alimentares da população brasileira. Research project. CNPq n°50.4369/2003-2.

1. Do you usually eat meals offered by the school?
1. Yes (Skip to the next question) 2. No (Skip to question 5)

2. How often do you usually eat meals offered by the school?
(Attention: tick just one option and skip to the next question)
1. 1 day of the week
2. 2 days of the week
3. 3 days of the week
4. 4 days of the week
5. 5 days of the week

3. Do you like meals offered by the school during the break?
1. Yes, I like all meal preparations available for school feeding (Skip to question 5)
2. I don´t like a few of them. (If this option is chosen, ask the student to cite which meals he/she doesn´t like. Then, skip to the next question)
3. I don´t like any of it. Cite:

4. Why don´t you eat the meal offered by the school? Tell us the reason(s):
(Skip to next question)

5. Have you ever tried school feeding?
1. Yes (Skip to next question) 2. No (Skip to question 8)

6. In your opinion,the temperature of the meals offered during the break is
1. Always good (Skip to next question)
2. Sometimes good (If this option is chosen, ask why. Then, skip to next question)
3. Never good (Skip to next question)

7. In your opinion, the amount of food offered by the school feeding is:
1. Too much [exaggerated] (Skip to next question)
2. Good [sufficient] (Skip to next question)
3. Too little [insufficient] (Skip to next question)

8. In your opinion, is the place where the meal is served comfortable?
1. Yes (Skip to question 10) 2. No (Skip to next question)

9. If you think the place is uncomfortable, state the reason(s) why. (Attention: answers are non-exclusive; tick and skip to question 11)
1. There aren´t seats for everyone
2. There are no tables
3. It´s dirty
4. It´s noisy
5. Other(s). Which one(s)?

10. Do you like the cutlery offered during the school feeding?
1. Yes (Skip to question 12) 2. No (Skip to next question)

11. Why do you dislike the cutlery offered during the school feeding?
(Attention: answers are non-exclusive; tick and skip to question 13)
1. I don´t like eating solid food with a spoon
2. I´d rather eat using a spoon
3. I don´t like plastic cutlery
4. The cutlery is dirty
5. Other(s). Which one(s)?

12. Do you like the kind of glass/cup used during the school feeding?
1. Yes (Skip to question 14) 2. No (Skip to next question)

13. Why do you dislike the kind of glass/cup used during the school feeding?
(Attention: answers are non-exclusive; tick and skip to the next question)
1. I don´t like drinking with a plastic cup
2. I don´t like drinking with an aluminum cup
3. The glass/cup smells strange
4. The glass/cup is dirty
5. Other(s). Which one(s)?

14. Do you like the kind of plate on which the meal is served?
1. Yes (Skip to question 16) 2. No (Skip to the next question)

15. Why do you dislike the kind of plate on which the meal is served?
(Attention: answers are non-exclusive; tick and skip to question 17)
1. I don´t like eating with a plastic plate
2. I don´t like eating with an aluminum plate
3. The plate is dirty
4. There aren´t enough plates for everyone
5. Other(s). Which one(s)?

16. In your opinion, the time available for eating the meal is:
1. Short (Skip to the next question)
2. Enough (skip to the next question)
3. Long (Skip to the next question)

17. In your opinion, does the food distribution take too long because there is a long line of students?
1. Yes (Skip to the next question) 2. No (Skip to the next question)

18. Do you usually buy food from the school cafeteria?
1. Yes (Skip to the next question) 2. No (Skip to question 24)

19. How often do you buy meals from the school cafeteria?
(Attention: tick just one option and skip to the next question)
1. 1 day of the week
2. 2 days of the week
3. 3 days of the week
4. 4 days of the week
5. 5 days of the week

20. Which food do you usually buy from the school cafeteria?
(Skip to next question)

21. Do you usually buy food in other places to eat during the break?
1. Yes (Skip to next question) 2. No (Skip to question 26)

22. What are other places where you usually buy food for consumption during the break?
Place(s): (Skip to next question)

23. What kind of food do you usually buy at those other places to consume during the break? Types of food: (Skip to the next question)

24. When do you usually buy food at the school cafeteria or other places?
(Attention: answers are non-exclusive. Tick the answer(s) and skip to the next question)
1. When I don´t eat the food provided by the school
2. When I don´t bring lunch from home
3. When I don´t like the food offered during that day
4. Even when I eat other food I also buy food from the cafeteria

25. How much money do you usually spend per day buying food at the school cafeteria or other places?
1. At cafeteria: $ _____ (Skip to next question)
2. At other places: $ _____ (Skip to next question)

26. Cite the types of food offered by the school that you like the most:

ANNEX II

Model of registration worksheet for acceptability test application

Name of meal preparation (product): _____
Date: _____ Place: _____
Person in charge of testing: _____
Test used: _____
Hedonic scale ( ) Waste-Ingestion (evaluation of leftovers) ( )
Number of students that participated in test: _____
Number of students in school: _____
Results: _____
Acceptability percentage: _____ %
Adhesion rate: _____

_____

Signature from school director

_____

Signature from person in charge of test

ANNEX III

Elaboration of Play Cards and ballot box

Instructions
A dimension of 7cm x 7cm is suggested for the play card, but it may be bigger or smaller, as long as the image is visible. The face icon indicating the acceptance degree must be at the center of the card, with a verbal indication right underneath, as exemplified by the following image.

Image 13 – Example for the “love” card.

In case a permanent supply of play cards is created, the cards must be laminated and have round borders to avoid injury.

Any box can be used as a ballot box, as long as it doesn’t display any advertising or gender-assuming colors, such as red and pink for girls and blue for boys. Neutral colors are ideal. Boxes that do not possess these characteristics must be wrapped.

The ballot box must also have an opening on its superior surface so that the child can deposit his or her play card by himself or herself.

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