

NANDU NAI LEARNING

# Cosmetic Lab Safety

Salon textbook

---

English

---

nandunai.com

This book covers the bench side of making cosmetics in a salon: weighing, premixes, raw material storage, water, heat, cleaning, protective equipment, batch records, patch tests, contamination signs and the point at which a formula is ready for an outside laboratory. It does not choose ingredients, build emulsions or design a formula for a skin type; that work belongs to the formulation textbook, and every ingredient choice and target percentage in these pages is taken as given. Here the question is narrower and more practical: can you make the batch you wrote down, keep it clean, describe it honestly, and know when it is not ready to touch a client? The arithmetic is shown in full so that it can be checked at the bench, and the records are written so that the next maker can repeat the batch without asking a question.

nandunai.com

## Grams



### Percent means grams per hundred grams

A percentage in a cosmetic formula is a mass fraction, not a volume fraction. Five percent means five grams of that material in every hundred grams of finished product, so a 100 g batch takes 5.00 g, a 500 g batch at 0.50% takes 2.50 g, and a 200 g batch at 0.10% takes 0.20 g. The line to remember is batch grams multiplied by percent, divided by 100. Write the multiplication on the batch card even when the answer looks obvious, because the next person has to be able to check the figure without trusting your mental arithmetic. A number with no working behind it is a claim, not a measurement.

Small percentages are where most weighing errors happen. At 0.10%, a 200 g batch asks for 0.20 g, which a 0.01 g balance can read but a kitchen scale cannot. At 0.05% in a 50 g batch the target is 0.05 g, which is one or two digits of real accuracy and not enough for a preservative. Do not round 0.05 g up to 0.10 g and call it close: that doubles the dose. The batch size should be chosen from the smallest line in the formula, not from the largest jar on the shelf. If the smallest line cannot be weighed well, either scale the batch up until it can or build a premix, which is covered later in this book.

The same equation runs backwards. The actual percent delivered is the grams weighed divided by the batch mass, multiplied by 100. If a 0.20 g target became 0.24 g in a 100 g batch, the actual is 0.24%, which is 20% over target. When a premix is used, the delivered percent is the premix strength multiplied by the premix grams, divided by the batch mass, then multiplied by 100. Water is normally the line that closes the formula to 100, so the water mass is the batch mass minus every other ingredient in grams. Keep all three forms of the calculation on one sheet, because a batch record that shows only the target cannot answer what the jar actually contains.

Rounding needs a rule, or two people will round differently. Round the weighed grams to what the balance can actually read, which is normally 0.01 g. Round the percentage only after the batch has been weighed, never before. Do not round a preservative or an active upward; round down only when the result stays inside the supplier's stated dose range and under the legal ceiling for that ingredient. Write the target and the actual side by side, and if they differ, write why. The choice of ingredient and its permitted dose belong to the formulation book; this book only measures and records what that book decided.

- 1. Write the batch size in grams at the top of the sheet, before anything else.
- 2. Copy each percentage from the approved formula, not from an old batch card.
- 3. Multiply batch grams by percent and divide by 100, showing the line.
- 4. Round each answer to 0.01 g and mark any line below 0.50 g for review.

- 5. Add the gram column and compare the total with the batch size.
- 6. Set the water line to the difference, so the formula closes at 100.00%.
- 7. Weigh each line and write the actual grams beside the target.
- 8. Recalculate the actual percent for every active and file the sheet with the record.

### Bench example

A salon writes a trial gel for 150 g. The formula lists 0.80% of an active, 0.15% preservative, 0.10% fragrance and water to 100. The maker converts each line before opening a jar. The active is  $150 \times 0.80 / 100 = 1.20$  g. The preservative is  $150 \times 0.15 / 100 = 0.225$  g, which the balance reads as 0.23 g, and the maker notes that the small upward rounding is inside the supplier's dose range. The fragrance is  $150 \times 0.10 / 100 = 0.15$  g. The other lines total  $1.20 + 0.23 + 0.15 = 1.58$  g, so the water is  $150 - 1.58 = 148.42$  g. The same formula at 400 g gives 3.20 g active, 0.60 g preservative, 0.40 g fragrance and 395.80 g water. The maker checks the pattern against three standard cases: 100 g at 5% is 5.00 g, 500 g at 0.50% is 2.50 g, and 200 g at 0.10% is 0.20 g. The arithmetic is written out, not just the answers, so a second maker can repeat the batch without guessing.

### CAUTION

Do not carry gram figures from the last batch to this one. The percentage stays the same and the grams change with every batch size; a copied figure is an unrecorded formula change.

### The formula must add to one hundred

A formula is a table of masses that has to total 100.00%. If the listed lines add to 97.5%, the missing 2.5% is not a mystery: it is water or another diluent that was left off the sheet. If they add to 102%, one line is wrong and the batch cannot be rescued by subtracting water by eye. Add the percentage column before you weigh anything, and add it again after the gram conversion. A formula that does not close is a draft, not a work instruction, and it should not be taken to the bench until the table is corrected and re-approved by whoever owns the formula.

The water line is usually the one that closes the formula. In a 300 g batch, if the other lines total 41.10 g, the water is  $300.00 - 41.10 = 258.90$  g. Do not write water as a percentage first and then convert, because the two routes can disagree by a few hundredths of a gram after rounding. Use the gram subtraction as the controlling figure, then state the percentage it represents for the record. When a premix or a stock solution is used, the water that arrives inside it belongs to the water line, so reduce the water by that mass; otherwise the batch is diluted more than the formula says and every concentration falls.

Watch for lines that appear twice. Glycerin may be listed in the water phase and again in the cool-down phase, and a gum may appear as both a dispersion and a slurry. Sum the duplicate entries and write one combined line, or keep them separate with a note that the total is the sum of the two. The same applies to a trade name and its INCI name appearing on the same sheet as if they were different materials. A formula that double-counts an ingredient can close at 100% and still be wrong, which is harder to catch than a table that plainly fails to add up.

When the total does not close after weighing, stop and find out why. Check the decimal point, the unit, and whether a container was tared twice. Do not add water to make the number look right: the concentrations are already set by what went into the vessel, and diluting changes every one of them. If the batch is already mixed and the error is small, record the deviation, recalculate the actual percentages, and decide whether the batch is a lab sample rather than a sale batch. If the error is large, scrap it. A batch made to a wrong formula teaches nothing except that the checks were skipped.

- 1. Copy the formula onto a clean sheet with one row per material.
- 2. Add the percentage column and confirm the total is 100.00.
- 3. Convert every line to grams for the chosen batch size.
- 4. Add the gram column and compare it with the batch size.
- 5. Calculate water as batch grams minus the sum of the other grams.
- 6. Re-add the complete column after the water figure is entered.
- 7. Merge or annotate any material that appears in two phases.
- 8. Sign and date the check, and attach it to the batch record.

### Bench example

A maker drafts a 300 g cleansing gel with 8.0% surfactant, 1.0% thickener, 4.0% glycerin, 0.5% preservative and 0.2% fragrance. The percentage column totals 13.7%, so water must be 86.3%. The gram column is 24.00 g surfactant, 3.00 g thickener, 12.00 g glycerin, 1.50 g preservative and 0.60 g fragrance, which totals 41.10 g. Water is  $300.00 - 41.10 = 258.90$  g. The maker checks that  $258.90 / 300 \times 100 = 86.3\%$ , so the two routes agree. A second sheet, written from memory, lists glycerin in both phase A and phase C at 4.0% each, and the percentage column then totals 17.7%. The water line printed on that sheet is 82.3%, taken from the correct version, so the formula now adds to 100% while containing twice the glycerin intended. The maker catches it by comparing the phase entries, merges them into one 12.00 g line, and marks the old sheet superseded. The lesson is kept on the card: a percentage total is checked against the phase entries, not only against the water line, because a double entry can close the sum while changing what the batch contains.

### CAUTION

A formula that adds to 101% is a typing error in the table, not permission to add 1% less water. Correct the table and re-approve it before weighing.

## Diluting a paste or a strong stock

Some raw materials arrive as a paste, a flake or a concentrated solution that is stronger than the formula needs. The rule is the same as any dilution: the mass of active required, divided by the concentration of the stock, gives the mass of stock to weigh. If the formula calls for 10% active matter in a 100 g batch, it needs 10.00 g of active. A paste that is 70% active contains 70 g of active in every 100 g, so the stock mass is  $10.00 / 0.70 = 14.29$  g, written as 14.3 g. The remaining 85.7 g of the batch

is made up by the other materials, with the water reduced to account for the water carried in the paste.

Always write both numbers on the record: the active percentage the formula intends and the raw material percentage actually weighed. In this case the record says 10.0% active matter, supplied by 14.3% of the 70% paste. A record that says only 14.3% does not tell the next maker what the product contains, and a record that says only 10.0% does not tell them how much paste to weigh. Check the dilution backwards: 14.3 g multiplied by 0.70 gives 10.01 g of active in 100 g, which is 10.0% after rounding. The 0.01 g difference comes from writing 14.29 as 14.3, and it belongs in the note, not hidden.

Use the assay printed on the certificate of analysis, not the trade name. A paste sold as 70% may be certified at 68% on the lot you received, and the correct stock mass is then  $10.00 / 0.68 = 14.71$  g. If the certificate gives a range, calculate with the lower figure and record the choice, because an underdose is usually worse than a small overdose for a preservative or an active. Note the lot number and the assay on the batch record so that a later investigation can tell which stock produced which jar. If the certificate is missing, ask the supplier before the batch, not after.

Never dilute by adding water until the mixture looks right. Appearance is not a concentration, and a cloudy paste diluted to clarity tells you nothing about its active content. Weigh the stock, subtract the water it brings from the water line, and record the calculation. The choice of which paste or active to use, and the target percentage in the formula, belong to the formulation book. This book takes the target as given and makes the conversion honest. If the supplier changes the assay between lots, the formula may need re-approval rather than a quiet adjustment at the bench. If the new lot is weaker, the formula may need a higher percentage, and that is a change to be approved and recorded rather than absorbed silently into the weighing.

- 1. Read the assay on the certificate of analysis for the exact lot.
- 2. Calculate the active mass needed: batch grams x target percent / 100.
- 3. Divide the active mass by the stock concentration as a decimal.
- 4. Round the stock mass to 0.01 g and write the unrounded figure beside it.
- 5. Subtract the water carried in the stock from the formula's water line.
- 6. Weigh the stock into a tared beaker and record the actual mass.
- 7. Recalculate the delivered active percent from the actual mass.
- 8. Record the stock lot, assay, and the delivered percentage on the batch card.

### Bench example

A 250 g trial shampoo needs 4.0% active from a surfactant paste certified at 65%. The maker first finds the active mass:  $250 \times 4.0 / 100 = 10.00$  g. Then the stock mass:  $10.00 / 0.65 = 15.38$  g of paste. The paste is 35% water, so it brings  $15.38 \times 0.35 = 5.38$  g of water into the batch, and the water line is reduced by that amount rather than by the full paste mass. The maker checks backwards:  $15.38 \times 0.65 = 10.00$  g of active in 250 g, which is 4.0%. A second formula calls for 10.0% active from a 70% paste in a 100 g batch, so the stock is  $10.00 / 0.70 = 14.29$  g, written as 14.3 g, and the record states 10.0% active from 14.3% raw paste. Both calculations are written in full on the batch card, with the lot number and the assay beside them, so the next maker can see where every gram came from. The maker also notes that the paste brought 5.38 g of water, so the water line is 5.38 g lower than it would be for the pure active, and the batch mass is unchanged.

### CAUTION

A paste assay is a lot-specific number, not a property of the product name. Recalculate when the lot changes; do not reuse last month's 14.3 g because the drum looks the same.

nandunai.com

## Scale



### Resolution decides what you can weigh

A bench balance with 0.01 g readability shows two decimal places and is the minimum for small cosmetic additions. A kitchen scale that reads 0.1 g cannot tell 0.20 g from 0.30 g, and at a 0.20 g target that difference is half the dose. Below about 0.50 g the error becomes too large to defend even when the instrument is otherwise in good order, because the displayed digit is a large share of the number you are trying to hit. The rule is not about what the balance cost; it is about the smallest mass the formula asks you to trust. If the smallest line cannot be weighed with confidence, the batch size or the premix has to change.

Resolution is not accuracy. A balance can display 0.01 g and still be wrong by 0.05 g if it is uncalibrated, overloaded, or standing on a sloping bench. Check it with the calibration weight the supplier specifies before a batch, and repeat the check after the balance has been moved, after a power cut, or after a heavy container has been dropped on the pan. Keep it on a firm, level surface away from drafts, speakers, and vibrating equipment. Close the draft shield while reading. Record the check result in the batch record, because a number produced by an unchecked balance is an opinion.

Small pocket scales sold for jewellery are not a substitute for a bench balance. Their pans are tiny, their drift is high, and they usually have no draft shield, so a 300 g batch cannot be weighed on one and a 0.05 g addition is not reliable on one either. Do not stack items on the pan or use the balance as a shelf. Do not exceed its capacity, even briefly, because an overload can bend the load cell and leave a permanent error. Have the balance serviced once a year, or sooner if it fails a check weight, and keep the service note with the equipment file rather than in a drawer.

When a target falls below the reliable range, there are only two honest answers. Make a larger batch so the target rises above about 0.50 g, or make a premix so a larger, weighable mass of the premix delivers the small amount of active. Guessing is not a third answer. Adding a scoop and calling it approximately right produces a batch whose concentration nobody knows, and the error is largest exactly where it matters most: preservatives, actives, and fragrance. The decision belongs on the batch card before weighing starts, with the arithmetic that justifies it. Write the choice on the card before the first weighing, with the batch size or the premix strength, and initial it, so the decision is visible to whoever checks the record later.

- 1. Put the balance on a level, firm bench away from doors and fans.
- 2. Check the bubble level or adjust the feet before switching on.
- 3. Calibrate with the supplier's check weight and write the result down.

- 4. Tare the empty container and wait for a stable zero.
- 5. Close the draft shield before adding material.
- 6. Add slowly and wait for the display to settle before reading.
- 7. Record the actual mass, not only the target.
- 8. Stop and service the balance if the reading drifts or fails a check weight.

### Bench example

A maker needs 0.50 g of a preservative for a 500 g batch. The kitchen scale reads in 0.1 g steps: the first attempt shows 0.5 g, the second 0.6 g, and the third 0.4 g, all with the same scoop. The true mass could be anywhere from 0.35 g to 0.64 g, which at a 0.10% target is a dose between 0.07% and 0.13%. The maker stops, borrows a 0.01 g balance, calibrates it with a 100 g check weight, and weighs 0.50 g, which the display shows as 0.50 g and holds. The batch record notes the instrument, the calibration time, and the actual mass. A second maker, working from the same formula, needs 0.10 g of a different preservative in a 200 g batch and finds that even the 0.01 g balance gives only two meaningful digits. The batch is moved to a 1000 g scale-up, where the same 0.10% is 1.00 g, and the record shows why the size changed. Neither maker rounds the small target up to make it easier to weigh. Both records show the instrument and the check weight, because a mass without the balance behind it is only a number.

### CAUTION

A reading that drifts while you watch is not a small nuisance. Stop the batch; a drifting balance means the number on the card cannot be trusted.

## Tare, then weigh

Taring means placing the empty container on the pan and setting the display to zero, so the number that follows is the mass of what you add rather than the container plus its contents. Use the same container throughout a batch; changing containers means taring again and invites a double subtraction. Add material slowly and close to the pan, and wait for the display to settle before reading. Do not hold the container in your hand while weighing, because your hand adds force and the reading moves. Do not lean on the bench either, for the same reason, and do not talk over an open powder while the pan is exposed.

Weigh each ingredient into its own tared beaker, or weigh in sequence only when the formula allows it and the previous material cannot stick to the vessel. Never weigh directly onto the pan, because cleaning the pan between materials is slower and less reliable than using a beaker. If you overshoot, do not spoon material back into the stock jar: the spoon is now contaminated and the jar is no longer clean. Set the excess aside as waste, record the actual mass, and decide whether the batch can continue. A record that hides an overshoot is worse than no record, because it teaches the next maker that hiding is normal.

Overshoot decisions need a limit written before the batch, not invented afterwards. A common bench rule is that any line more than 2% away from target is a deviation that must be justified; a preservative

or an active is tighter, and the supplier's dose range sets the ceiling. If the overshoot is small and the total batch mass can be corrected by reducing another line, do the arithmetic and record it. If it cannot be corrected, the batch becomes a lab sample or is discarded. Never add extra of everything else to balance one overweighed line unless the formula has been recalculated in full and re-approved, because that changes the batch size and every concentration with it.

Keep the weighing area clear and the containers labelled before the first scoop. A beaker with 12 g of glycerin and a beaker with 12 g of a thickener look identical, and a swapped beaker is a formula error that no later check will catch. Write the material name and the target mass on the beaker, or use a labelled set of small cups. Between materials, put the spatula down on a clean surface, not on the bench mat, and never put a used spatula back into a bulk container. These habits are slower for the first batch and much faster than an investigation.

- 1. Label each beaker with the material name and target mass.
- 2. Place the empty beaker on the pan and tare to zero.
- 3. Add material slowly, close to the pan, with a clean spatula.
- 4. Wait for the display to settle before reading the mass.
- 5. Write the actual mass beside the target on the batch card.
- 6. Never return excess material to the stock container.
- 7. If a line is over target, recalculate or stop; do not add water by eye.
- 8. Clean the pan and the spatula before the next material.

#### **Bench example**

A maker tares a 250 mL beaker and weighs 12.00 g of glycerin. The display settles at 12.00 g. A colleague asks a question, and the maker adds another 0.40 g while talking. The actual mass is 12.40 g, which is 3.3% over target on a 12.00 g line. The maker does not spoon it back. The batch card records 12.40 g and the deviation note says the addition was made while distracted.

Because the batch is 300 g and glycerin is a humectant rather than a preservative, the maker recalculates the water line to keep the batch mass at 300 g: water drops by 0.40 g, and the glycerin percentage rises from 4.00% to 4.13%. The change is written down, the batch is marked as a lab sample rather than a sale batch, and the next batch starts from the approved formula with the target restored. The record now shows what happened and why the jar is not stock. The deviation note is short and factual, and it is the reason the jar is a lab sample rather than stock, which is exactly what the next person needs to know.

#### **CAUTION**

Do not return an overshoot to the stock jar. The moment the spatula touched the beaker it stopped being clean, and the bulk jar is now a contamination risk.

**Spoons are for moving, not measuring**

A spoon measures volume, while the formula asks for mass. A teaspoon of glycerin, a teaspoon of salt and a teaspoon of a light oil weigh different amounts, and the same spoon heaped and level differs again. The formula is written in grams, so the only instrument that answers the question is a balance. Spoons are acceptable for moving powder from a jar into a tared beaker, never for deciding how much went in. Keep one spoon per container, clean and dry it between uses, and do not leave a spoon standing in a bulk jar. If a formula arrives in spoons, cups or drops, convert it before the first batch and have the converted sheet approved.

Volume also changes with temperature and with how a powder settles. A spoon of a fluffy powder may hold half the mass of the same spoon filled after the powder has compacted in the bag. A drop from a dropper depends on the tip, the viscosity and the angle, so ten drops of one fragrance are not ten drops of another. This is why a formula written in cups or drops cannot be checked, repeated or scaled. Convert it once, write the gram version into the record, and mark the old sheet as superseded so nobody uses both. If the density is unknown, weigh a measured volume, calculate the density, and record the result rather than guessing a factor.

Converting a volume recipe is straightforward when a density is available. Weigh a known volume in a graduated cylinder, divide the mass by the volume, and you have grams per millilitre. Glycerin is about 1.26 g per mL, so a 5 mL measure is about 6.30 g, not 5.00 g. Water is about 1.00 g per mL, which is why water is the one material where the two numbers coincide. Oils are lighter than water, usually 0.90 to 0.92 g per mL, so a 10 mL measure is about 9.10 g. Record the density source and the temperature, because both change the answer.

Do not use a household measuring cup for a batch that will be recorded in grams. The cup's markings are not accurate enough, the meniscus is hard to read, and the material left on the wall of the cup is unmeasured. A graduated cylinder is acceptable for measuring a volume that will then be converted to mass, but it is not a substitute for the balance when the formula is already in grams. The habit to build is simple: volumes are for moving and for approximate preparation, masses are for the record. Every number that goes into a batch card should come from the balance, not from a spoon.

- 1. Check whether the formula is written in grams or in spoons.
- 2. If it is in spoons, convert every line before weighing anything.
- 3. Weigh a known volume to establish density when it is not given.
- 4. Record the density, its source, and the temperature.
- 5. Convert the volume to grams and add the grams to the formula.
- 6. Mark the old volume sheet as superseded and remove it from the bench.
- 7. Use spoons only to move material into a tared beaker.
- 8. Keep one spoon per container and clean it between materials.

### Bench example

An old salon card says one teaspoon of gum and two teaspoons of glycerin for a small gel. The maker weighs a level teaspoon of the gum three times and gets 2.1 g, 2.4 g and 2.2 g, a spread of 14% around the middle value. Two teaspoons of glycerin are weighed at 12.4 g and 12.8 g on two attempts. The card cannot be repeated to better than about a gram, which is too wide for a 100 g batch. The maker converts the recipe: gum 2.2 g, glycerin 12.6 g, water to 100 g, and writes the densities and the trial weights beside the figures. The old card is marked superseded in red and kept in the file for history, not for use. On the next batch the maker weighs 2.20 g and 12.60 g directly, records the actual values, and the gel sets the same way twice. The conversion took about ten minutes and removed a recurring batch-to-batch variation. The maker keeps the old card in the file for history but never copies from it again, because a recipe that cannot be repeated is not a recipe.

### CAUTION

A spoon is not a small scale. If the formula matters enough to record, it matters enough to weigh; converting by guesswork only hides the variation.

nandunai.com

## Water



### Use distilled or deionised water

Tap water carries calcium, magnesium, chloride, and sometimes iron and copper. Those ions react with surfactants and thickeners, change the feel of the product, and can leave a film on the skin. More importantly, tap water carries microorganisms. A water-based cream, toner or gel is a growth medium, and a product with a weak preservative system can show mould within weeks. Use distilled or deionised water for every water-containing formula, and buy it from a supplier who states the grade on the label. Filtered water from a domestic jug is not the same thing, and neither is water from a bottle that has stood open in the salon.

Distilled water is not sterile. It has been boiled and condensed, which leaves most dissolved salts behind, but it is not packed under a validated sterilisation process, and it becomes contaminated as soon as the container is opened and the batch is exposed to air. That is why a preservative is still required, and why the bench still has to be clean. Water activity, not only water content, decides whether microbes can grow: a formula with high water activity and a weak preservative system is the highest-risk product on the bench. Record the water grade and the lot in the batch record, because a complaint months later cannot be investigated without them.

Handle the water container like a raw material, not like a utility. Date it when it is opened, keep it lidded between uses, and pour into a clean jug rather than dipping a beaker into the stock. Do not store it in an open bucket beside the sink, and do not refill a commercial water bottle from the tap and put it back on the shelf. If the water is cloudy, has particles, or smells different from the last lot, discard it. A five-litre container that has been open for months is not the water you paid for, even if the label still looks respectable.

The choice of water grade is a formulation decision, and this book does not make it. What this book requires is that the grade stated in the formula is the grade in the jug, that the lot is recorded, and that the water is treated as a material with a shelf life. When a formula is scaled up, the water line is usually the largest mass on the sheet, so an error in the water is the easiest way to change every percentage in the batch at once. Weigh it like everything else; do not estimate it by filling to a mark on the beaker.

- 1. Read the formula and confirm which water grade it requires.
- 2. Check the supplier label for the grade and the lot number.
- 3. Date the container on opening and keep it lidded.
- 4. Pour the water into a clean, tared beaker; do not dip into the stock.

- 5. Weigh the water line rather than filling to a volume mark.
- 6. Record the grade and lot on the batch card.
- 7. Discard any container that is cloudy, particulate or off-smell.
- 8. Never top up a water container from the tap.

### **Bench example**

A salon makes a rose water toner with tap water because the distilled container is empty. Three weeks later a bottle shows a grey floating layer and a sour smell. The batch record says tap water, no lot, no preservative lot, and no pH reading. The maker cannot tell whether the problem came from the water, the fragrance, or an underdosed preservative, and every bottle from that batch has to be withdrawn. The next batch uses distilled water from a sealed five-litre container, opened that morning, lot recorded, weighed at 780.00 g for a 1000 g batch, with the preservative at the supplier's stated dose. The pH is recorded at 5.42 after 24 hours, and the batch is held as a lab sample pending a plate count and a yeast and mold count. Nothing in the second batch is different except the water and the records, and those two changes are enough to make the batch traceable and repeatable, even before the laboratory results arrive. The maker also notes that the second batch is a lab sample until the counts come back, because a clean look and a clean smell are not results.

### **CAUTION**

Distilled water is not sterile water. Do not tell a client that a product made with it is sterile, and do not skip the preservative because the water was bought sealed.

## **Water bath and the heat of an emulsion**

An emulsion is made from two phases that must reach a similar temperature before they are combined. Heat the oil phase and the water phase in a water bath at about 70 to 75 degrees Celsius, and check both with the same thermometer. A water bath gives gentle, even heat and keeps the temperature below the point where some oils oxidise. Stir the water bath itself, not only the beaker, so the heat is even around the vessel. Record the temperature of each phase at the moment of mixing, not the setting on the dial, because a dial is a setting and a thermometer is a measurement.

Never use an open flame near alcohol, solvents or fragrance. Alcohols give off vapour that can ignite at a distance, and a flame on a bench with open bottles is an accident waiting to happen. Use a hot plate or a water bath in a ventilated area, and keep containers closed when they are not in use. If a formula contains a flammable solvent, remove the ignition source from the room, not just from the bench. A fire extinguisher within reach is part of the setup, not an optional extra, and a small fire blanket and a lid for the water bath belong beside it.

Do not fill a beaker more than about two-thirds for a hot phase. Hot liquid expands, and a beaker that is too full will spill when it is lifted or stirred. Use tongs or heat gloves, and put the hot beaker on a heatproof pad, not on a paper towel or a cold stone surface. Do not put a hot beaker straight into cold water, because thermal shock can crack the glass and spill the batch. Add boiling water to the bath

slowly, and keep the bath level below the rim of the beaker so water cannot run in. Check the bath level before switching on, not after the beaker is hot, because adding water to a hot bath is its own splash risk.

Measure the temperature of the product, not the wall of the vessel. A probe resting against the glass can read several degrees low, and a batch combined at 60 degrees when the record says 72 will not emulsify the same way. Hold the probe in the middle of the phase, wait for the reading to hold, and write it down. If the two phases differ by more than a few degrees, wait rather than pouring; a cold phase into a hot phase shocks the emulsifier and can leave a grainy or split batch that no amount of stirring will repair.

- 1. Set up the water bath on a stable, heatproof surface.
- 2. Heat the water phase and the oil phase in separate labelled beakers.
- 3. Stir the bath so the heat is even around both vessels.
- 4. Check the temperature of each phase with a clean probe.
- 5. Bring both phases to about 70 to 75 degrees Celsius.
- 6. Record both temperatures at the moment of combining.
- 7. Stir gently until the emulsion is uniform, then remove from the heat.
- 8. Cool on a heatproof pad, loosely covered, and never in cold water.

#### **Bench example**

A maker heats 150 g of oil phase and 250 g of water phase in two beakers in the same water bath. The bath is set to 75 degrees Celsius, but the dial is not the measurement. The oil phase reads 71 degrees and the water phase reads 68 degrees, so the maker waits four minutes and reads again: 73 and 72. The phases are combined at those temperatures, and both numbers go on the card with the time. The emulsion turns white and uniform after two minutes of gentle stirring. A second maker, in a hurry, combines at 58 and 74 degrees because only the water phase was checked. The batch looks fine for ten minutes, then shows a thin oily ring at the rim and a grainy texture after cooling. It is kept as a lab sample, not filled, and the record says the phases were 16 degrees apart at combine. The first batch is repeatable; the second is a lesson written in the deviation column. The second batch is not offered to a client, and the deviation is written on the same card as the temperatures, so the record explains the fault without anyone having to remember it.

#### **CAUTION**

A dial setting is not a temperature. If the probe has not been in the product, the number on the card is a guess and the batch cannot be repeated.

### **Cool down before fragrance and preservative**

Fragrance and many preservatives are volatile or heat-sensitive. Add them after the emulsion has cooled below about 40 degrees Celsius. Above that temperature, fragrance notes flash off and the

smell changes; some preservatives lose activity, and the product may fail a challenge test even though the label shows the right percentage. Cool with gentle stirring rather than putting a lid on a hot beaker, because a lid traps condensation and the water that runs back into the batch is unmeasured. Measure the temperature in the product, not at the side of the vessel, and wait for the reading to hold before adding anything.

A cool-down that is too fast can cause the emulsion to split or thicken unevenly. Stir slowly and let the air and the water bath do the work; do not drop ice into the product and do not plunge the beaker into cold water. Once the temperature is below 40 degrees Celsius, add the heat-sensitive items one at a time and stir until each is fully dispersed before the next. Record the temperature at each addition, because the difference between 38 and 45 degrees is the difference between a fragrance that survives and one that does not. If the batch is already thick, stirring faster will not recover the lost note; it will only add air, which is another defect on the same jar.

If you miss the window and the batch has already thickened, do not reheat it to fix the problem. The damage is done, and a reheat adds a new risk without removing the old one: the emulsion may split, the preservative may lose more activity, and the record now has an unplanned heat cycle. Keep the batch as a lab sample, note the temperature at addition, and start again with a fresh batch if the product is meant for a client. A reheat is sometimes possible for a simple oil blend, but it is a formulation decision, not a bench correction.

The order of additions matters as much as the temperature. Water-soluble actives usually go in before the cool-down, oil-soluble ones with the oil phase, and heat-sensitive preservatives and fragrance at the end. Follow the formula's phase list rather than your own preference. If the formula does not state an addition temperature, ask the person who owns the formula; do not choose one because the batch feels cool to the back of the hand. A hand is not a thermometer, and a batch at 45 degrees can feel comfortable while it is still too hot for the fragrance. When in doubt, wait another five degrees and read again; the batch will not be harmed by ten extra minutes of gentle cooling, and the fragrance will be.

- 1. Remove the batch from the heat when the emulsion is uniform.
- 2. Stir slowly and cover loosely to keep dust out.
- 3. Measure the product temperature with a clean probe.
- 4. Wait until the reading is below 40 degrees Celsius and holds.
- 5. Add the heat-sensitive preservative first, with gentle stirring.
- 6. Add the fragrance next and stir until dispersed.
- 7. Record each temperature, the time, and the actual mass added.
- 8. Never reheat a batch to recover a missed addition window.

### **Bench example**

A maker adds a citrus fragrance to a lotion at 55 degrees Celsius because the batch looks cool and the schedule is running late. The fragrance smells sharp and disappears within a day, leaving a faint oily note. A second batch is cooled to 38 degrees, checked with a probe held in the middle of the vessel, and the fragrance is added at that temperature. The smell holds for the length of the trial. The two batches use the same fragrance at the same 0.30%, which is 1.50 g in a 500 g batch, but the first was dosed at 55 degrees and the second at 38. The record for the first batch shows the temperature, so the failure can be explained rather than blamed on the fragrance supplier. The second batch is held for a patch test and a lab sample, and the maker writes the target addition temperature on the formula card so the next person does not have to remember it. The maker also writes 'add fragrance below 40 C' on the formula card, so the next batch does not depend on the same memory.

### **CAUTION**

Fragrance added to a hot batch is not a stronger product; it is a weaker one with an unrecorded loss. Cool below 40 degrees Celsius and measure the product, not the air.

nandunai.com

## Clean, Disinfect, Sterilise



### Three words that are not synonyms

Cleaning, disinfection and sterilisation are three different processes, and using the words loosely leads to false claims. Cleaning removes soil, oil and product film with detergent and warm water, followed by a rinse and drying. Disinfection uses a chemical to reduce the number of microorganisms on a surface that has already been cleaned. Sterilisation is a validated process that kills a defined microbial load, and on a salon bench that means an autoclave cycle or another validated method, not a pan of boiling water. A surface cannot be disinfected if it is dirty, because the soil protects the organisms and consumes the chemical.

Seventy percent alcohol is the usual bench disinfectant. The water in the dilution slows evaporation and helps the alcohol penetrate the cell, so the surface stays wet for the contact time, often 30 to 60 seconds. 99% alcohol evaporates too fast to hold that contact time and is less effective on a surface, even though it sounds stronger. Alcohol on a dirty bench moves the soil around and leaves it spread over a larger area. Wipe the surface clean first, then apply 70% alcohol and let it stay wet for the stated time, then let it air dry or wipe with a clean paper towel.

A boiling pan is not sterilisation. Boiling is hot water and it kills some vegetative organisms, but it does not kill bacterial spores and it is not a validated cycle with a recorded temperature and time. Do not call a boiled jar sterile, and do not put that word on a label or in a message to a client. If a process genuinely needs sterilisation, it needs an autoclave with a validated cycle, a indicator or record, and someone trained to run it. A salon making a normal cosmetic batch does not need sterile equipment; it needs clean, disinfected equipment and a closed routine.

The order is always clean, then disinfect, then, only if required, sterilise. Skipping the first step wastes the second, and skipping the second makes the third impossible. Keep the three words separate in the batch record as well. Write 'cleaned with detergent and rinsed' when that is what happened, and write 'wiped with 70% alcohol, 60 seconds wet' when that is what happened. A record that says 'sterilised' when the jar was rinsed in hot water is not a small exaggeration; it is a false statement about a process that nobody performed. Use the same plain words in a message to a client: cleaned and disinfected is honest, and sterile is a claim that needs a validated cycle behind it.

- 1. Remove visible product and soil with detergent and warm water.
- 2. Rinse with distilled water so no detergent film remains.
- 3. Dry on a clean rack or with a clean paper towel.
- 4. Wipe the surface with 70% alcohol and keep it wet for the contact time.

- 5. Let the surface air dry before putting anything on it.
- 6. Use an autoclave only for a validated cycle, with a record.
- 7. Never describe boiling water as sterilisation.
- 8. Write the actual process in the batch record, not a stronger word.

### Bench example

A maker fills four 50 g jars for a trial. The jars are washed in warm water with detergent, rinsed with distilled water, and left upside down on a clean rack to dry. The lids are washed and dried separately. The bench is wiped with detergent, then with 70% alcohol, and left wet for a full minute before the jars are placed on it. The spatula is washed, rinsed, dried, and wiped with alcohol. The maker writes in the record: jars washed and rinsed, bench and spatula wiped with 70% alcohol for 60 seconds. A colleague asks whether the jars are sterile, and the answer is no: they are clean and disinfected, which is what a normal cosmetic batch needs. The batch is filled, labelled with the batch code and the date, and held as a lab sample. If the process had needed sterile jars, the jars would have gone through a validated autoclave cycle with a record, and the record would say so. The record is signed, and the words match what was actually done, which is the only standard that matters when someone asks later how the jars were prepared.

### CAUTION

Do not use the word sterile for a washed jar, a boiled pan, or an alcohol wipe. If there is no validated cycle and no record, the word is false.

## The bench workflow

A bench workflow is a sequence, not a list of good intentions. Start by clearing the bench so that only the batch, the tools and the record are on it. Wash beakers, spatulas and jars with detergent and warm water, rinse with distilled water, and dry them on a clean rack or with a clean paper towel. Clean the bench surface, then wipe it with 70% alcohol and let it stay wet for the contact time. Wipe the outside of every container that comes onto the bench, because a dusty drum carried from a storage shelf brings contamination with it. Tie hair back, remove jewellery from the hands, and keep food, drink and the phone away from the work area.

Wash your hands before the batch, then use 70% alcohol or clean gloves. Gloves are not a substitute for hand washing, and a glove that has touched a phone, a door handle or a bin is no cleaner than the hand inside it. Change gloves when they tear, when they are visibly soiled, and between handling raw materials and handling clean jars. Use a new spatula for each container, and never put a used spatula back into a bulk jar. Fingers never go into a bulk jar; pour or scoop with a clean tool into a secondary container, then close the bulk container before doing anything else.

The bench does not need to be sterile for a normal cosmetic batch, but it does need to be clean, disinfected and closed to dust and fingers. Keep the work area free of clutter and wipe up spills immediately, because a spill is both a slip hazard and a microbial niche. Do not use a dishcloth on the bench and then on a beaker; use separate cloths or paper towels for surfaces and for glassware. Do

not dry glassware with a used towel. Do not store a beaker upside down on a dirty mat, and do not put a lid on a warm jar and stack it, because condensation inside the jar grows things.

At the end of the batch, clean as you go rather than leaving everything for the next morning. Wash the beakers, spatulas and the scale pan, empty and dry the water bath, and wipe the bench. Put the batch record, the calculation sheet and the retention sample together in one place. A bench that is clean at the start of the next batch is a bench that was cleaned at the end of the last one, and the habit is easier to keep than a deep clean after a problem. Record the cleaning in the bench log, with the date, the time and who did it.

- 1. Clear the bench of everything not needed for the batch.
- 2. Wash glassware and tools with detergent and warm water.
- 3. Rinse with distilled water and dry on a clean rack.
- 4. Clean the bench, then wipe with 70% alcohol and keep it wet.
- 5. Wipe the outside of every container that comes onto the bench.
- 6. Wash hands, then use 70% alcohol or fresh gloves.
- 7. Use one clean spatula per container and never reuse it in bulk stock.
- 8. Clean the bench and the equipment at the end, and log the cleaning.

### Bench example

A maker starts a 500 g lotion at nine in the morning. The bench holds a balance, two beakers, a thermometer, a spatula, the record and the raw materials. The phone is in a drawer, the tea is in the office, and the hair is tied back. The glassware was washed and dried the evening before; the maker wipes the bench with detergent and then with 70% alcohol, leaving it wet for a minute. A new spatula is used for the preservative, a second for the fragrance, and both are washed at the end rather than being put back in the jars. At 11:40 the batch is filled into four jars, and by noon the bench is clear, the water bath is empty, and the record is signed. A visitor arrives and puts a coffee cup on the bench beside the record; the maker moves it to the office and wipes the spot, because the rule is not about the coffee but about what a full cup does to an open batch. At the end of the day the sink is clean, the cloths are washed and dried, and the bench is clear for the next batch, which is the point of doing the work in the same order every time.

### CAUTION

A cloth that wipes the bench and then a beaker spreads soil to clean glass. Use separate cloths or paper towels, and wash hands after handling waste.

## A cleaning schedule that holds

A cleaning schedule is only useful if it names the item, the frequency and the method. The bench surface is cleaned and wiped with 70% alcohol after every batch, fully cleared and cleaned weekly, and cleaned immediately when soiled. Beakers and spatulas are washed, rinsed and dried after every batch, checked for cracks weekly, and rewashed at once if they are chipped. The scale pan is wiped

after use and never washed under running water, because water in the body of a balance ends the balance. The water bath is emptied and dried after use and cleaned weekly, and the fridge is wiped for spills and checked for temperature.

Jars and lids are kept lidded and dust-free, wiped on the outside weekly, and cleaned immediately if they are soiled. Store them upside down on a clean tray or in a closed cupboard, not on an open shelf where a delivery box has been resting. Do not keep a bucket of disinfectant for a week and top it up; mix fresh, because a bucket that smells of old cloth is a microbial culture, not a cleaning solution. Do not use alcohol on a wet or dirty surface and call it disinfected, because the water dilutes the alcohol and the soil protects the organisms.

Some habits matter more than the schedule. Do not use a dishcloth on the bench and then on a beaker. Do not dry glassware with a used towel; air-dry it or use a clean paper towel. Do not store a beaker upside down on a dirty mat, and do not put a lid on a warm jar and stack it. Do not keep food in the same fridge as raw materials, and do not eat at the bench. These are small decisions that decide whether the batch starts clean, and they cost nothing except attention. Write the ones that are easy to forget on the schedule itself, so the sheet teaches the habit rather than assuming it.

Review the schedule quarterly and after any incident. If a batch shows a contamination sign, the first questions are about the cleaning record, the water, the preservative and the jars, in that order. A schedule that nobody signs is a schedule that nobody follows. Keep it short enough to complete, specific enough to check, and visible on the wall rather than buried in a folder. When a new person joins the bench, walk them through the schedule on their first batch; a verbal handover is not a training record. The walk-through takes fifteen minutes and prevents the same questions from being answered differently by two people, which is how a cleaning routine drifts.

- 1. Write the item, frequency and method on one page.
- 2. Clean the bench surface after every batch and weekly in full.
- 3. Wash and dry glassware after every use, and check for cracks weekly.
- 4. Wipe the scale pan; never put water into the balance body.
- 5. Empty and dry the water bath after use, clean the tank weekly.
- 6. Keep jars and lids lidded and store them in a closed cupboard.
- 7. Mix fresh disinfectant rather than topping up an old bucket.
- 8. Sign the schedule and review it quarterly and after an incident.

### **Bench example**

A two-person salon keeps a one-page cleaning sheet on the wall beside the bench. The morning maker signs the bench wipe, the glassware wash and the water bath empty. The evening maker signs the floor, the bins and the fridge check. On a Thursday a jar from a Monday batch shows a swollen lid, and the record is pulled. The sheet shows the bench was wiped at 09:10 and the jars were washed on Sunday and stored in the cupboard. The water container was opened on the Monday and dated. The preservative was weighed at the supplier dose. The likely cause is a jar that was filled while still warm and lidded before it cooled, and the batch is quarantined while a lab sample is arranged. The schedule did not prevent the fault, but it made the investigation possible in ten minutes instead of a week, which is the practical value of writing down what was done. The incident is written up in three sentences, and the schedule is changed so that a warm jar is never lidded, which is the only useful outcome of a failed batch.

### **CAUTION**

A cleaning bucket that is topped up for a week is not a disinfectant. Mix fresh solution, use it, and discard it; old cloth in old water grows organisms.

nandunai.com

## Protective Equipment



### Goggles, gloves and the apron

Protective equipment is chosen for the task, not for the look of the bench. Goggles are needed when handling acid, alkali, hot phases or any powder that can splash or dust; safety glasses are not enough for a splash, because they leave the sides of the eye open. Nitrile gloves are a good default for cosmetic work, and they need to fit so that you can still feel a spatula. Change them when they tear, when they are dirty, and between raw materials and clean jars. Closed shoes and an apron are for caustic or hot work, and a mask is needed when weighing powders that dust, or when the supplier sheet says so.

Gloves are not a substitute for hand washing, and they are not a licence to touch your face. A glove that has been in a bulk jar, on a phone, or on a door handle is contaminated on the outside, and everything it touches afterwards is contaminated too. Wash hands before gloving, change gloves when they are soiled, and take them off without touching the outside with a bare hand. Keep nails short and do not wear rings or a watch on the bench, because both trap material and tear gloves. If a glove is torn during the batch, stop, remove it, wash hands, and put on a new pair before touching anything else on the bench.

Check the equipment before the batch, not during it. Goggles should be clean enough to see through, with an intact strap. Gloves should be the right size and within their date. The apron should be dry and unfastened at the back so it comes off quickly if something spills. The eye wash bottle should be full and in date, and you should know where the nearest tap is. An eye wash that is empty when it is needed is worse than no eye wash, because it was counted as protection. Replace the bottle when it is past its date, and write the check on the batch card so the next maker does not have to trust the shelf.

Store personal protective equipment away from the raw materials. Goggles that have been lying face down on a bench are dirty on the inside, and gloves that have been kept in a hot drawer may be brittle. Keep a spare pair of gloves and a spare pair of goggles in a closed box, and replace the eye wash when it passes its date. The cost of this equipment is small compared with the cost of a splash, and the habit of wearing it is easier when it is always in the same place. A hook beside the bench and a closed box for spares costs little and removes the excuse that the goggles were somewhere else.

- 1. Read the supplier safety sheet before opening a new raw material.
- 2. Put on goggles and nitrile gloves before handling acid, alkali or hot phases.
- 3. Wear closed shoes and an apron for caustic or hot work.
- 4. Use a mask when weighing powders that dust.

- 5. Check that the eye wash is full and in date before starting.
- 6. Change gloves when torn, soiled, or between raw materials and clean jars.
- 7. Remove gloves without touching the outside with a bare hand.
- 8. Wash hands after removing the equipment and before leaving the bench.

### **Bench example**

A maker opens a bottle of concentrated sodium hydroxide to adjust the pH of a 400 g gel. The bottle is kept below eye level and closed between uses. The maker puts on goggles and nitrile gloves, checks that the eye wash is full, and adds the alkali drop by drop with a clean pipette, stirring and checking the pH between drops. A drop lands on the bench and fizzes on a trace of water; the maker wipes it with plenty of water and a paper towel, then cleans the area again with detergent. No skin contact occurs. A second maker, working without goggles because the bottle was small, receives a splash at the inner corner of the eye while opening the cap. The eye is rinsed at the eyewash for fifteen minutes and the person is taken for medical review. The batch is abandoned. The difference between the two outcomes is not skill; it is whether the equipment was on before the bottle was opened. Both makers write the lesson in the bench log, one as a near miss and one as an injury, and the salon adds a rule that the bottle is opened only with goggles on.

### **CAUTION**

Safety glasses are not goggles. If the task can splash sideways or from below, only sealed goggles protect the eye.

## **Acid into water, never the reverse**

Concentrated acid goes into water, not water into a large volume of concentrated acid. The heat of dilution can spit and boil, and a sudden addition of water to acid can send hot liquid out of the vessel. Add the acid slowly, with stirring, into the water, and keep the vessel on a stable surface at a height where you can see into it. Wear goggles and gloves, and have the eye wash ready before the bottle is opened. If the mixture becomes too hot, stop and let it cool rather than adding more acid to finish quickly. Keep the bottle capped between additions and stand it on a tray, so a tip-over does not become a spill across the bench.

Concentrated sodium hydroxide is caustic. It damages skin and eyes on contact, and the damage can be delayed, so a splash that feels mild at first may blister later. Keep the bottle closed, labelled and below eye level, and never store it in an unmarked container. Use a clean dry scoop for pellets and a clean pipette for solution, and never return unused material to the stock bottle. A pellet that falls on the bench should be picked up with a dry tool, not a wet cloth, and the area should then be wiped with plenty of water. Store pellets and solutions on separate shelves, and never put a wet scoop into a pellet bottle, because the moisture starts a reaction in the stock.

If product or a raw material gets into an eye, rinse with plenty of water and get medical help. If it gets on the skin, rinse with plenty of water and remove any contaminated clothing. Do not attempt to

neutralise a splash on skin with another chemical, because the neutralisation reaction produces its own heat and can add a thermal burn to a chemical one. Do not write a first-aid lecture beyond rinse and seek help; the point of the bench rule is to prevent the exposure, and the response is water and medical review. Keep a written note of the product and the time of exposure for the medical assessment, and record the incident in the bench log afterwards.

Store acids and alkalis apart from each other and away from fragrance, alcohol and oxidisers. A bottle that leaks in a cupboard with another reactive material is a problem that starts before anyone opens it. Keep the supplier label on the container, and if a label is damaged, re-label the container with the name, the hazard and the date. An unlabelled bottle of clear liquid is not identifiable by smell or by look, and it should not be used. These storage rules are part of the same protective system as the goggles. A shelf that is checked for leaks once a month is part of the same system, because a leak found late is a fume and a corrosion problem.

- 1. Put on goggles and gloves before opening concentrated acid or alkali.
- 2. Place the vessel on a stable surface and check the eye wash.
- 3. Measure water into the vessel first.
- 4. Add the acid slowly, with stirring, into the water.
- 5. Stop if the mixture becomes hot and let it cool.
- 6. Keep bottles closed, labelled and below eye level.
- 7. Rinse any splash with plenty of water and seek medical help.
- 8. Never neutralise a skin splash with another chemical.

#### **Bench example**

A maker needs a dilute acid solution for a pH adjustment. The instruction says to add the acid to water. The maker measures 90 g of distilled water into a beaker, puts on goggles and gloves, and adds 10 g of concentrated acid slowly with a glass rod, stirring between additions. The beaker warms noticeably but does not boil, and the maker waits for it to cool before use. A colleague who reverses the order, adding 10 g of water to 90 g of acid, sees the mixture spit and crack the beaker, and a drop lands on the bench. Nobody is hurt, but the batch is abandoned and the bench is cleaned with plenty of water. The record for the successful preparation states the order, the masses and the fact that the solution was allowed to cool, which is exactly the information the next maker needs to repeat it safely. The record also notes that the acid was added to the water and not the reverse, which is the detail an investigation would look for first. It is written in the same record, not in a separate note.

#### **CAUTION**

Never add water to concentrated acid. The heat of dilution is local and violent; the acid goes into the water, slowly, with stirring.

## **Spills, waste and the bench log**

A spill is handled in a fixed order. Stop and keep people back. Put on goggles and gloves if they are not already on. For an acid or an alkali, neutralise only if you have the correct neutraliser and know the reaction; if not, dilute with plenty of water and wipe from the outside in. For an oil, cover with absorbent paper and then clean the floor with detergent so the next person does not slip. For a fragrance or a solvent, ventilate the area and keep ignition sources away. Put the waste in a closed bin rather than down the sink unless the supplier says the sink is allowed, and write the spill and the cleanup in the bench log.

Do not use a paper towel on concentrated acid and then squeeze it. Do not mix a spill with another chemical to neutralise it unless you know the products of the reaction. A bucket of water is the default for a small aqueous spill, and absorbent material is the default for an oil. If the spill is large, or if the material is unknown, leave the area and get help rather than improvising. The cost of stopping is a few minutes; the cost of a bad reaction is much higher. If the spill is larger than a small puddle, or the material is unknown, leave it, ventilate, and call for help rather than experimenting.

Waste needs a route before the batch starts. Know which materials can go down the sink, which go into a closed chemical waste container, and which go into the general bin. Empty fragrance bottles, solvent residues and any material with a hazard label do not belong in the general bin or the sink without checking. Keep a labelled waste container with a lid, and do not fill it past a safe level. A waste container that is open on the bench is a spill waiting to happen and a source of vapour in the work area. Check the local rules for the sink before pouring anything down it, and keep the waste container away from heat and ignition sources.

Record every spill, however small, with the date, the material, the amount if known, what was done, and who did it. The log is not a punishment; it is how a pattern is found. Three small spills of the same material in a month point to a storage or handling problem that a single incident would hide. Review the log at the monthly bench check, and change the storage or the tool if the same spill keeps happening. The aim is a bench where the same accident does not have a second chance. The same log records the near misses, because a spill that was caught before it reached the floor is still information about how the bench is arranged.

- 1. Stop work and keep other people away from the spill.
- 2. Put on goggles and gloves before approaching.
- 3. For acid or alkali, dilute with water unless you have the correct neutraliser.
- 4. For oil, cover with absorbent, then wash the floor with detergent.
- 5. For solvent or fragrance, ventilate and remove ignition sources.
- 6. Put waste in a closed, labelled container, not the sink.
- 7. Clean the area again and check that it is not slippery.
- 8. Write the spill, the material, the cleanup and the time in the log.

### **Bench example**

A 200 mL bottle of fragrance oil slips from a shelf and breaks on the floor. The maker stops, moves a client away from the area, opens the window and turns off the hot plate. Gloves are put on, the glass is picked up with tongs and placed in a rigid container, and the oil is covered with absorbent paper. The floor is washed twice with detergent and left to dry, and the room is ventilated for an hour before anyone works there again. The spill is written in the log with the time and the material, and the shelf is checked: the bottle had been stored on the front edge, in front of a larger drum. The next week the shelf is fitted with a lip and the bottles are moved back. The log entry from the first spill is what makes the second one preventable, and the change is recorded on the same page. The shelf lip is recorded in the log as the corrective action, so the next review can see whether it worked and whether another spill followed.

### **CAUTION**

Never squeeze a paper towel that has absorbed concentrated acid, and never mix an unknown spill with another chemical to neutralise it. Water first, then help.

nandunai.com

## The Batch Record



### What the record must carry

A batch record is the written account of one made quantity of product, and it has to be complete enough for someone else to repeat the batch. It starts with the date, the product name and a unique batch code, then the batch size in grams. Every material is listed with its INCI name, the supplier, and the lot number if one is printed. The target grams and the actual grams sit side by side, so a difference is visible without arithmetic. The phase, the temperature at combining, the time mixed, the final pH and its temperature, the maker's name and the number and size of jars filled are all part of the same page.

The record also carries the things that went wrong. A dropped spatula, a second pH adjustment, a longer heat than planned, a substitution because a material ran out: each is written at the time, with the time. A record with no deviations is not necessarily a good record; it may be a record that was written from memory at the end. The point of the deviation column is not blame. It is that the next maker can see what changed and decide whether the change mattered. A batch that was made twice, once with a deviation and once without, may not behave the same in a stability trial.

Attach the calculation sheet and the pH readings to the record rather than copying only the final numbers. The calculation shows how each gram was derived, and the pH readings show whether the number was stable or drifting. If a premix was used, record its strength, its lot and the grams taken. If water was weighed, record the grade and the container lot. These details look excessive until a client reports a reaction or a jar changes colour, and then they are the only way to find out which material, which lot and which day are involved. A copied pH value without the temperature is half a measurement, because pH changes with temperature and a reading at 25 C cannot be compared with one at 40 C.

Sign and date the record, and keep it with the retention sample from the same batch. The retention sample is the physical evidence; the record is the description. One without the other is much less useful. Keep both for at least the shelf life claimed plus a margin, and longer if the product is still on a client's shelf. Store the record where it can be found by batch code, not in a pile ordered by date, because the first question in an investigation is always which batch, not which day. File by code, with the retention sample beside the record, and keep the file dry and away from sunlight so the ink and the sample both survive.

- 1. Enter the date, product name and a unique batch code.
- 2. Write the batch size in grams and the phase list.

- 3. List every material by INCI name with supplier and lot.
- 4. Record target grams and actual grams on the same line.
- 5. Record temperatures, mixing times, final pH and the pH temperature.
- 6. Record the jar count, the pack type and the fill mass.
- 7. Note every deviation with the time it happened.
- 8. Sign, date, and attach the calculation sheet and pH readings.

### Bench example

A 200 g test batch of an oil-in-water lotion is recorded on one page. The batch code is 20261025-01, the product is 'O/W lotion, test', and the batch size is 200.00 g. Phase A lists aqua 140.00 g, glycerin 6.00 g and a chelating agent 0.10 g, with the supplier and lot for each. Phase B lists the oil, the emulsifier and the thickener, with target and actual grams. The phases are combined at 72 degrees Celsius, recorded at 08:40, and mixed until 08:55. The cool-down is recorded at 38 degrees, and the preservative is added at that point, 1.00 g actual against a 1.00 g target. The final pH reads 5.21 at 25 degrees Celsius. Four 50 g jars are filled, and the note says 'no split at 24 h; pH 5.18 at 24 h'. The maker signs, and the calculation sheet is stapled behind the page. A second maker can read the page and repeat the batch without asking a question, which is the test the record is meant to pass. The page is dated at the start and signed at the end, and the difference between those two times is the batch.

### CAUTION

A record written after the jars are filled is a reconstruction, not a record. Write each value at the bench, while the beaker is still on the scale.

## Write during the batch, not after

The record is written during the batch, in ink, on the sheet that belongs to that batch. Values are entered as they are read, not collected in memory and transferred later. Memory is good at the shape of an event and poor at the third decimal place, and a pH recalled an hour later is a guess. Keep the record at the edge of the bench, out of splash range but within reach, and put the pen with it. A record that lives in a drawer is a record that gets written at the end, and a record written at the end always looks cleaner than the batch was.

Every batch gets a unique code. Date plus a sequence number is enough: 20261025-01, 20261025-02. Do not reuse a code because the product is the same, and do not code by product name alone, because there will be several batches with the same name. The code goes on the record, on every jar, on the retention sample and on any lab sample. If a code is written incorrectly, do not overwrite it; strike it once, write the correct code beside it, and initial the change. An overwritten number is unreadable and looks like a concealment even when it is only a slip.

Record the actual mass even when it is wrong. If a target of 10.00 g became 10.02 g, write both and note the difference. If the difference is outside the limit set for that material, write what was decided: continue, adjust another line, keep as a lab sample, or discard. The decision and its reason are part of

the record. A record that shows only the target is not a record of the batch; it is a record of the plan. The plan and the batch diverge at the bench, and the divergence is the information that matters later. The deviation note should be short enough to write in the moment and specific enough to be understood a year later, with the time and the decision.

Scale changes need the same discipline. If a formula is made at half size or double size, the record still carries the percent and the grams for that batch. Do not copy an old record and change only the batch size, because the other numbers will not have been recalculated. Write the new gram column from the percentages and check that it sums to the new batch size. A copied record with a changed date is the most common way a small error becomes a repeated error, and it is entirely avoidable with a fresh calculation sheet. Write the new batch size at the top and recalculate every line, even the water, because a copied water figure is the most common error in a scale change.

- 1. Keep the record and a pen at the bench before the first weighing.
- 2. Write each value as it is read, not from memory afterwards.
- 3. Assign a unique batch code before the batch starts.
- 4. Strike through an error once, write the correction, and initial it.
- 5. Record the actual mass beside every target.
- 6. Write each deviation, the time, and the decision taken.
- 7. For a scale change, recalculate every line from the percentages.
- 8. Sign and date at the end, and file the record with the retention sample.

### **Bench example**

A maker starts a 500 g body cream at 09:00. The record is on a clipboard at the end of the bench, and the batch code is 20261025-02. At 09:20 the thickener is weighed at 4.02 g against a target of 4.00 g, and both numbers are written. At 09:35 the water bath overshoots to 78 degrees, and the note says 'held 3 min at 78, cooled to 73 before combine'. At 10:05 the pH reads 5.60 against a target of 5.30, and a citric acid solution is added in three steps, with each mass and each pH reading on the sheet. At 10:30 the batch is filled into ten 50 g jars, and the maker writes the jar count and the fill mass. At the end the maker signs and attaches the calculation sheet. Two weeks later a jar shows a slight separation, and the record shows the heat overshoot and the three pH adjustments, which is exactly the sequence the investigation needs to see. The record is filed with the retention sample the same afternoon, and the maker initials the file entry so the chain from jar to page is complete.

### **CAUTION**

Do not rewrite a record to make it look tidy. A crossed-out number with an initial is honest; a clean copy made later is not a record of what happened.

## **A weak record and how to fix it**

A weak record has recognisable features. It says 'water, oils, emulsifier, preservative' with no INCI names and no grams. It has a target list and no actual weights. It says 'pH ok' with no number and no temperature. It reuses a batch code, so two jars cannot be told apart. It says 'made more' or 'added a little' without a mass. It has no name, no date and no signature, and it was clearly written after the jars were filled. Each of these is fixable, and the fix is the same: write the missing value at the bench, for the next batch, and treat the existing batch as less well documented than it is.

The test of a record is simple. Give it to another maker, with the same raw materials, and ask them to repeat the batch. If they can weigh the same masses, reach the same temperature, and check the same pH without asking a question, the record is finished. If they have to ask what 'a little' means, or which preservative, or whether the water was distilled, the record is a draft. Run this test on your own record before a client or an inspector does, and fix the gaps while the batch is still fresh in memory. A record that passes this test is worth more than a longer record that nobody can follow, because the test measures whether the information is usable.

Retention matters as much as completeness. Keep a sample of every batch in the same pack, with the same lid, at the same storage condition, for at least the shelf life claimed plus a margin. Write the make date and the discard date on the retention jar. If the product is a water-containing formula that has not passed a challenge test, the retention period is short, often 7 to 14 days, and the record should say so. A retention sample that has been opened, used, or stored on a sunny shelf is not a retention sample. Write the storage condition on the record as well, because a sample kept in a warm cupboard tells a different story from one kept cool and dark.

When a complaint arrives, the record is how the batch is found. The batch code on the jar leads to the record, the record leads to the raw material lots, and the lots lead to the supplier. Without the code, the investigation starts from nothing. With the code, it starts from a page. This is why the code is written on the jar as well as the record, and why the record is filed by code. The paperwork is not for the inspector; it is for the day a client says the cream changed, and the answer has to be more precise than 'it was fine when it left'.

- 1. Read the last record and list every missing value.
- 2. Replace vague words with masses, temperatures and times.
- 3. Give every batch a unique code and write it on every jar.
- 4. Add the INCI names, supplier names and lot numbers.
- 5. Add the actual masses and the pH with its temperature.
- 6. Attach the calculation sheet and the pH readings.
- 7. Keep a retention sample in the same pack with a discard date.
- 8. Test the record by asking another maker to repeat the batch from it.

### **Bench example**

A salon's folder holds twelve records for the same hand cream. Six say 'pH ok', four have no batch code, and two list 'preservative' without a name or a mass. A client reports that a jar from July developed a sour smell. The jar carries no code, so the record cannot be matched; the folder has three July batches, and all three records are incomplete. The salon cannot tell whether the fault was the preservative lot, the water, or the jar. The next batch starts a new sheet: code 20261025-03, every material by INCI name, supplier and lot, actual masses, pH 5.44 at 24 degrees Celsius after 24 hours, ten jars, retention sample with a discard date of 20261108. The record is tested by asking a second maker to repeat a 100 g trial from it; the trial matches within 0.02 g on every line. The old records are kept, not discarded, but the new sheet is the standard from that day. The old records stay in the file with a note that they are historical, so nobody mistakes them for a template to copy.

### **CAUTION**

A record with no actual masses cannot answer a complaint. If the jar and the record cannot be matched by code, the batch is untraceable however good the product was.

nandunai.com

## The Patch Test



### A screen, not a clearance

A patch test is a personal tolerance screen. It tells you whether one person's skin reacted to one sample on one site over two days. It does not test for microbes, stability, or legal status, and a quiet patch is not a safety certificate. The method is small on purpose: about a 1 cm square on the inner forearm, intact skin, no cut, no rash and no eczema. Apply a small amount of the product, leave it uncovered unless the supplier says otherwise, and read the site at 24 hours and again at 48 hours. Record the site, the product, the batch code, the times and what you saw.

The inner forearm is used because it is convenient, relatively protected, and easy to read. It is not the face, and a product that is quiet on the forearm may still sting near the eye. That is why a patch test is not a green light for a new product on a client's face; it is one filter among several. Do not patch on the face first, do not patch two products on one square, and do not patch a product that has not passed the bench checks and the microbial work if it contains water. A patch test on a poorly preserved cream tests the cream and the contamination at the same time, which is not a useful experiment.

A patch test on a client with a known reaction history, broken skin, or a known allergy is not a useful screen. Refer that client to a doctor rather than using the patch to prove the product is safe. The same applies to a client who has reacted to a similar product before, or who is using a prescribed topical treatment on the site. The patch test is not designed to challenge a known allergy, and a reaction on such a client is predictable rather than informative. Record the referral in the same way as a test result, with the date and the reason, so the decision not to patch is visible if the client asks later.

Write the result even when it is clear. 'No reaction at 24 and 48 hours' is a record. 'Fine' is not, because it does not say when it was checked or what was looked for. If the client cannot return for the 48-hour read, say so and treat the test as incomplete rather than passed. A single read at 24 hours misses delayed reactions, and a delayed reaction is exactly the kind a patch test is meant to catch. The two reads are the minimum, and a test with only one read should not be described as complete, even if the first read was clear.

- 1. Confirm the product has passed the bench checks before patch testing.
- 2. Choose intact skin on the inner forearm, with no cut or rash.
- 3. Mark about a 1 cm square and note left or right.
- 4. Apply a small amount of one product and leave it uncovered.
- 5. Record the product, batch code, site, date and time.

- 6. Read the site at 24 hours and write what you see.
- 7. Read again at 48 hours and write the result.
- 8. Refer any client with a reaction history instead of testing.

### **Bench example**

A client agrees to try a new lotion before it is offered in the salon. The maker checks that the batch has passed the pH recheck and the heat screen, and that the record is complete. A 1 cm square is marked on the left inner forearm, and a small amount of batch 20261025-01 is applied at 10:15 on Monday. The site is left uncovered. At 10:00 on Tuesday the maker reads it: no redness, no swelling, no itch. At 10:00 on Wednesday the read is the same. The record says 'left inner forearm, 1 cm, batch 20261025-01, applied 10:15 Mon, read 24 h clear, read 48 h clear'. The client is told that this means she tolerated the sample on that site for two days, not that the product is safe for everyone or that it has passed a laboratory test. A second client with a history of eczema on the arms is not patched; she is referred, and the salon does not use her as a test site. The form is signed by the maker and kept with the batch record, and the client is told the result in plain words rather than being shown a tick.

### **CAUTION**

A quiet patch does not prove the jar is free of bacteria, stable, or legal to sell. It is one person's tolerance on one site for two days.

## **Running the patch test**

Run the test the same way every time, or the results cannot be compared. Choose the site, clean it gently and let it dry. Mark about a 1 cm square with a skin-safe marker, and write down which arm and where. Apply a small amount of the product, roughly the size of a grain of rice for a cream, and spread it thinly inside the square. Do not cover it unless the supplier's instructions say to cover, and do not wrap it in cling film, because occlusion changes how the product behaves and can produce a reaction that would not happen in normal use.

One product at a time. Two products on one patch tells you nothing about either, and if a reaction appears you cannot tell which one caused it. If several products need testing, use separate sites with at least a few centimetres between them, and label each site on a diagram. Do not test a product on broken skin, and do not test on skin that has been shaved, waxed or treated with an acid in the previous 24 hours. The skin barrier needs to be intact for the test to mean what it is supposed to mean. If two products must be compared, use two sites, two forms, and two batches of product, and keep them far enough apart that a reaction cannot spread from one to the other.

The client should keep the site dry and avoid scrubbing it, and should not apply another product over it. Give written instructions for what to do if it itches or burns: wash it off with water and contact the salon. Do not tell the client to 'see how it goes' for two days if there is swelling or blistering; that is a stop signal, not a data point. The maker should be reachable during the test period, or the test should

not start before a weekend or a holiday. Give the client a number to call and a time by which to call it, and write both on the instruction card so the advice does not depend on memory.

Record the test in a form that can be read later. The fields are product name and batch code, site, size, date and time applied, the 24-hour reading, the 48-hour reading, the result, the action and a signature. A photograph is useful if the client agrees, but the written description is the record. If the client misses a read, write 'not read' rather than leaving the field blank, because a blank looks like a clear result to the next person. Keep the form with the batch record, not in a client file alone, because the batch record is where an investigation will look first.

- 1. Clean the site gently and let it dry completely.
- 2. Mark a 1 cm square and record the arm and position.
- 3. Apply one product thinly inside the square.
- 4. Leave it uncovered unless the supplier says otherwise.
- 5. Give written instructions for itching, burning or swelling.
- 6. Read at 24 hours and record what you see.
- 7. Read at 48 hours and record the result and the action.
- 8. File the form with the batch record and keep a copy.

### **Bench example**

A maker prepares to patch test a cream with a new fragrance. The site is the right inner forearm, cleaned and dried, marked with a 1 cm square. The product is applied at 11:00 on Thursday, and the client is given a card that says to wash it off and call if it burns, swells or blisters. At 11:00 on Friday the site is read: a faint pink area at the edge of the square, no swelling, no itch. The maker records 'mild redness at edge, 24 h' and asks the client to return the next day. At 11:00 on Saturday the redness has settled and there is no itch. The result is recorded as 'mild transient redness, settled by 48 h', and the action is 'do not use on the face; refer for a second opinion before any further trial'. The batch is not offered to clients on the strength of this patch; it goes for a lab sample instead, and the form is filed with the batch record. The maker also records that the site was not covered and that the client kept it dry, because both details change how the result should be read.

### **CAUTION**

Do not cover a patch with cling film unless the supplier instructs it. Occlusion changes penetration and can turn a quiet product into a reacting one.

## **Reading a reaction and what to do**

A clear patch means no visible change and no itch at either read. It says that this person tolerated this sample on this site for 48 hours. It does not say the product is safe for every person, and it does not say the batch is free of microbes. Mild redness that settles may be irritation rather than allergy, but it is still a warning: do not put the product on the face, and do not treat a second patch as a clearance.

Itch, swelling or a raised patch is a stronger signal: wash it off, do not use the product, and refer if it spreads or does not settle. A blister or a spreading rash needs medical help.

Wash the site with water if there is any reaction, and do not apply a soothing product over it without advice, because that adds a second variable. Record what you see in plain words: redness, raised area, itch, swelling, blister, spread. Note the time the reaction appeared and whether it changed between the reads. A reaction that appears at 48 hours but not at 24 is a delayed reaction and is important; a reaction that is present at 24 and gone at 48 may be irritation. Neither is a diagnosis, and the record should not pretend to be one. If the client sends a photograph, keep it with the form and note the date it was taken, but do not use the photograph instead of a written description.

The hair-colour patch test is a different test, run according to the brand's instructions, usually 48 hours before a colour service. Do not mix the two methods, and do not use a cosmetic cream patch as a substitute for a colour patch. Colour products contain different chemistry and have their own instructions, including where to apply and how long to wait. If a client has reacted to a colour before, the answer is not a bigger patch; it is a referral and, where the brand requires it, no service. Keep the brand's instruction sheet with the service record, and follow its timing rather than a salon habit that has drifted over the years.

A patch test is not a marketing tool. Do not tell a client that a product is 'patch tested and safe' as though that were a guarantee. Say what was done: a small amount was applied to the inner forearm and read at 24 and 48 hours, with no reaction. That is an accurate sentence. Anything stronger is a claim the test cannot support, and it invites a problem the salon cannot answer when a different client reacts. The honest sentence is short and specific, and it protects both the client and the salon when a different person reacts to the same product.

- 1. Read the site in good light and compare it with the surrounding skin.
- 2. Write plain descriptions: redness, itch, swelling, blister, spread.
- 3. Record the time each sign appeared and how it changed.
- 4. Wash off any product that burns, itches or swells.
- 5. Do not apply another product to the reacting site.
- 6. Refer a spreading rash or a blister for medical help.
- 7. Mark the test incomplete if the 48-hour read is missed.
- 8. Use the brand's own method for a hair-colour patch test.

### **Bench example**

A client returns at 48 hours with an itchy, raised patch exactly the size of the marked square. The maker washes the site with water, records 'raised, itchy area, 1 cm, appeared between 24 and 48 h', and advises the client to see a pharmacist or doctor if it spreads. The product is not used again on that client, and the batch is flagged in the record. A second client has faint redness at 24 hours that has gone by 48; the maker records 'mild redness 24 h, settled 48 h, no itch', marks the result as irritation rather than allergy, and does not put the product on the face. A third client cannot attend the 48-hour read, so the form says '48 h not read, test incomplete', and the salon does not describe the test as passed. In all three cases the record is written the same day, and none of the results is turned into a claim about the product. The three forms are filed together, and the batch record carries a note that one client reacted and two did not, which is the full picture rather than a selection of it.

### **CAUTION**

A patch test that is described as 'passed' when the 48-hour read was missed is a false record. Write 'incomplete' and do not rely on it.

nandunai.com

## Ready for an Outside Lab



### The checks before a sample leaves

A sample goes to a laboratory only when the bench work is finished and documented. The first check is that the formula adds to 100.00%, with every line in grams and the water line closing the total. The second is that the preservative is at the supplier's stated dose and inside the legal ceiling, with the actual mass and the delivered percentage recorded. The third is that the pH is inside the target and has been rechecked after 24 hours, because a pH that drifts overnight is a different product by the time it reaches a client. The fourth is that there is no split, graininess or oil ring after the heat screen. The fifth is that the sample is packed in the final jar, with the final lid and the final fill mass, because a lab result on a different pack is a result for a different product. The sixth is that the batch record is complete.

If any one of those six fails, the sample is not ready. A formula that sums to 100 but has the preservative below the supplier dose will fail a challenge test, and sending it wastes the test and the sample. A pH that was measured once and not rechecked may be outside the target by the next morning, and a stability trial started on that sample is a trial of the wrong product. A split after heat is a formulation fault that the lab cannot fix, and a record with a missing lot number cannot be linked to the raw materials that were used.

The order of the checks matters only in that the cheap ones come first. The formula sum and the record review cost nothing. The pH recheck costs a day and a few grams of sample. The heat screen costs a few days. The lab tests cost money and time, and they should be the last step, not the first. A maker who sends a sample to find out whether the formula adds to 100 is paying a laboratory to do arithmetic that belongs on the batch card. Spend the cheap checks first, and let the laboratory answer the questions that only a laboratory can answer, with a sample that is already known to be well made.

Write the checks on a release sheet with a date, a result and an initial for each. The sheet stays with the record. When the lab report comes back, the release sheet shows what state the sample was in when it was sent, which matters if the result is borderline. A sample that was already changing at the time it was packed cannot be rescued by a good report, and a sample that was clean and stable at packing gives a result that can be interpreted. Sign the release sheet, date it, and file it with the record; a check that was done but not written down is a check that cannot be shown.

- 1. Confirm the formula sums to 100.00% in grams.
- 2. Confirm the preservative is at the supplier dose and under the ceiling.
- 3. Recheck the pH after 24 hours and record it with temperature.

- 4. Run the heat screen and confirm there is no split or grain.
- 5. Pack the sample in the final jar with the final lid.
- 6. Complete the batch record, including lots and actual masses.
- 7. Fill in the release sheet with a date, result and initial.
- 8. Only then book the laboratory tests.

### **Bench example**

A maker has a 300 g batch of face cream ready for a laboratory. The release sheet is checked line by line. The formula sums to 100.00%, and the water line is 231.30 g, which matches the batch mass minus the other lines. The preservative is at 0.80%, inside the supplier's range of 0.50 to 1.00%, and the actual mass is 2.41 g against a target of 2.40 g. The pH was 5.38 at combine and 5.36 after 24 hours, both at 25 degrees Celsius. The heat screen at 45 degrees for four weeks shows no split, no grain and no colour change. The sample is packed in two 50 g final jars with the final lids, labelled with the batch code, the date and the tests requested. The record includes the raw material lots and the deviation note for the 0.01 g overshoot. The lab is booked for a total plate count, a yeast and mold count, and a challenge test, and the release sheet is signed the same day. The release sheet is the last page of the record, and it is the page that says the sample was fit to send, not merely available to send.

### **CAUTION**

Six checks are not a menu. If one fails, the sample stays on the bench; a laboratory cannot test a formula problem out of a jar.

## **The three tests and what they mean**

The total plate count estimates the general bacterial load in the sample at the time of test. A low count means the batch was made cleanly and the preservative is holding at that moment. A high count means the batch, the water, the jars or the handling introduced organisms, and the product should not be sold. The count is a snapshot, not a prediction, and a good result on one batch does not clear a changed supplier, a changed formula or a changed pack. The test method and the acceptance limit come from the laboratory and the applicable rules, not from this book.

The yeast and mold count looks for fungal contamination, which a general plate count may not show well. Mould can grow slowly and appear weeks after filling, especially in a product with high water activity and a preservative system that is strong against bacteria but weak against fungi. A yeast and mold result above the laboratory's limit is a stop signal for the batch, even if the plate count looked acceptable. The two tests are read together, because a product can pass one and fail the other. Read the counts with the pH and the water activity, because those three numbers together describe the environment the organisms had to survive.

The challenge test is the proof that the preservative system holds. The laboratory inoculates the product with a defined mix of organisms, then measures how well the system reduces them over a set period. A pass means the preservative can cope with a reasonable microbial challenge in that formula

and that pack. A fail means the system is underdosed, incompatible with another ingredient, or defeated by the pH or the packaging. A challenge test is not a guarantee for every batch; it is evidence that the system works when the formula and the process are followed. If the challenge test fails, the answer is a formulation change, not a larger dose of the same preservative added at the bench without re-testing.

Stability can run in parallel with the microbial work, and it does not replace it. A stable product can still be contaminated, and a clean product can still separate. The lab report is one input to a release decision, not the decision itself. A pass on one batch does not clear a formula change, a raw material change, a new pack or a new supplier. When any of those change, the questions start again, even if the old report was good. Write the scope of each report on the release sheet, so nobody later assumes it covered a lot or a pack that it never saw.

- 1. Ask the laboratory which tests it recommends for the product type.
- 2. Send enough sample for the test and a repeat.
- 3. Request a total plate count for the general bacterial load.
- 4. Request a yeast and mold count for the fungal load.
- 5. Request a challenge test for the preservative system.
- 6. Run stability in parallel, not instead of the microbial work.
- 7. Read the report against the laboratory's stated limits.
- 8. Treat a pass on one batch as evidence, not as a permanent clearance.

#### **Bench example**

A salon sends two samples from the same 300 g batch. The first is tested for a total plate count and a yeast and mold count, and both are reported below the laboratory's limit. The second is put through a challenge test, and the report says the preservative reduces the test organisms as required over the test period. The salon reads the report with the batch record: the preservative was at 0.80%, the pH was 5.36, and the sample was in the final jar. The batch is released for a limited trial. Six months later the supplier of the fragrance changes the carrier, and the salon wants to use the new lot. The old report does not cover the new material, so a new sample is made and sent for the same tests. The old report is kept, but it is not used to clear the new batch, because the formula's inputs changed. The release sheet for the second batch records the new lot numbers and the new date. The second release sheet notes the new fragrance lot and the new test date, and the old report is filed as history rather than as current evidence.

#### **CAUTION**

A plate count, a yeast and mold count and a challenge test answer different questions. Do not treat one passing result as though it covered the other two.

## **Packing and sending a sample**

Packing a sample for a laboratory is part of the test. Use a clean, leak-proof container: a screw-cap jar or a bottle with a seal, not a snap-lid pot that can open in transit. Fill enough for the test and a repeat, and ask the laboratory for the volume before you fill. Label the outside with the batch code, the date, the product name and your contact, and put the same information on a label inside the outer bag in case the outer label is damaged. Keep the sample cool in transit and do not leave it in a hot car or on a sunny loading dock.

Send the batch record, or a copy of the relevant page, with the sample. The laboratory needs to know what it is testing, the preservative and its dose, the pH, and the pack. If the sample arrives without that information, the laboratory may test it correctly and still leave you unable to interpret the result. Ask for a written report rather than a verbal pass, and check that the report names the sample, the batch code, the tests and the limits. Do not invent an accreditation number or a method number, and do not copy one from another report. Ask the laboratory what it needs in writing, and keep that reply with the record, so the sample and the request are documented together.

Keep a retention sample from the same batch, in the same pack, stored the same way. If the laboratory result is unexpected, the retention sample is what allows a repeat test or an investigation. Store it with the record and the release sheet, and write the discard date on the jar. Do not open the retention sample to smell it or to show a client; once it is opened it is no longer a retention sample. If a client asks to see the product, use a separate jar from the trial stock, not the retained one. Write the retention sample's location on the record, because a sample that cannot be found is the same as no sample when a question arrives.

Keep the courier receipt and the laboratory's acknowledgement with the record. If a sample is lost or delayed, the receipt is how the chain is traced. Do not send a sample late on a Friday without checking the laboratory's receiving hours, because a sample that sits in a depot over a weekend is not the sample you packed. A laboratory result is only as good as the sample that arrived, and the sample is your responsibility until it is received. If the laboratory reports a problem with the sample on arrival, write that down too, because a result from a compromised sample is not a result.

- 1. Ask the laboratory for the sample volume and the container type.
- 2. Use a clean, leak-proof jar or bottle with a seal.
- 3. Label the outside with batch code, date, product and contact.
- 4. Add a second label inside the outer bag.
- 5. Keep the sample cool and out of direct sun in transit.
- 6. Send the batch record or the relevant page with the sample.
- 7. Keep the courier receipt and the laboratory's acknowledgement.
- 8. Store a retention sample from the same batch with a discard date.

### **Bench example**

A maker packs two 100 mL samples of a toner for a laboratory. The jars are new, screw-capped and sealed with tape, and each is labelled with the batch code, the date, the product name and the salon's phone number. A second label with the same details goes inside the outer bag. The batch record page is printed and placed in a plastic sleeve, with the preservative, the pH and the pack type highlighted. The samples are packed with a cool pack in an insulated box, and the courier is booked for a Monday morning so the box does not sit in a depot over a weekend. The receipt is kept, and the laboratory acknowledges receipt by email the same day. A retention jar from the same batch stays in the cupboard with a discard date written on the lid. When the report arrives three weeks later, the batch code on the report matches the code on the record, the release sheet and the retention jar, and the result can be read against the sample that was actually sent. The evidence file for that batch is complete: release sheet, courier receipt, acknowledgement, report and retention jar in one place.

### **CAUTION**

Do not open a retention sample to check the smell. Once the seal is broken it is no longer evidence, and a repeat test needs an untouched jar.

nandunai.com

## Premix and Tiny Weights



### When the addition is too small to weigh

Every formula has a smallest line, and that line decides whether the batch can be made accurately at the size written. If the addition is under about 0.50 g, a 0.01 g balance is working at the edge of what it can defend: a target of 0.05 g is five digits of display and one or two digits of real confidence. There are only two honest answers. Make a larger batch, so the same percentage becomes a weighable mass, or make a premix, so a larger mass of a diluted stock delivers the small amount of active. Both answers are recorded; neither is a workaround hidden in the notebook.

A larger batch is the simpler answer when the product will be used anyway. At 0.10%, a 50 g batch asks for 0.05 g, which is too small, while a 500 g batch asks for 0.50 g, which is weighable. The cost is that five hundred grams of a trial product may be more than the salon can use before it expires, and a large batch of a formula that is still being tested is a large amount of waste if the formula fails. The batch size should be chosen from the smallest line and the realistic use of the product, not from the size of the largest beaker.

A premix is usually the better answer because it keeps the batch small. A small mass of the active is diluted in a weighed vehicle, and a larger mass of that mixture is weighed into the batch. The vehicle has to be compatible with the active and with the formula: water for a water-soluble preservative, an oil or a glycol for an oil-soluble material, and never a vehicle that reacts with the active or grows organisms on the shelf. A premix is a small batch in its own right, so it needs its own label, its own date and its own record, even when it is made in a 30 mL beaker.

Not every material should be premixed. A preservative that is supplied as a ready-made solution is already a premix, and diluting it again may take it below its effective dose. A fragrance is not water-soluble and will not make a useful aqueous premix. A material that is light-sensitive or volatile may lose activity during the extra handling. The formulation book decides whether a premix is suitable for a given ingredient; this book decides how to weigh it, how to record it and how to subtract the vehicle from the batch. If the formulation book cannot say whether a premix is suitable, the batch waits; a guess at the bench is not a substitute for that decision.

- 1. Identify the smallest line in the formula and its target mass.
- 2. Compare the target with the balance's reliable range, about 0.50 g and above.
- 3. If it is below the range, choose a larger batch or a premix.
- 4. Check with the formulation book that the material can be premixed.
- 5. Choose a compatible vehicle and record its grade and lot.

- 6. Weigh the active and the vehicle into a tared, labelled beaker.
- 7. Record the premix strength, the date, the maker and the vehicle mass.
- 8. Subtract the vehicle carried into the batch from the batch's own vehicle line.

### Bench example

A 100 g trial toner needs a preservative at 0.10%, which is 0.10 g. The maker's balance reads 0.01 g, and 0.10 g is only ten display steps, so the decision is between a 1000 g batch and a premix. The salon does not need a kilogram of toner, so the maker builds a premix. A 10.00 g quantity of a 10% premix is made from 1.00 g of preservative and 9.00 g of distilled water, stirred until clear and labelled 'preservative premix 10%, 20261025, made by A'. To deliver 0.10 g of active, the maker weighs 1.00 g of the premix:  $1.00 \times 10 / 100 = 0.10$  g. The batch's water line is reduced by the 0.90 g of water that arrived inside the 1.00 g of premix, so the batch still weighs 100.00 g and the preservative is still 0.10%. The record shows the premix strength, the grams used, the water credit and the delivered percentage, and the remaining premix is discarded at the end of the day rather than kept for next month. The premix is not kept for the next batch, and the record says so, because a water-based premix made on Monday is not the same material on Friday.

### CAUTION

A premix does not create accuracy by itself. If the premix is weighed on the same balance at 0.20 g, the small-mass problem has only moved one step back.

### Building a premix with the arithmetic shown

A premix is defined by its strength, and the strength is a mass fraction just like any other percentage. Ten grams of active made up to 100 g with vehicle is a 10% premix; one gram of active with nine grams of vehicle is also 10%, because the total is ten grams. Write the strength as a percentage and as grams of active per gram of premix, so there is no ambiguity. A 10% premix contains 0.10 g of active in every gram, which is the number used at the bench when the batch needs a small mass. Write both forms on the label, because the percentage and the grams per gram answer different questions at the bench.

The arithmetic has three steps. First, find the active mass the batch needs: batch grams multiplied by target percent, divided by 100. Second, divide that active mass by the premix strength as a decimal, which gives the premix mass to weigh. Third, subtract the vehicle carried in that premix mass from the batch's vehicle line, so the batch mass does not change. Check the result backwards: premix grams multiplied by premix strength gives the active mass, and active mass divided by batch mass, multiplied by 100, gives the delivered percentage. Do the three steps on paper before opening the premix jar, and initial each line, so a mis-typed strength is caught before anything is weighed.

Worked case one: a 200 g batch at 0.10% needs  $200 \times 0.10 / 100 = 0.20$  g of active. With a 10% premix, the premix mass is  $0.20 / 0.10 = 2.00$  g. That 2.00 g contains 1.80 g of water, so the water line drops by 1.80 g. Worked case two: a 200 g batch needs 0.10 g of active, which is 0.05%, and the same 10% premix gives  $0.10 / 0.10 = 1.00$  g of premix, carrying 0.90 g of water. Both cases are correct; the

difference is the target percentage, and writing the percentage beside the grams is what keeps them apart.

Round the premix mass to what the balance reads, and record the unrounded figure beside it. If the premix mass itself is below about 0.50 g, the premix is too weak for the job and a stronger one is needed, or the batch is too small. A 1% premix would need 20.00 g to deliver 0.20 g, which is easy to weigh but adds a lot of vehicle; a 10% premix needs 2.00 g, which is comfortable. Choose a strength that puts the weighed mass in the middle of the balance's range, not at the bottom of it. If the weighed premix mass lands below about 0.50 g, stop and choose a stronger premix rather than trusting a small number on the balance.

- 1. Decide the premix strength and write it as a percentage.
- 2. Calculate the active mass the batch needs.
- 3. Divide the active mass by the premix strength as a decimal.
- 4. Round the premix mass to 0.01 g and note the unrounded value.
- 5. Weigh the premix into a tared beaker and record the actual mass.
- 6. Calculate the vehicle carried in and reduce the batch vehicle line.
- 7. Recalculate the delivered active percentage from the actual mass.
- 8. Label the premix with name, strength, date, maker and vehicle.

#### Bench example

A maker needs 0.20 g of a preservative in a 200 g batch, which is 0.10%. A 10% premix is prepared from 5.00 g of preservative and 45.00 g of distilled water, giving 50.00 g of premix. The premix mass for the batch is  $0.20 / 0.10 = 2.00$  g, and the maker weighs 2.00 g. The water carried in is  $2.00 \times 0.90 = 1.80$  g, so the batch water line is reduced from 180.00 g to 178.20 g. The check is  $2.00 \times 10 / 100 = 0.20$  g of active, and  $0.20 / 200 \times 100 = 0.10\%$ , which matches the target. A second batch of 500 g at 0.05% needs 0.25 g of active; from the same premix that is 2.50 g, carrying 2.25 g of water. The maker writes both calculations on their own cards, with the premix lot and the date, and discards the unused premix at the end of the day because it is a water-based mixture with no preservative of its own. The maker checks the water credit twice, because a missing 1.80 g is invisible in the jar but changes every percentage in the batch.

#### CAUTION

Do not count the premix water twice. If the water line is not reduced, the batch is heavier than the formula and every percentage falls.

### Recording and storing a premix

A premix is a batch and gets a batch record. The record carries the premix name, the strength, the active mass, the vehicle mass, the total mass, the date, the maker, the vehicle lot and the active lot. It also carries the calculation that produced the strength, because the next maker needs to know whether 10% means ten grams of active in a hundred grams of premix or ten grams of a commercial

solution in a hundred grams of vehicle. Those are different mixtures, and a label that says only '10%' does not distinguish them. Write the vehicle name as well, because a 10% premix in water and a 10% premix in glycerin behave differently in the same formula.

Store a premix in a clean, labelled, closed container, and give it a short life. A water-based premix without its own preservative is a growth medium, and it should be discarded at the end of the day or, at most, kept for the next batch under refrigeration with a date and a discard time. An oil-based premix has a longer life but still needs a label and a date, and it should be checked for smell and colour before use. Never top up a premix jar with a fresh batch: empty it, clean it and make a new one, because a jar that is topped up has no reliable strength and no reliable date.

Record the premix used in the batch record, not only the active mass. Write 'preservative premix 10%, lot P20261025-01, 2.00 g, delivering 0.20 g active' so the chain from premix to batch is visible. If a later investigation asks which preservative lot went into which jar, the premix record is the link. Without it, the batch record shows 2.00 g of a material that does not appear in the formula, and the trace stops there. The premix record and the batch record should point at each other by identifier, so a reader can move from one to the other without guessing.

Do not make a premix in advance for a batch that may not happen. A premix made on Monday for a Thursday batch is a small container of material with an unknown microbial load by Thursday. Make it on the day, use it, and discard the remainder. The exception is a premix that the supplier sells as a stable stock, which comes with its own shelf life and its own instructions; that is a raw material, not a bench premix, and it should be recorded as one. If a premix must be kept, write the discard date on the jar and check it before every use, exactly as you would for a batch.

- 1. Give the premix its own record and its own identifier.
- 2. Write the strength as grams of active per hundred grams of premix.
- 3. Record the active lot, the vehicle lot and the total mass.
- 4. Label the container with the name, strength, date and maker.
- 5. Store it closed, cool and dark, with a discard date.
- 6. Discard a water-based premix at the end of the day.
- 7. Never top up a premix jar with a new mix.
- 8. Write the premix identifier and mass in the batch record.

### **Bench example**

A maker prepares a 20% premix of a thickener in glycerin for a gel. The record shows 4.00 g of thickener and 16.00 g of glycerin, total 20.00 g, strength 20%, made on 20261025 at 09:20 by A. The jar is labelled 'thickener premix 20% in glycerin, P20261025-01, 20261025, A'. For a 400 g batch that needs 0.30% thickener, the active mass is 1.20 g, and the premix mass is  $1.20 / 0.20 = 6.00$  g. The glycerin carried in is 4.80 g, so the batch glycerin line is reduced by that amount. The batch record says 'P20261025-01, 6.00 g, delivering 1.20 g thickener'. The unused premix is kept for two days in a closed jar in a cupboard, then discarded because the gel batch was cancelled. A second maker, reading the record a month later, can see exactly what the 6.00 g was and why the glycerin line is lower than the formula. The record for the cancelled batch says why the premix was discarded, so the waste is documented rather than unexplained. The date and the reason for the discard are both on the record.

### **CAUTION**

A premix with no label and no record is an unknown material. If you cannot say what strength it is, do not put it in a batch.

nandunai.com

## Raw Material Storage



### Lids, lot numbers and first in, first out

A raw material starts losing value the moment it is opened, and the record of that opening is the lot number. Write the lot on the container when it arrives, with the date received and the date opened. Keep the supplier label intact, because it carries the name, the grade, the hazard information and the lot, and a container with a handwritten name and no supplier label is already a weaker material. Close the lid fully after every use, and check that the lid seal is clean and undamaged; a lid that does not seal lets in air, moisture and dust.

Store materials first in, first out. New stock goes behind old stock, and the oldest lot is used first. This is not tidiness for its own sake: an oil that has been open for a year is a different oil from the one that arrived last month, and a preservative near the end of its life may not deliver the dose on the certificate. If a container has no date, treat it as old and check with the supplier before use. A shelf where the newest drum is at the front is a shelf that quietly uses the oldest material last.

Transfer only what you need into a secondary container. Do not decant a bulk drum into an unlabelled bottle for convenience, and do not keep a small jar of powder with a marker scrawl that could be anything. The secondary container gets the material name, the lot, the date and the initials, and it is used only for that material. When it is empty, clean it and remove the label rather than reusing it for something else, because a jar that has held one powder and now holds another is a mix-up waiting to happen. Label the secondary container before the material goes in, not after, because a full unlabelled jar is already an unknown material.

Record the lot in every batch record that uses the material. If two lots of the same oil are open at once, keep them apart and use one at a time, so a batch can be tied to a single lot. When the lot changes, note it in the record even when the supplier and the name are the same. A complaint that traces to a lot is only findable if the lot was written down, and the writing takes a few seconds at the bench. If the lot is illegible, do not guess it; ask the supplier for a copy of the certificate or the invoice before the material is used.

- 1. Write the lot number, the date received and the date opened on the container.
- 2. Keep the supplier label intact and legible.
- 3. Close the lid fully and check the seal after every use.
- 4. Place new stock behind old stock and use the oldest lot first.
- 5. Transfer only the needed amount into a labelled secondary container.

- 6. Never decant into an unlabelled bottle or a food container.
- 7. Record the lot in every batch record that uses the material.
- 8. Keep two open lots apart and finish one before opening the next.

### **Bench example**

A salon receives two five-litre drums of a base oil, one in January and one in June. The January drum is written with its lot, the receipt date and the opening date, and it is placed at the front of the shelf. The June drum goes behind it, and the rule is that the January oil is finished first. In July a batch of balm is made from the January drum, and the record shows that lot. In August a client reports that a balm smells slightly rancid. The record leads to the January lot, which was opened in February and had been in use for six months, and the supplier confirms that the lot was within its shelf life but at the end of it. The June drum is unaffected, and the next batch is made from it with a fresh opening date. Without the lot on the drum and in the record, the salon would have blamed the formula rather than the age of the oil. The shelf is rearranged so the oldest drum is at the front, and the monthly check now includes a look at every opening date.

### **CAUTION**

A container with no lot number cannot be traced. If the supplier label is gone and the lot is unknown, the material is not a batch ingredient.

### **Cool, dark, dry and no food**

Most cosmetic raw materials want a cool, dark, dry place. Heat speeds up oxidation and can melt or separate a paste; light degrades some oils, colours and vitamins; moisture turns powders into lumps and feeds microbes in anything water-based. Keep the storage area below the temperature the supplier states, out of direct sunlight, and away from the water bath, the hot plate and the window. A closed cupboard at room temperature is usually better than an open shelf above a radiator, even if the shelf looks more professional. Check the supplier's storage temperature on the label rather than assuming that room temperature is always acceptable.

Do not store food or drink with raw materials. A fridge that holds a staff lunch and an opened preservative is a fridge with two sets of contamination and two sets of smells. Keep a separate shelf, or a separate fridge, for materials that need cold storage, and label it. No food on the bench, no drink beside an open jar, and no phone resting on the weighing area. A crumb on the bench is a particle in the batch, and a coffee cup that is set down beside a beaker is a spill waiting to happen. If a fridge is shared, put the materials in a closed box with a label, and keep the box on a shelf above any food, never below it.

Fingers never go into a bulk jar. Pour or scoop with a clean, dry tool into a secondary container, then close the bulk jar before doing anything else. A wet spoon in a powder jar creates a crust and a microbial niche; a used spoon returned to a jar inoculates the whole container. Use one tool per material, and clean and dry it between uses. If a scoop is left standing in a jar, treat the top layer of that material as suspect and do not use it for a batch that matters. A jar that has been open with a

scoop standing in it should be treated as a contaminated lot until the top layer is removed and the rest is checked.

Check the storage area monthly. Look for lids that are not sealed, labels that have fallen off, powders that have clumped, oils that smell different, and containers that have leaked onto a shelf. Clean the shelf, discard anything out of date or unidentifiable, and write the check in the log. A storage area that is checked monthly is a storage area where a small problem is found before it becomes a batch problem, and the check takes less time than a single failed batch. Write the date and the initials on the log, and note anything that was discarded, so the next check can see whether the same problem returned.

- 1. Store materials below the supplier's stated temperature.
- 2. Keep them out of direct sunlight and away from heat sources.
- 3. Keep the storage area dry and the containers closed.
- 4. Keep food and drink out of the material store and off the bench.
- 5. Use a clean, dry tool for every material and never fingers.
- 6. Pour into a secondary container and close the bulk jar at once.
- 7. Check shelves monthly for seals, labels, clumps and smells.
- 8. Discard out-of-date or unidentifiable material and log the check.

#### **Bench example**

A salon stores its raw materials in a closed cupboard under the bench. The cupboard is cool, dark and away from the water bath. A new assistant puts a bag of biscuits on the top shelf because there is space, and within a week a opened bag of powder on the same shelf has absorbed a smell of biscuits and formed a crust at the top. The biscuits are removed, the crusted powder is discarded, and the shelf is cleaned. The salon then labels the cupboard 'materials only' and adds a small shelf in the office for staff food. A monthly check finds a jar of oil with a loose lid and a bottle of fragrance with a faded label; both are dealt with before the next batch. The cost of the discarded powder is small, but the lesson is recorded in the storage log, and the cupboard is no longer a pantry. The rule is written on the cupboard door: no food, no drink, no open containers, and no material without a date. The check is signed at the end of each month.

#### **CAUTION**

Do not put a wet or used spoon back into a bulk jar. One spoon can contaminate a kilogram of material and every batch made from it.

### **What to do with an unlabeled jar**

An unlabeled jar is an unknown material. It has no name, no lot, no date and no supplier, so it cannot be recorded in a batch and cannot be traced if something goes wrong. Do not use it, do not smell it to identify it, and do not taste it. Do not add it to a batch because it looks like the material you need. Two

white powders can look identical and behave very differently, and a clear liquid can be water, alcohol, glycerin or a concentrated acid. The only safe assumption is that the jar is not a batch ingredient.

Move the jar away from the working stock and label it 'unknown, do not use' with the date and your initials. If you know who opened it and when, write that on the label as well. Ask the person who bought it whether the supplier label or the invoice can be found; if the identity can be established from a document, the jar can be relabelled with the name, the lot and the date, and then used. If the identity cannot be established, discard it through the correct waste route. A jar of unidentified material is worth less than the batch it could ruin, the client reaction it could cause, or the false record it would create.

The same rule applies to a container whose label has faded, whose lot number is unreadable, or whose contents do not match the label. Do not use a material on the strength of a memory. If the jar is the last of a lot and the batch cannot be made without it, the batch waits for a new delivery. A delay is a cost; an unidentified ingredient in a product that goes on a client's skin is a risk that cannot be calculated, and it also breaks the traceability that the whole record system exists to provide. Do not relabel a container from memory or from the colour of the powder, because a wrong name is worse than no name: it looks like knowledge.

When a material is discarded, write it in the waste log with the date, the approximate quantity and the reason. This is how a pattern of poor labelling is seen. If the same material keeps losing its label, change the storage: keep it in its original container, write the name on the lid as well as the side, and stop decanting into unmarked jars. The fix is almost always a storage habit, not a better memory. A simple rule helps: write the name on the lid and on the side, and keep the original container whenever the material will fit on the shelf.

- 1. Stop and do not open, smell or taste the unknown material.
- 2. Move the jar away from the working stock.
- 3. Label it 'unknown, do not use' with the date and your initials.
- 4. Ask who bought it and whether a supplier label or invoice exists.
- 5. Relabel only if the identity can be proved from a document.
- 6. If identity cannot be proved, discard it by the correct route.
- 7. Record the discard in the waste log with the reason.
- 8. Change the storage habit that allowed the label to be lost.

### **Bench example**

A maker finds a 250 mL jar of white powder at the back of the cupboard. The label has fallen off and the only marking is a faded marker line. The powder could be the chelating agent, the thickener or a preservative, and all three are used in small amounts. The maker does not smell it, does not put a fingertip in it, and does not add it to the batch waiting on the bench. The jar is labelled 'unknown, do not use, 20261025, A' and moved to a quarantine shelf. The supplier invoice from three months earlier lists a chelating agent and a thickener, but not which jar is which, and the person who opened it cannot remember. The jar is discarded, and the salon buys a new one with the lot written on the lid and the side. The batch is delayed by two days, and the record shows why. The next delivery is stored with the label facing out and the name written on the lid, and the problem does not recur. The waste log entry is signed, and the new delivery is checked in with the lot written on the lid before it goes on the shelf.

### **CAUTION**

Never identify a material by look or smell. An unlabeled jar is not a raw material; it is waste until a document proves otherwise.

nandunai.com

## Contamination Signs



### Swollen lid, yeast smell, mould spots

A swollen lid is gas, and in a cosmetic jar the gas is usually microbial. Fermentation produces carbon dioxide, the pressure builds, and the lid domes or the jar bulges. Do not open it to see what it smells like; opening releases spores and pressure, and the contents can spray. Photograph the jar, note the batch code and the date, and move it to a quarantine shelf. A swollen lid is not a packaging fault to be fixed by pressing it down, and it is not a reason to add more preservative to the next batch without finding out what happened to this one.

A yeast smell is a sweet, bread-like, fermented or solvent-like odour that was not in the batch when it was made. It can appear before any visible change, and it is often strongest when the jar is first opened. A sour or rancid smell is different: rancidity is usually an oil problem, while a fermented smell points to microbial growth. Neither is a smell to cover with fragrance. If the product smells wrong, it is wrong, and the batch goes to quarantine while the cause is investigated. If the smell is faint, close the jar and let it stand for an hour, then smell again at the lid; a smell that grows is a stronger signal than one that fades.

Mould appears as fuzzy spots, often at the rim, under the lid, or at the water line where condensation collects. It can be white, green, blue or black, and it can start in a single spot that is easy to miss. Do not wipe it off and sell the jar. A mould spot on the surface means the organism has grown through the product, and the visible part is only the fruiting body. The whole batch is suspect, including jars that look clean, because they came from the same mix and the same filling session. Do not open every jar to check; open one, photograph it, and treat the rest as suspect until the pattern is clear.

Any of these signs means the batch is quarantined and the record is pulled. Check the water grade, the preservative dose, the pH, the jar cleaning and the fill temperature, in that order. Check whether the jars were lidded warm, whether the lids were wet, and whether the batch was left standing open during a break. The answer is usually in one of those steps, and the record is what makes it findable. If the record is missing a value, write that the value is missing rather than filling it in from memory, because an invented number is worse than a gap.

- 1. Do not open a swollen jar; photograph it and set it aside.
- 2. Note the batch code, the date and the storage conditions.
- 3. Smell carefully at the lid, not with your nose in the product.
- 4. Look for fuzzy spots at the rim, under the lid and at the water line.
- 5. Move the whole batch to a quarantine shelf with a HOLD label.

- 6. Pull the batch record and check water, preservative, pH and jars.
- 7. Keep one affected jar as evidence for the investigation.
- 8. Do not sell, sample or fragrance the batch while it is under HOLD.

### **Bench example**

A client returns a 50 g jar of cream with a lid that domes upward. The maker does not open it. The jar is photographed, labelled with the batch code 20260912-04 and the return date, and placed on the quarantine shelf. The record for that batch is pulled: the preservative was at 0.60%, the pH was 5.41, the water was distilled and dated, and the jars were washed and dried. The filling note says the jars were lidded at 42 degrees Celsius because the batch was running late. A second jar from the same batch, still in stock, is opened carefully in a well-ventilated area and shows a faint fermented smell and a small fuzzy spot under the lid. The whole batch is quarantined, the remaining jars are discarded, and the filling instruction is changed to 'cool below 35 degrees before lidding'. The record and the photographs are kept with the incident note. The client is told the batch is being investigated and is offered a replacement from a later batch, not another jar from the same one. The rest of the batch is not sold.

### **CAUTION**

Do not press a domed lid back down and put the jar back on the shelf. The pressure came from something growing, and the jar is evidence, not stock.

### **Unexpected split and pH drift**

An emulsion can split for formulation reasons: too little emulsifier, an incompatible ingredient, a cold phase poured into a hot one, or too much shear at the wrong temperature. It can also split because the preservative failed and the microbial load changed the interface. The distinction matters. A split that appears within hours of making is usually a process or formula fault; a split that appears after two weeks in a jar that was fine at filling is more likely to be a stability or contamination problem. Record when the split appeared, not only that it did. Photograph the jar at the first sign and again a week later, because a split that grows tells a different story from one that stays the same.

pH drift is a quiet sign and often the first one. A product measured at 5.40 at filling and 4.90 after a week has changed, and the change means a reaction is happening: an ingredient is hydrolysing, a preservative is breaking down, or organisms are producing acids. Recheck the pH with a calibrated meter, at the same temperature and with the same method, and compare it with the filling value on the record. A drift of a few tenths may be normal for some formulas; a drift of half a unit in a week is a question that needs an answer.

Keep a control jar from the same batch, unopened, stored beside the suspect jar. If the control has also drifted, the cause is the formula or the storage condition. If only the opened jar has drifted, the cause is more likely to be contamination introduced in use: fingers, a wet applicator, or a jar left open. This comparison is why a retention sample is kept, and why it is kept unopened. Without a control,

every change is a guess. If the control also drifts, the fault is in the formula or the storage, and the investigation moves to the batch record rather than the client's bathroom.

Do not correct a split by reheating and do not correct a pH drift by adding alkali without knowing the cause. Reheating can fix an emulsion temporarily and make the microbial problem worse; adding alkali to a drifting product may neutralise an acid produced by growing organisms while leaving the organisms in place. Both actions hide the sign that the investigation needs. Quarantine, record, and investigate. A reheated batch may look acceptable for a day and fail again in a week, and by then the record no longer describes what is in the jar. The cause, not the appearance, decides what happens to the batch.

- 1. Note the date the split or drift was first seen.
- 2. Photograph the jar and record the batch code.
- 3. Recheck the pH with a calibrated meter at the same temperature.
- 4. Compare the reading with the filling value on the record.
- 5. Keep an unopened control jar from the same batch.
- 6. Compare the opened jar with the control.
- 7. Do not reheat, re-emulsify or adjust the pH to hide the sign.
- 8. Quarantine the batch and investigate the cause.

#### **Bench example**

A lotion is filled at pH 5.42 and looks uniform. After eight days a jar in the salon's display shows a thin watery layer at the bottom. The maker pulls the record and takes an unopened jar from the same batch: it also shows a thin layer, but much less. The pH of the opened jar is 5.01, and the pH of the unopened control is 5.28. Both have moved, and the opened one has moved further. The record shows the emulsifier at the lower end of its range and the batch combined at 68 degrees Celsius, below the 70 to 75 range, because the water bath was slow. The batch is quarantined, the remaining jars are not sold, and the next batch is made with the emulsifier at the mid-range and the phases combined at 73 degrees. The control jar is kept with the record as evidence of what the batch did over time. The two pH readings and the two jars are photographed together, so the comparison is visible rather than merely described. The cause is written in the incident note, not left to memory.

#### **CAUTION**

Do not add alkali to a drifting product to bring the number back. The drift is a symptom; correcting the number can hide the cause.

### **Quarantine, and never fragrance a bad batch**

Quarantine is a physical place and a written status. The jars go on a separate shelf, in a labelled box, with a HOLD label that carries the batch code, the date, the reason and the initials of the person who moved them. The batch record is marked HOLD in the same words. Nobody uses a quarantined jar for

a client, a sample or a refill, and nobody moves it back to sale stock without a written decision that says why. A quarantine shelf that is really a storage shelf with a different name is not a quarantine. Label the shelf itself, not only the box, so a jar that is moved out of the box is still recognisably on hold.

Do not fragrance a batch to cover a smell, and do not add preservative to a batch that has already shown growth. Fragrance masks the smell for a while and does nothing to the organisms; adding preservative to a contaminated batch kills some organisms and leaves the dead ones and their by-products in the product, and the dose may still be wrong. The batch is already out of control, and the only honest routes are discard, or investigation followed by discard. A product that has shown a contamination sign is not made safe by a later addition. If a client has already used a jar from the batch, record that too, and tell them what to watch for without alarming them beyond the facts.

Investigate before discarding if the batch is valuable, because the cause matters more than the jar. Check the raw material lots, the water, the preservative dose and its lot, the pH record, the jar cleaning and the fill temperature. Look at other batches made in the same week with the same materials. If two batches share a lot, the lot is a suspect. If every batch in a week failed, the bench or the water is a suspect. Write the findings in a short incident note and keep it with the records. The incident note should be short enough to read in one sitting and specific enough to change a habit, with dates and lot numbers rather than impressions.

Discard through the correct route, in a closed container, and record the quantity. Do not pour a contaminated emulsion down the sink unless the supplier and the local rules allow it. Do not give it away, do not use it as a tester, and do not keep it 'to see what happens' beyond the single jar kept as evidence. The cost of discarding is known and finite; the cost of a client reaction from a batch you knew was bad is neither. If the local rules require a particular waste route, follow it, and keep the receipt or the log entry with the incident note.

- 1. Move the whole batch to a separate, labelled quarantine shelf.
- 2. Write HOLD on every jar and on the batch record.
- 3. Record the batch code, date, reason and your initials.
- 4. Do not use, sample, refill or sell any quarantined jar.
- 5. Do not add fragrance or preservative to a contaminated batch.
- 6. Check the lots, water, preservative, pH, jars and fill temperature.
- 7. Write a short incident note with the findings.
- 8. Discard by the correct route and record the quantity.

### **Bench example**

A maker finds mould spots under the lids of three jars from a 20-jar batch. The three jars and the rest of the batch are moved to a quarantine box with a HOLD label and the batch code. The record is marked HOLD, and the salon owner is told the same day. The maker checks the lots: the preservative lot is the same as the previous batch, which was clean, but the water container was opened three weeks earlier and had been kept on the floor beside the sink. The pH of a control jar has drifted from 5.35 to 5.12. The investigation points to the water and to the storage of the open container. The batch is discarded, the water container is replaced, and the new rule is that water is dated and kept in the cupboard, not on the floor. The incident note is two paragraphs long and is filed with the batch record; the next batch uses fresh water and passes its checks. The owner signs the incident note, and the batch record is marked 'discarded' rather than simply removed, so the gap in the numbering is explained.

### **CAUTION**

Fragrance does not fix a contaminated batch. It hides the smell, adds another material to a failed product, and delays the only correct decision.

nandunai.com

## Label and Sample Jar



### The lab jar label

A lab jar is not a retail jar, and its label says so. It carries the product name, the batch code, the date made, the pH, and the words 'lab sample, not for sale'. It may also carry the tests requested, the storage condition and the maker's initials. The label is there so that the jar can be identified months later, and so that nobody mistakes it for stock. A lab jar with a pretty label and no batch code is a jar with no history, and a jar without history is not evidence of anything. Write the storage condition on the label as well, because a lab sample kept warm is not the same sample as one kept cool.

Write the label before the jar is filled, not after. A jar that is filled and then labelled from memory is a jar that can be mislabelled, especially when several samples are filled on the same day. Use a waterproof pen or a printed label, and put the same information on the lid as on the side, so the jar is still identifiable if the side label comes off. Do not use a label that can be peeled off and moved to another jar; a loose sticker is an invitation to a mix-up. If several jars are filled on the same day, label them in the order they are filled and keep the batch record beside the filling area.

The lab label is also the instructions for handling. If the sample is for a plate count, it should not be opened before it reaches the laboratory. If it is for a pH check, it can be opened, but the reading and the temperature go on the record. If it is a retention sample, it stays closed until its discard date. Marking the purpose on the jar prevents the common mistake of using a lab sample as a tester and then wondering why there is no sample left for the test. A retention jar is the clearest example: it stays closed until its discard date, and the label says so in words that nobody can misread.

Keep the lab label plain and readable. A small jar has limited space, so use the smallest useful set of fields: product, code, date, pH, purpose and the not-for-sale line. If there is not enough room, use a tag or an outer bag with a label, and keep the full information in the record. Readability matters more than design, and a label that cannot be read in poor light is not doing its job. Print the label in a font that is legible at arm's length, and keep the same field order across products so a reader knows where to look.

- 1. Write the label before the jar is filled.
- 2. Put the product name, batch code and date on the label.
- 3. Add the pH with the temperature at which it was measured.
- 4. Write 'lab sample, not for sale' in plain words.
- 5. Add the purpose, such as plate count or retention.

- 6. Repeat the key details on the lid as well as the side.
- 7. Use a waterproof pen or a printed label that will not peel.
- 8. Keep the full details in the batch record, not only on the jar.

### **Bench example**

A maker fills four 30 g jars from a 200 g batch. Two are for a plate count and a yeast and mold count, one is for a challenge test, and one is a retention sample. Each jar is labelled before filling: 'O/W lotion, 20261025-01, 20261025, pH 5.21 at 25 C, lab sample not for sale', with the purpose written underneath, 'micro' on two and 'retention, discard 20261108' on the fourth. The lids carry the code and the date. The jars are packed in a small box with the batch record page, and the box is kept in a cupboard, not on the display shelf. When the laboratory report arrives, the code on the report matches the code on the jars and the record, and the retention jar is still closed. Nobody has used a lab sample as a tester, because the labels said what each jar was for. The box is stored with the batch record, and the retention jar is not opened when the report arrives, because the test sample and the evidence sample are separate. The labels and the record agree on every field.

### **CAUTION**

A lab sample with no batch code cannot be matched to a record. Write the code on the jar and the lid before the product goes in.

## **What a retail label needs**

A retail cosmetic label is a legal document, and the exact requirements depend on the market and the current rules. In the European Union, for example, a cosmetic label carries the responsible person, the nominal content, the batch code, the ingredients by INCI name in descending order, and any warnings. In India, the cosmetic rules set out the declarations for the product, and those rules change; the label has to be checked against the version in force at the time of packing, not against a label from five years ago. This book does not issue a label approval, and it does not replace a regulatory check.

At a practical level, a retail label needs the identity of the product, its function, the net quantity, the ingredients in descending order of mass, the business name and address, the batch code, the date of manufacture, the use instructions and the warnings that apply. The ingredient list uses INCI names and descends from the largest to the smallest, with ingredients at 1% or less allowed in any order after the 1% point in some systems, but the exact rule must be checked. Water is usually the first ingredient in a water-based product, which is why the order is informative rather than decorative.

Net quantity is the mass or volume that the consumer receives, and it has to be accurate. A jar that is labelled 50 g must contain 50 g at filling, within the allowed tolerance, and the fill mass should be on the batch record. A label that says 50 g on a jar that holds 46 g is a false declaration, even if the jar looks full. The business name and address are the identity of the seller, not a certification; they tell the consumer who is responsible, and they are not a licence number. Check the net quantity with a scale, not with the fill line on the jar, and record the check on the batch card.

Use instructions and warnings have to match the product. A product with an acid or a fragrance may need a patch-test recommendation, a warning to avoid the eyes, or a statement that it is for external use only. Do not copy warnings from another product without checking that they apply. Do not put a claim on the label that the product cannot support, such as 'sterile', 'hypoallergenic' or 'dermatologist tested', unless the process or the test actually happened and the evidence is on file. The label is the most public statement the salon makes about the product, and every line of it should be true.

- 1. Confirm the current labelling rules for the market where the product is sold.
- 2. Write the product identity and its function.
- 3. State the net quantity accurately and check it against the fill mass.
- 4. List ingredients by INCI name in descending order of mass.
- 5. Add the business name and address of the responsible seller.
- 6. Add the batch code and the date of manufacture.
- 7. Add the use instructions and the warnings that apply.
- 8. Check every claim against evidence before the label is printed.

### **Bench example**

A salon prepares a 50 g jar of face cream for sale. The label draft lists the product name and function, 'face cream, 50 g', the business name and address, the batch code 20261025-05, the date of manufacture, and the ingredients by INCI name in descending order: aqua, glycerin, a base oil, an emulsifier, a thickener, a preservative and a fragrance. The use instruction says to apply to clean skin and avoid the eyes, and the warning says to patch test before first use. The maker checks the net quantity by weighing three filled jars and confirming each is at or slightly above 50 g. The label is checked against the current rules by the person responsible, and a claim about 'dermatologist tested' is removed because no such test was done. The label is printed, applied, and a copy is kept with the batch record. Nothing on the label is stronger than the evidence behind it. The label copy is kept with the record, and the printed jar is photographed before it leaves the bench, so the label and the batch are linked.

### **CAUTION**

Do not copy a licence number, a registration number or a certification mark from another product. A number that belongs to someone else is a false statement on your label.

## **What a label does not prove**

A label describes a product; it does not approve it. The presence of a batch code, a business name or an ingredient list does not mean the product has been tested, registered or licensed. Nobody in this book is issuing a licence, a certificate or an approval, and a salon that writes a label is not thereby a licensed manufacturer. The label is the information the seller is required or chooses to give, and the responsibility for the product remains with the business that puts it on the market. If the business cannot meet the requirement, the honest response is not to sell the product in that market until it can.

Do not imply a licence that does not exist. Do not write 'approved', 'certified', 'laboratory approved' or 'government approved' unless a document supports the words and you can show it. Do not put a fake registration number in the corner to make the jar look official. If a market requires a registration or a notification, the business either completes the process or does not sell the product in that market; a label cannot substitute for the process. When in doubt, get the label and the claim checked by someone who works with the current rules. A label that looks official is not the same as a product that has been assessed, and the difference matters most when a client asks a direct question.

Claims have to match evidence at the level the claim implies. 'Patch tested' can be said if a patch test was run and the record exists, but it should not be turned into 'safe for all skin'. 'Preservative system tested' can be said if a challenge test was done on that formula and that pack, but it does not mean the product is sterile. 'Natural' and 'chemical free' are claims with legal meanings in some markets and no fixed meaning in others; use them only with advice. A claim that is technically true but misleading is still a problem. Keep the evidence for each claim in the batch file, and drop the claim if the evidence is a memory rather than a document.

Keep a copy of every label version with the batch record, and note the date the version was introduced. If the label changes, the change is recorded, and the old jars can be traced to the old label. This is the same traceability principle as the batch code: the label on the jar should lead back to a document, and the document should say what was claimed and why. A label file that is a drawer of loose stickers is not a label record. Number the label versions and write the number on the batch record, so a jar can be matched to the exact words it carried.

- 1. Do not describe a label as an approval or a licence.
- 2. Do not use 'approved' or 'certified' without a supporting document.
- 3. Do not invent or copy a registration number.
- 4. Match every claim to a test or a process that actually happened.
- 5. Keep the evidence for each claim with the batch record.
- 6. Check claims that have legal meanings in the target market.
- 7. Keep a copy of every label version with its introduction date.
- 8. Get the label checked against the current rules before printing.

### **Bench example**

A salon prints a label for a body butter and adds the words 'laboratory approved' because a lab once tested a different product from the same kitchen. The phrase is removed after a review: no report covers this formula, this pack or this batch, and the words imply an approval that does not exist. The label is reprinted with the product name, net quantity, ingredients, business name and address, batch code, date, instructions and a patch-test recommendation. The batch record holds the label version, the date it was introduced and the reason for the change. A client asks whether the product is 'certified organic'; the answer is no, and the label does not say so. The salon keeps a folder with the current label, the previous version and the batch codes that used each, so a jar can be matched to the words that were on it when it was sold. The folder is reviewed once a year against the current rules, and the review is recorded with the date and the name of the person who did it. The review is signed.

### **CAUTION**

This book does not issue a licence, a certificate or a regulatory approval. A label is a description, and the business that sells the product carries the responsibility for it.

nandunai.com

# Glossary

## Active

The ingredient that is meant to do the main job in a formula, as distinct from water, thickeners and other support materials.

## Batch

One made quantity of a product, identified by a single code and described by one batch record.

## Batch record

The written account of a batch: formula, masses, temperatures, pH, pack and maker.

## Challenge test

A laboratory test that adds a known mix of organisms to a product and measures whether the preservative system reduces them.

## Contact time

The time a disinfectant must stay wet on a surface to work as the label claims.

## Deionised water

Water with most dissolved ions removed by ion exchange. It is not necessarily sterile.

## Distilled water

Water that has been boiled and condensed, leaving most dissolved salts behind. It is not necessarily sterile.

## Emulsion

A mixture of two liquids that do not normally mix, held together by an emulsifier.

## INCI

International Nomenclature of Cosmetic Ingredients, the standard naming system used on cosmetic labels.

## Lab sample

A batch made for testing or bench checks, not for sale and not for use on a client.

## pH

A scale from 0 to 14 that describes acidity and alkalinity. It must be measured, not assumed, and can drift after a day.

## Patch test

A small controlled exposure of a product to intact skin, read at 24 and 48 hours. It is a screening step, not a safety certificate.

## Plate count

A laboratory method that estimates the number of living bacteria in a sample.

## PPE

Personal protective equipment: goggles, gloves, apron or lab coat, and closed shoes.

## Preservative

An ingredient that limits microbial growth in a product. Its dose comes from the supplier and from testing, not from preference.

**q.s.**

Quantity sufficient: the amount of a material, usually water, added to bring a formula to its final mass.

**Sterilise**

To kill or remove all microorganisms, including spores, using a validated method such as an autoclave.

**Tare**

To set a balance to zero with the empty container on the pan, so the display shows only the mass added.

**Premix**

A small, weighed dilution of a material, made so that a tiny dose can be weighed accurately and recorded with its strength.

**Quarantine**

A separate, labelled place for a batch that is on hold and must not be sold, sampled or used until a written decision is made.

**Retention sample**

An unopened sample of a batch, kept in the same pack for the shelf life claimed plus a margin, so that a later question can be investigated.

**Net quantity**

The mass or volume of product the consumer receives, declared on the label and checked against the fill mass.

**Lot number**

The supplier's identifier for one made quantity of a raw material, recorded so that a batch can be traced back to it.

**Sterilise**

To use a validated process, such as an autoclave cycle, that kills a defined microbial load. Boiling water is not sterilisation.

**Water activity**

A measure of the water in a product that is available for microbes to use, which is not the same as the water content.

**Hold**

The written status of a batch under investigation; jars stay on the quarantine shelf and the record is marked in the same words.

# References

1. [WHO Guidelines on Hand Hygiene in Health Care](#)  
Hand hygiene steps and the place of alcohol-based hand rubs in a clean routine.
2. [FDA Cosmetics](#)  
The regulatory view of cosmetic safety, labelling and responsibility for marketed products.
3. [CDC Hygiene](#)  
Everyday cleaning and hygiene guidance that separates cleaning from disinfection.
4. [FDA Summary of Cosmetics Labeling Requirements](#)  
The label fields a cosmetic carries: identity, net quantity, ingredients and the name of the responsible business.
5. [FDA Cosmetics Guidance and Regulation](#)  
The framework for claims, safety and good practice in cosmetic manufacture.
6. [ISO 22716:2007 Cosmetics - Good Manufacturing Practices](#)  
Good manufacturing practice principles for production, control, storage and shipment.
7. [OSHA 1910.151 Medical services and first aid](#)  
The requirement for suitable facilities for quick drenching or flushing of the eyes.
8. [WHO Laboratory Biosafety Manual, 4th edition](#)  
Risk-based laboratory practice, protective equipment and safe handling of biological material.
9. [CDC Disinfection and Sterilization](#)  
The difference between cleaning, disinfection and sterilisation, and the limits of boiling.
10. [FDA Allergens in Cosmetics](#)  
Why patch testing cannot guarantee that a product will never cause a reaction.
11. [Regulation \(EC\) No 1223/2009 on cosmetic products](#)  
The product safety report and the distinction between a cosmetic and a medicinal claim.