

HACCP



SUSHI RICE HACCP GUIDANCE

This guidance is for food service operators who want to acidify sushi rice for extended storage at room temperature and do not already have an approved Hazard Analysis Critical Control Point (HACCP) plan.

*For Retail Operators
Rev 2.0-5/23*

Carson City Health & Human Services
Environmental Health Division
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Sushi Rice Guidance for Food Service

Background Information

Sushi is a type of Japanese cuisine consisting of acidified rice combined with various toppings and fillings, usually raw fish or other ingredients. Sushi rice is generally kept at room temperature or in a warm holding unit in sushi restaurants for the ideal taste.

Prepared plain white rice (no acid added) has a pH range of 6.0 - 6.7. Bacteria can easily grow within this pH range therefore; cooked rice is considered a “Potentially Hazardous Food” or “Time/Temperature Control for Safety” food. **(PHF/TCS)**

Although the rice cooking process kills most pathogenic bacteria, heat resistant bacterial spores may germinate and begin to grow as the cooked rice cools. *Bacillus cereus* is a spore forming bacteria commonly found in rice, it is responsible for the majority of food poisonings linked to cooked rice. Cooked rice may also become contaminated with toxin forming *Staphylococcus aureus* through poor operator hygiene.

Sushi rice is typically prepared with vinegar to the extent that it becomes “acidified” having a pH value of 4.2 or below. The acidity inhibits the growth of harmful food poisoning bacteria. **At a pH value of 4.2 or below, sushi rice is considered a non-PHF/TCS food and may be held at room temperature and simply discarded at the end of the day.** (Without the requirement to closely monitor time)

Some literature supports the acidification of sushi rice to < 4.6, however *Bacillus cereus* and *Staphylococcus aureus* bacteria may still grow (slowly) between 4.3 - 4.6. Sushi rice with a pH between 4.3 - 4.6 would consequently still be subject to time limits that would require monitoring actions. Although labeling is not required when the pH is ≤ 4.2, many operators choose to discard rice after 12 hours as a quality guideline.

To ensure the safety of your sushi rice, you should aim for a pH of <4.2. A food safety program for sushi rice must include the use of reputable pH test strips or a pH meter with standard buffer solutions for calibration.

How to Obtain a Waiver to Extended Sushi Rice Storage Time (w/o Temperature Control)

A food service establishment must have a plan approved by the health department before they can hold their sushi rice outside of temperature control. The plan must identify basic food safety practices such as pH monitoring.

Your establishment must be in good standing and demonstrate control of food safety risk factors in order to qualify for a waiver approval.

1. A **Waiver Request Application Form** must be completed and submitted to your local health inspector for review and approval.
2. If you do not already have a written HACCP plan developed to submit with the waiver, a **Sushi Rice HACCP Supplemental Information Form** may be completed and submitted to help you document the necessary information. The supplemental form completed in detail may be sufficient to function as your food safety “HACCP” plan.
3. Employees must be properly trained on your process. Training procedures should be included with your submission.
4. pH logs must be maintained as well as calibration records. (if using a pH meter) Copies of the logs you will use should be included in your submission.

If an operator does not wish to monitor the pH of their sushi rice; two options are available:

1. Label the rice container to be discarded 4-hours from the time it is removed from temperature control. Remaining rice **MUST** be discarded after 4 hours. (Written procedure and employee training required)
2. Use temperature control: hold rice below 41°F or above 135°F (Not ideal for sushi)

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Sushi Rice Preparation and Testing

Cooling rice after cooking: Some processes recommend that both the rice and the acid mixture be cooled to approximately 115°F before they are mixed together. When rice is not acidified immediately after cooking, it is important that the process of cooling to $\approx 115^{\circ}\text{F}$ and then acidifying take no longer than 2-hours. To speed up the cooling process it's recommended that the rice be spread into shallow pans no more than 4-inches deep. (2 inches deep is ideal)

Mixing: Once the rice has cooled enough but is still warm, run a spatula through the rice using right and left slicing motions to separate the grains. Slowly add your prepared vinegar mixture making sure all rice is evenly coated with the vinegar mixture so that all rice reaches the appropriate pH (≤ 4.2).

Testing: The pH should be tested within 30 minutes after acidification. (See below)

Corrective Actions: If the pH of the sushi rice fails to fall to 4.2 or below; two options are available:

1. **Best Option - Adjust:** Add additional vinegar and retest.
2. **2'nd best - Label with discard time:** (*Written procedure and employee training required*)
 - If the pH is between 4.3 – 4.6 = the operator may label the rice container to be discarded within 8-hours from the time it is removed from temperature control. (Remaining rice MUST be discarded after 8 hours)
 - If the pH is 4.6 or above the operator may label the rice container to be discarded within 4-hours from the time it is removed from temperature control. (Remaining rice MUST be discarded after 4 hours)

How to Measure the pH of Your Rice

Remove a sample: Always remove a small sample from your rice and test this sample. Sticking your pH probe directly in your main batch can cause contamination. (i.e. The probe may be unclean or glass from a cracked electrode could potentially fall into your product)

Prepare your sample: Samples should be tested at a constant temperature, preferably room temperature. Hot or cold samples may result in inaccurate readings. Blend or smash the rice to create a paste. Some pH papers and meters may be designed for testing slurries or paste; however many of the test papers and pH meters on the market are designed for testing liquid products. Rice paste may be tested with a liquid type pH meter or test strip if the sample is sufficiently diluted. A sample may be diluted with a small amount of deionized water without modifying the pH. If deionized water is not available, a small amount of distilled water will generally suffice.

(Do not dilute with tap water because tap water will most likely change the pH reading.)

Recommended Dilution: $\frac{3}{4}$ distilled water to $\frac{1}{4}$ cup rice paste = blend for 20 seconds

Measure and Record: Measure the acidity (pH) of your sushi rice within 30 minutes after acidification (mixing the cooked rice and vinegar solution) Record the pH for each batch made on your pH log.

pH Test Papers: pH test papers are acceptable for sushi rice verification; however they are not as sensitive/accurate as a calibrated pH meter. You may have to over acidify in order to verify that you are within a safe pH range. Refer to the manufacturer's instructions to determine if your strips require sample dilution. Dip pH test strips into the liquid portion of the rice slurry. (According to manufacturer's recommended time period) Compare the color of the test strip to the color chart provided with the test papers.

pH Meters: pH meters are much more sensitive than paper test strips and are the preferred method for obtaining accurate pH readings. Accurate readings allow an operator to verify safety without potentially compromising product quality.

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pH meter care: pH meters are delicate instruments and should be handled with care. Meters typically require daily calibrating when in use. Follow the manufacturer's instructions carefully. Learning to calibrate, operate, and care for a pH meter can often take some practice.

- Follow the manufacturer's instructions to make sure it is cleaned properly. The electrode can get food build-up on it from testing which will make it inaccurate. Most probes may be gently rinsed with warm water tap between products.
- Wiping of most electrodes should be kept to a minimum, gently blotting rather than wiping will produce less static interference. Kim wipes are preferred for contact with pH electrodes, but may not be available to small operators. If Kim wipes are not available, use only soft facial tissues to wipe or blot the electrode. (They must not have added oils like lavender or aloe vera)
- When the pH meter is not in use, follow the manufacturer's instructions for correct storage. It may need to be stored in distilled water or a commercial storage buffer solution.
- When purchasing a pH meter, ensure you also purchase a sufficient amount of calibration buffer solutions. (4 buffer and 7 buffer) Only use clean pH buffer solutions for calibrations. Rinse the probe gently with deionized or distilled water before moving from one calibration buffer to the next.
- It's also advisable to purchase an extra electrode and set of batteries so that you are prepared for when replacement is necessary.

A low sushi rice pH alone is not enough for adequate sushi food safety

Good manufacturing practices, operator hygiene, and safe sourcing and storage of other sushi ingredients are all important factors in the production of safe sushi.

- Although the rice may be safe at room temperature, the **fish and other seafood ingredients must be stored refrigerated at or below 41°F.**
 - Some species of fish may produce toxic histamines when temperature is abused. Elevated histamine levels can cause a type of food poisoning called scombroid.
 - Scombroid is the most common form of food poisoning linked to fish.
 - Scombroid can cause severe symptoms similar to allergic reactions (Flushing, hives, sweating, burning peppery taste in the mouth and throat, dizziness, nausea and headache)
- Ensure seafood products are sushi grade. (Fish may carry parasites)
 - Low parasite risk = *Freezing Not Required*
 - Aquaculture-raised fish such as farmed salmon which are fed formulated feed unlikely to contain parasites.
 - Tuna of the species Yellowfin, Bluefin, Bigeye, Blackfin, or Albacore
 - Fish eggs that have been removed from the skin and rinsed
 - Most other types of fish require freezing to kill parasites.
 - You must maintain documentation from your supplier to prove that fish to be served raw were previously frozen for parasite destruction.
 - Alternatively you may freeze the fish yourself using one of the following methods (records required):



- Freeze at a temperature of $\leq -4^{\circ}\text{F}$ for 7 days, or
- Freeze at a temperature of below $\leq -31^{\circ}\text{F}$ for 15 hours



- The following link from the University of Florida IFAS Extension service contains additional safety information for sushi and may be a valuable resource (<http://edis.ifas.ufl.edu/pdffiles/FS/FS11700.pdf>)

Sushi Rice Guidance for Food Service

Special Processes Requiring a Full HACCP Plan & Process Authority

The Carson City and Douglas County Public Health Regional Partnership reserves the right to require full HACCP and/or process authority review and approval for any process when they deem is necessary; However, if following the guidance provided in this document, no additional scientific literature is typically required for sushi rice preparation. Reference: (<http://www.ncceh.ca/sites/default/files/BCIT-Lee-2014.pdf>)

Facilities submitting processes that do not follow existing validated methods may work with a process authority and/or conduct challenge studies to verify adequate pathogen reduction. Contact info for several process authorities is available at: <http://www.afdo.org/foodprocessing>.



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Sushi Rice HACCP Supplemental Information Form

Any alterations, modifications or changes to an approved HACCP, must be resubmitted for review and approval of the Environmental Health Division.

General Information		
Name of Owner & Title:	Phone:	
Establishment Name:	Email:	
Mailing Address:	City:	Zip Code:
HACCP TEAM Members		
Name	Title / Role	
1) List sushi rice equipment to be used (such as containers, pH meter, etc.) Or attach manufacturer's specification sheets. Record NA if not applicable.		
pH meter or pH test strips		
Rice cooker		
Containers & utensils		
Sushi machine if applicable		
Other		



Sushi Rice HACCP Supplemental Information Form

2) Identify all applicable products, processes, and ingredients		
Product / Type	Process (acidification)	Ingredients
i.e. Sushi Rice (white Rice)	Acidification	White rice, white distilled vinegar, sugar, salt, seasonings

Definitions

Control Points in the sushi rice acidification process are the steps in the flow of production from receiving to service.

Critical Control Points (CCPs) are steps that, when done correctly, can control the possibility of a food borne illness outbreak. For sushi rice preparation pH reduction (acidification) is the primary CCP.

Critical Limits are the maximum or minimum value to which physical, biological or chemical parameters must be controlled at a CCP to minimize the risk of a foodborne illness outbreak. (i.e. sushi rice pH \leq 4.2)

Corrective Actions are what is done to correct a step that's gone out of control. For example if the pH fails to drop to \leq 4.2, the operator may calibrate the pH meter to verify the accuracy of the reading and then add additional vinegar if needed. Labeling with an appropriate discard time is also an acceptable corrective action for sushi rice.



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Sushi Rice HACCP Supplemental Information Form

3) Process flow

- Examine the example process flow provided at the end of this document. You can make a copy of it for practice is desired.
- Use a highlighter or other pen to show the actual process flow you use for each product. Cross out any steps you don't use. Mark directional arrows as necessary to make the process clear.
- Add any other processing steps not already shown.
- Once you have determined your flow steps, you should be able to draw out your process flow.



Sushi Rice HACCP Supplemental Information Form

4) Process steps and critical control points

List the critical limits (CCPs) for your product

How will the pH measurements and any other monitoring activities be conducted, by whom, and how often?

If using a pH meter, how will it be calibrated, by whom and how often?

What is the corrective action if the pH is not ≤ 4.2

5) Records: Attach copies of all logs to be used for record keeping

Who verifies that records for monitoring steps are properly maintained and how often do they review the records?

Where will your records be kept and for how long?



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6) Describe or attach operational procedures for the following subjects

Describe the work area for sushi rice preparation and describe the methods that will be used to prevent cross contamination (A picture may be attached for reference if desired)

Describe how sushi rice preparation will be limited to responsible trained personnel who understand the risk involved

Describe your procedures regarding operator hygiene and prohibiting bare hand contact with ready- to-eat foods



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6) Describe or attach operational procedures for the following subjects - continued

Describe your cleaning and sanitizing procedures for food contact surfaces

Describe or attach your training program that ensures that staff involved in sushi rice preparation understand the concepts required for a safe operation

Describe or attach any additional information relevant to your process as needed



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Sushi Rice HACCP Supplemental Information Form

All sushi rice acidification waiver applications must be submitted to your health inspector for review and approval prior to holding sushi rice for extended periods without time & temperature control in your establishment. Applications will be denied if the inspector believes the proposed HACCP plan does not take the proper precautions to keep the public from harm.

By signing and submitting this form to the permit issuing official you are requesting a waiver and establishing a plan to comply with the above requirements as conditions to holding sushi rice for extended periods without time and temperature control. Failure to implement the process as described is subject to enforcement. Any additions or modifications to this plan must be reviewed and approved by the permit issuing official prior to being implemented.

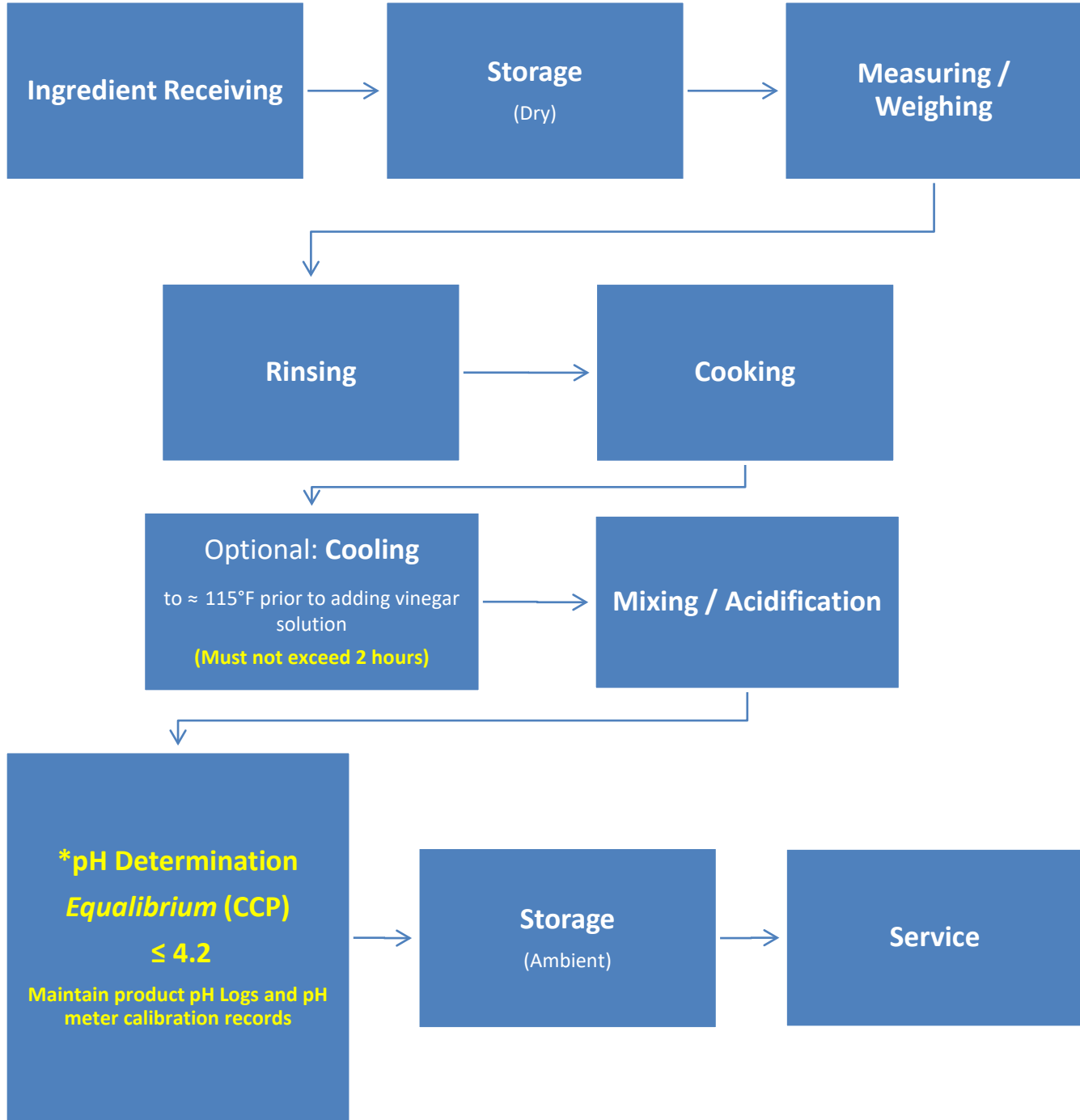
I certify that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief.

Signature:

Date:

Any alterations, modifications or changes to an approved HACCP, must be resubmitted for review and approval of the Environmental Health Division.

Sushi Rice HACCP Flow Example



*Spore forming food poisoning bacteria *Bacillus cereus* will grow in cooked rice held between 42-134°F unless the rice is properly acidified to inhibit bacterial growth. Acidification can also inhibit toxin forming *Staphylococcus aureus* bacteria that may contaminate cooked rice through poor operator hygiene.

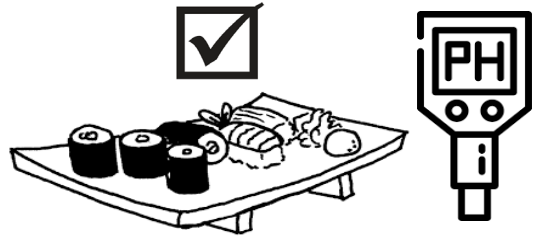


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Sushi Rice pH Log

Keep a copy of pH log near sushi rice preparation area. Check pH of each batch of sushi rice by using a calibrated pH meter or pH test strips accurate to 0.2-0.3



If sushi rice is above 4.2, record corrective action in the appropriate column.

Date	Time	pH	In Spec Y or N	Corrective Action (Add more vinegar and re-check)	Initials

Return this sheet to the owner / manager when completed

Verified by: _____ Date: _____



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REQUEST FOR FOOD ESTABLISHMENT WAIVER

As defined by NAC 446.039, a health hazard or nuisance may not result from the granting of the waiver in the opinion of health authority.

General Information			
Name of Person Requesting Waiver:		Title:	Establishment:
Phone:		Cell:	Email:
Street Address:		City:	Zip Code:
Mailing Address:		City, State:	Zip Code:
Type of waiver requested (Check one)			HACCP Food Safety Plan Required?
Smoking food as a method of food preservation rather than as a method of flavor enhancement (NAC 446.183(1)).			YES
Curing food (NAC 446.183(2)).			YES
Using food additives or adding components, including, without limitation, vinegar: (a) As a method of food preservation rather than as a method of flavor enhancement; or (b) To render a food so that it is not potentially hazardous (time/temperature control for food safety) (NAC 446.183(3)).			YES
Packaging food using a reduced oxygen packaging method, except as specified in this chapter, where a barrier to <i>Clostridium botulinum</i> in addition to refrigeration exists (NAC 446.183(4)).			YES
Operating a molluscan shellfish life-support system display tank used to store and display shellfish that are offered for human consumption (NAC 446.183(5)).			YES
Custom processing animals that are for personal use as food and not for sale or service in the food establishment (NAC 446.183(6)).			YES
Preparing food by another method that is determined by the health authority to require a waiver (NAC 446.183(7)), including but not limited to raw animal foods pursuant to NAC 446.164(4)(b).			YES
Sprouting seeds or beans (NAC 446.183(8)).			YES
Other – Rule modification or waiver request for items not involving specialized processes. <i>(Attach additional information)</i>			To Be Determined
Justification:			
* Attach written justification for why you believe the issuing of a waiver will not expose consumers to adverse environmental health conditions; will not create any health hazards; will not create a nuisance; and will protect the health and safety of the public and food service workers.			
Check the applicable types of supporting documents you have attached.			
Operational plans	Scientific study	Monitoring logs	Validation study
Labeling/disclaimers	HACCP plan	Written procedures	Other
<i>I certify that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief.</i>			
Signature:			Date:

SECTION BELOW FOR OFFICIAL DEPARTMENT OF HEALTH USE ONLY

Action taken by the Public Health Authority:	
Granted	Denied
<i>Attach reasons for denial or the approval with waiver conditions and effective dates are attached.</i>	
REHS reviewer:	Date:
Manager, EHS:	Date: