

TXOJ HAUV KEV TXUAG KHOOM NOJ KHOOM HAUS



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Ib tus neeg ua lag luam fab zaub mov yuav tsum nkag siab yooj yim txog cov yam ntxwv uas cuam tshuam rau kev nyab xeeb thiab kev ruaj khov ntawm cov zaub mov. Kev nkag siab txog qhov cuam tshuam ntawm cov kev hloov pauv no hauv kev tsim khoom los sis cov txheej txheem ntawv yog qhov tseem ceeb rau kev xa cov khoom noj khoom haus kom muaj kev nyab xeeb nrog lub sij hawm khaws cia raws li xav tau. Cov lus txhais hauv qab no muab ib cov ntaub ntawv luv-luv

piav qhia txog cov txheej txheem kev khaws cia, nrog cov kev piav qhia txog kev txhawj xeeb fab kev nyab xeeb ntawm cov zaub mov thiab cov tswv yim uas muaj feem cuam tshuam.

COV LUS TSHWJ XEEB: COV LUS NTAWM KEV TSHAWB FAWB TXOG KEV TXUAG ZAUB MOV

- **Qhov kub thiab txias ib puag ncig:** Qhov kub thiab txias ntawm huab cua ib puag ncig tam sim no, tseem hu ua qhov kub thiab txias hauv chav tsev.
- **Anaerobic:** Tsis muaj oxygen.
- **Clostridium Botulinum (C. bot):** Ib hom kab mob npev taws lias ua rau tus kab mob anaerobic loj hlob (tsis muaj oxygen) thiab tsim cov tshuaj txhaum rau paj hlwb uas ua rau muaj kab mob botulism. [4]
- **Kev Ntim Khoom Uas Tshuab Pa (MAP):** Lub tshuab ntim khoom uas muaj feem cuam tshuam txog kev hloov pauv cov cua uas nyob ib puag ncig ntawm cov khoom noj hauv pob khoom thiab siv cov hnab yas ntim khoom thiab cov hnab uas tuaj yeem ntim tau cua txhawm rau tswj cov cua hloov pauv hauv pob khoom noj. [3]
- **Kev cub khoom:** Ib txoj kev ua zaub mov uas siv cov cua sov los tua cov kab mob tsis zoo (ua rau muaj kab mob) los sis ua rau cov khoom lwj thiab khaws cia tau ntev. [5] Muaj ntau hom kev cub khoom uas cuam tshuam nrog lub sij hawm thiab qhov kub sib txawv uas tuaj yeem sib txawv raws li hom khoom noj los sis dej haus uas tau ua tiav. Cov txheej txheem feem ntau muaj xws li:
 - o Kev tsau hauv cov thoob (Ua Xuv), nrog rau lub sij hawm / kub li ntawm 63°C (145°F) yog 30 feeb
 - o Lub Sij hawm Luv-Luv los sis Kub Heev (HTST), nrog rau lub sij hawm / kub li ntawm 72°C (161°F) yog 15 feeb. [10]
- **Microorganisms ua rau muaj kab mob (los sis kab mob Pathogens):** Cov Microorganisms (feem ntau yog cov kab mob npev taws lias) uas, thaum noj, ua rau muaj kab mob los ntawm cov zaub mov, los ntawm kev kis kab mob los sis kev tau txais cov tshuaj txhaum. Piv txwv li, cov kab mob Salmonella, Listeria, Escherichia Coli (E. Coli), thiab Clostridium Botulinum. [9]
- **pH:** Tus nqi uas siv los ntsuas qhov uas qaub ntawm cov khoom noj, ntsuas txij li 0-14. Cov khoom noj uas muaj pH < 7.0 yog cov kua qaub, cov khoom noj uas muaj pH > 7.0 yog cov kua qaub los sis alkaline, thiab cov khoom noj uas muaj pH kwv yees li 7.0 yog cov kua qaub nruab nrab.
- **Khaws Cia Ntev:** Lub sij hawm uas tus neeg tsim khoom noj cia siab tias cov khoom yuav muab qhov kev paub uas xav tau rau tus neeg siv khoom. [6]
- **Tej yam ua rau cov khoom lwj:** Cov microorganisms (cov kab mob npev taws lias, cov poov xab, cov pwm) uas ua rau cov khoom noj tsis zoo, ua rau muaj ntxhiab tsw phem, tsis qab, cov qauv tsis zoo, thiab cov tsos tsis zoo.
- **Cov Txheej Txheem Ua Rau Kub:** Thev niv ntawm kev lag luam siv cov cua kub rau cov khoom noj kom txhawm rau rhuav tshem cov microorganisms uas ua rau muaj kab mob thiab cov kab mob uas ua rau lwj. Thaum siv ua them niv kev txuag khoom noj txhawm rau khaws cia kom ntev ntawm lub tsee rau khoom, cov txheej txheem yuav tsum tau sau tseg thiab pom zoo los ntawm kws tshaj lij muaj cai tsim nyog.

- **UHT los sis Cov Txheej Txheem Kev Ua Nrog Cov Cua Kub Siab Heev:** Siv rau cov khoom noj uas muaj kua qaub qis los ntawm pH > 4.6 thiab yuav tsum ua kom cov khoom kub txog li 135°C (275°F) li ob peb feeb kom tua tag nrho cov microorganisms, ua rau cov khoom lag luam muaj kev tua cov kab mob uas tsim nyog rau kev faib muag tawm hauv ib puag ncig. [7]
- **Kev Tshuaj Xyuas Kom Raug, Tshuaj Xyuas Kom Raug los sis Kev Tshuaj Xyuas Uas Raug Rawv Txheej Txheem:** Ib qho kev ntsuam xyuas kev tshawb fawb uas muab cov pov thawj sau tseg tias ib qho txheej txheem tshwj xeeb (piv txwv li, ua noj, kib, kev luam, thiab lwm yam) tuaj yeem ua kom muaj txiaj ntsig zoo tas li txhawm rau kom ntseeg tau tias cov microorganisms ua rau muaj kab mob yuav raug rhuav tshem. [8]
- **Tes Dej Num ntawm Dej (feem ntau hu luv-luv ua Aw los sis aw):** Yog kev ntsuas ntawm qhov ntau tsawg ntawm cov dej hauv cov khoom noj, uas piav qhia txog lub zog ntawm cov dej ntawv. Cov dej uas tsis lo nrog cov khoom xyaw tuaj yeem siv los ntawm cov microorganisms, ua rau muaj cov kab mob los sis cov khoom lwj tau. Cov dej ntsuas tau pib li ntawm 0.0 txog 1.0. Nws muaj feem cuam tshuam nrog cov dej hauv cov khoom noj, tab sis tsis zoo ib yam li.

LUB LAJ TXHEEJ

KEV TXUAG ZAUB MOV [1,2]

Nqaij nyoos	Kev ua kom txias ua rau cov microbial loj hlob qeeb. Kev ntim khoom nqus pa/hloov kho cua (MAP) tuaj yeem ua rau kaws cia tau ntev tab sis kuj muaj kev pheej hmoo ntawm kev loj hlob ntawm cov kab mob anaerobic (piv txwv li, Clostridium botulinum, los sis C. bot).
Cov Zaub Nyoos/Zaub Xas Lav/Cov Noob Uas Kaus	Kev khaws cia rau hauv tub yees kom nyob tau ntev. Tej zaum yuav raug ntim rau hauv lub hnab nqus cua tawm MAP txhawm rau kom khaws cia tau ntev, tab sis ua rau muaj kev pheej hmoo ntawm kev loj hlob ntawm cov kab mob anaerobic (piv txwv li, C. bot).
Txiv Hmab Txiv Ntoo thiab Kua Txiv Hmab Txiv Ntoo	Tus pH qis thiab khaws cia hauv tub yees yuav pab kaws tau ntev dua.
Cov Khoom Mis	Kev cub thiab kev ua kom txias yuav khaws cia kom kav ntev. Kev ua cov khoom noj nrog cov cua kub heev (UHT) yuav pab kom nyob tau ntev ntawm qhov kub txias hauv/chav.
Cov Khoom Noj Uas Tau Ua Tiav Lawm (Npaj txhij noj [RTE] Los sis muab rhaub kom sov)	Kev tso rau tub yees pab khaws kom kav ntev. Qhov no yuav ua hauj lwm koom nrog lwm yam xws li qhov qab ntsev, pH, cov tshuaj tiv thaiv kom txhob lwj, thiab ntim cov khoom kom khaws cia tau ntev tshwj xeeb, txawm tias ncuaj sij hawm luv. Qhov no yuav tsum tshuaj xyuas kom paub tseeb tias txhua hom khoom muaj kev nyab xeeb.
Cov khoom noj uas tau cua sov, muaj pH qis (< 4.6) los sis muaj qhov noo nruab nrab	Kev sib xyaw ua ke ntawm pH qis, muaj qhov qab zib siab, ntsev siab thiab kev ua kom sov yuav ua rau khaws cia tau ntev. Yuav tsum tau txais kev tshuaj xyuas txhawm rau kev nyab xeeb ntawm cov khoom noj. Piv txwv li cov nqaij ua tiav, cov khoom lag luam tsau roj, zaub pos, kua sauces, kua siv txiv hmab txiv ntoos
Cov Khoom Noj Uas Noo Nruab Nrab	Cov khoom noj uas muaj Aw ntawm 0.60 thiab 0.85 tias tas yuav muab tso rau hauv lub tub yees los sis lwm yam khoom los tswj kev loj hlob ntawm cov kab mob tab sis tej zaum yuav muaj lub sij hawm khaws cia tsawg vim yog los ntawm kev lwj, feem ntau yog los ntawm cov poov xab thiab pwm. Kev ua kom kub los sis kev tua kab mob ua ntej ntim khoom yuav tiv thaiv cov khoom lwj tau. Tej zaum yuav txiav txim siab siv cov tshuaj tso kom txhob lwj txhawm rau kom khaws cia tau ntev. Piv txwv li suav nrog cov kua siv txiv hmab txiv ntoo, qee cov qhov cij los sis cov granola bars, txiv hmab txiv ntoo qhuav, cov kua sauce taum pauv.
Khoom noj hauv kaus poom, hauv hnab, los sis hauv hwj	Cov txheej txheem kev ua kom kub uas taws qauv los txhawm rau khaws cia kom tau ntev hauv/ chav los ntawm kev rhuav tshem cov microbiological uas nyob hauv cov khoom. Yuav tsum tau txais kev tshuaj xyuas tias muaj kev nyab xeeb ntawm cov zaub mov.
Cov Khoom Bakery	Cov txheej txheem kev cub yuav txo Aw qis, ua rau kev khaws cia hauv chav tsis kav ntev. Cov khoom baked yuav raug ntim rau hauv lub hnab tshuab pa MAP kom khaws cia tau ntev tab sis ua rau muaj kev pheej hmoo ntawm kev loj hlob ntawm cov kab mob anaerobic (piv txwv li, C. bot).
Cov Khoom Noj Qhuav (xws li cov khoom nyoos, cov khoom noj uas muab ua siav thiab cov khoom noj uas yuav tsum tau ua kom siav)	Tus Aw qis (< 0.60) pab txwv tsis pub cov kab mob loj hlob, ua rau khaws cia tau ntev hauv chav tsev. Piv txwv li noob taum, txiv hmab txiv ntoo, mov/pasta, cov cereals rau puas tshais, tshuaj ntsuab/txuj lom, thiab lwm yam qhaub noom qab zib.
Cov rog thiab cov roj uas tsis yog mis nyuj	Tuaj yeem khaws cia tau ntev rau hauv chav tsev, los ntawm kev tsim khoom, ntim khoom thiab khaws cia rau hauv qhov chaw uas zoo.
Cov dej tsis muaj cawv thiab muaj cawv	Tus pH qis yog ib txoj haus kev tseem ceeb ntawm kev khaws dej qab zib cia uas siv koom nrog cov carbonation thiab cov tshuaj tiv thaiv tsis pub lwj xws li benzoates thiab sorbates feem ntau pab kom nyob tau ntev ntawm kev khaws cov dej qab zib hauv/chav tsev. Cov dej cawv yuav raug khaws cia los ntawm kev muaj cov cawv thiab lwm yam tshuaj pab kom txhob lwj. Ob hom tib si yuav dhau cov txheej txheem kev cub txhawm rau kom muaj kev nyab xeeb thiab khaws cias kom nyob tau ntev.

Yog xav paub ntxiv txog cov lus ntxaws xws li tes dej num ntawm dej, pH, cov txheej txheem kev ua kom kub thiab qhov faib tawm los sis kev khaws cias tuaj yeem tiv thaiv los sis uas rau cov khoom lwj qeeb thiab/los sis khaws cov khoom cia tau ntev uas tias tas yuav khaws cia hauv lub tub yees, saib ntawm [qhov no](#) cov ntaub ntawv los ntawm Purdue University Extension.

COV NTAUB NTAWV POV THAWJ:

1. https://myhaccp.food.gov.uk/sites/default/files/resources/a_table_of_food_types_and_microorganisms_of_concern_to_food_safety.pdf
2. https://foodsafety.wisc.edu/assets/pdf_Files/GMP_sauces_NebEntre.pdf
3. <https://www.sciencedirect.com/topics/food-science/modified-atmosphere-packaging>
4. <https://www.fsis.usda.gov/food-safety/foodborne-illness-and-disease/pathogens/clostridium-botulinum>
5. <https://vtechworks.lib.vt.edu/bitstream/handle/10919/93378/FST-315.pdf>
6. <https://auri.org/guides/food-product-shelf-life-guide-for-scaling-businesses/>
7. <https://www.tetrapak.com/solutions/processing/main-technology-area/uht-treatment>
8. <https://qualityassurancemag.com/article/aib0615-food-safety-validation-verification-methods/>
9. <https://ask.usda.gov/s/article/What-is-the-difference-between-foodborne-illness-and-food-poisoning>
10. <https://www.idfa.org/pasteurization>

Kev txhais lus rau phau ntawv no tau txais nyiaj txhawb los ntawm qhov kev pom zoo sib koom tes ntawm Resilient Food Systems Infrastructure, uas yog los ntawm U.S. Department of Agriculture (USDA) Agricultural Marketing Service. Cov ntsiab lus hauv no yog lub luag hauj lwm ntawm cov neeg sau nkaus xwb, thiab tej zaum yuav tsis sawv cev rau cov kev xav raws cai ntawm USDA.

Lub khoos kas AURI no ua tau ib feem los ntawm kev pab nyiaj txiag los ntawm USDA Lub Chaw Hauj Lwm Txog Tej Yam Tshiab ntawm Khoom Txhiam Laj Txhiam Xwm.
