



MODERNIST · CROSS-CULTURAL · ROMAN ANCIENT + JAPANESE KOJI ·
PANTRY STAPLE · FLAVOR MULTIPLIER · UMAMI BASE

Garum Moderno · Koji- Accelerated Fermented Fish Sauce

A modernist home-made umami-concentrate — white fish trimmings + koji rice + salt + water, fermented at 60°C for 10 weeks, producing a deep-amber liquid that tastes like the most complex possible fish sauce crossed with the most intense dashi. The koji (*Aspergillus oryzae*) accelerates enzymatic breakdown of fish proteins to ~1/10 the time of traditional Roman-era garum (which took 3-6 months). Temperature-controlled in an incubator or SV bath; produces ~500 ml from 1 kg of fish trimmings. Use sparingly (5-10 drops per dish) as a flavor-multiplier; replaces fish sauce, soy sauce, or concentrated stock in dozens of applications. 10 weeks mostly-idle + 2 hours of active work; the modernist umami-stash most cooks only dream about making.

Protein Fish trimmings (any white-fleshed fish) + koji rice

Serves ~500 ml (flavor-multiplier; lasts 6+ months)

Difficulty Advanced

Active 2 h spread across 10 weeks

Total 10 weeks

The Sauce That Rome Made + The Enzyme That Accelerates It

Garum was the dominant condiment of the Roman Empire — fermented fish sauce made by layering whole fish + salt in amphorae + aging in the sun for 3-6 months. Similar sauces (liquamen) survived into the Byzantine era + reach their modern descendants in Southeast Asian fish sauce (nuoc mam, nam pla), Japanese ishiru, and Korean saeu-jeot. All follow the same principle: autolysis (self-digestion) of fish proteins via endogenous enzymes + salt-protection against pathogens, producing a deep-amber protein-rich liquid with intense umami.

The modernist adaptation (developed + popularized by the Nordic foraging-school + others from 2015 onward) uses koji — the Japanese mold *Aspergillus oryzae* grown on rice — as an enzymatic accelerator. Koji produces proteases that break down proteins ~10x faster than endogenous fish enzymes alone. Combined with temperature control (60°C warm incubation), the fermentation time drops from 3-6 months to 8-10 weeks. The result is genuinely close to the best Southeast Asian fish sauces, with a cleaner character + no muddy old-fishy notes.

The process requires patience + equipment: a container that can hold 60°C consistently for 10 weeks (SV bath + insulated cooler, or a dedicated fermentation chamber). Home cooks without SV setup can use a yogurt maker (some models hold 55-60°C) or modify a slow cooker to maintain the target temperature. The ingredients are simple + affordable: fish trimmings (often free at a fishmonger), koji rice (\$15-25 per kg online), non-iodized salt, water. The result: ~500 ml of liquid that costs ~\$15 to make but would cost \$80+ to buy at artisan quality.

Applications: 5-10 drops into any soup, braise, sauce, or sauté for instant umami depth. Replace a dash of fish sauce in Southeast Asian recipes. Add to tomato sauces, risottos, stews. Substitute for soy sauce (lighter flavor). Brush onto meats before the final fire for added savory depth. The garum is a flavor-intensifier — a few drops transform an already-good dish into a Great one. Once made, lasts 6+ months refrigerated.

Specs

<p>YIELD</p> <p>~500 ml garum from 1 kg fish trimmings + 300 g koji rice</p>	<p>INGREDIENT RATIOS</p> <p>1 kg fish + 300 g koji rice + 80 g non- iodized salt (4% total) + 600 ml water</p>	<p>TEMPERATURE</p> <p>60°C / 140°F – must hold consistently for 10 weeks</p>	<p>TIME</p> <p>10 weeks (8 weeks for less-intense version; 12 weeks for darker/deeper version)</p>
<p>KEEP</p> <p>6+ months refrigerated in sealed sterile jars</p>	<p>DIFFICULTY</p> <p>Advanced ●●●●○ (equipment + patience dependent)</p>	<p>ACTIVE TIME</p> <p>2 h spread over 10 weeks (30 min setup + weekly 10-min check-ins + strain)</p>	<p>KEY RULE</p> <p>Temperature MUST hold at 60°C consistently. Swings below 50°C allow bacterial contamination; above 65°C kill koji enzymes. This is equipment-dependent.</p>

What Changed & Why

This recipe requires specific equipment — a reliable 60°C incubator. Tier A / Tier B here is about equipment sophistication, not ingredient quality. ● Tier A (Everyday) uses a **sous-vide circulator in an insulated cooler** (Anova, Joule, Inkbird — set to 60°C, cooler retains temperature for weeks with minimal circulator usage). ● Tier B (No Limits) uses a **dedicated fermentation chamber** (commercial-grade, \$200-500 from fermentation-supply companies) or a modified wine-cooler fridge with temperature controller. Ingredients are Tier A throughout: cheap fish trimmings from any fishmonger + affordable koji rice online (**GEM Cultures** or **Cold Mountain Koji**, ~\$20/kg) + non-iodized salt. Fish: use any white-fleshed trim; cod/snapper/flounder all work. The equipment reliability is the real differentiator.

CHANGE	ORIGINAL	UMAMI VERSION	WHY
TECH	Ferment fish at room temperature for 3-6 months	Use koji as enzymatic accelerator + hold at 60°C for 8-10 weeks	Traditional garum relies entirely on endogenous fish enzymes + Lactobacillus at room temp — slow process. Koji's <i>Aspergillus oryzae</i> proteases cleave proteins ~10x faster + the 60°C temperature is optimal for protein digestion. The combination reduces fermentation time from 3-6 months to 8-10 weeks while producing a cleaner, more-refined final product. This is the modernist innovation.

CHANGE	ORIGINAL	UMAMI VERSION	WHY
TECH	Use whole fish (heads + bones + flesh)	Use fish trimmings from a fishmonger (often free)	Fishmongers clean + filet fish for their customers; the trimmings (heads, bones, tails, small flesh scraps) are often discarded or sold cheaply. These are perfect for garum — you want the whole-fish extract, not a fillet. Ask your fishmonger for 1 kg of trim; most will give it for free. Save 5-10x the cost vs buying whole fish. Freeze trim until you accumulate 1 kg.
ADD	—	Check the ferment weekly for any signs of surface mold (white/black spots floating); skim + discard immediately if present	Weekly 10-min visual check is standard practice. Surface mold (not the submerged koji) indicates contamination; skim + discard that layer + continue. If significant mold forms: discard batch + restart with better temperature control. A quality airlock + consistent 60°C temp makes contamination rare but not zero.

CHANGE	ORIGINAL	UMAMI VERSION	WHY
ADD	—	Strain through 3 layers of cheesecloth slowly (overnight drip) for clean liquid	The finished fermentation is an opaque brown slurry of fish + koji + liquid. Overnight drip through 3-layer cheesecloth (at room temp or cold) separates the clear amber liquid (garum) from the solid residue (which can be re-used — grind into fish-umami paste). Reject the urge to squeeze; the pressure pushes cloudy particles through + compromises the final product.
ELEV	Koji rice from home-brew supply	Fresh koji rice from a specialty Japanese supplier (if accessible)	Koji varies in quality. Dried grocery-tier koji is fine + widely available. Fresh koji (available from specialty suppliers near Japanese communities — unfortunately rare in Miami) is more-potent; some makers grow their own koji from spores. For 99% of home cooks, GEM Cultures dried koji or Cold Mountain (online) is completely adequate + produces excellent garum.

CHANGE	ORIGINAL	UMAMI VERSION	WHY
SKIP	Add spices, herbs, or aromatics	Four ingredients only: fish + koji + salt + water. No spices.	The power of garum is the pure fish-protein-koji-enzyme transformation. Adding spices shifts the flavor into marinade territory + produces a less-versatile ingredient. Pure garum is your base — for dishes that want specific seasonings, season the dish not the base. Keep the pantry ingredient pure + apply it strategically.

INGREDIENTS

What You Need

Everyday

The Ingredients

- 1 kg **fish trimmings** — any white-fleshed fish (cod, snapper, flounder, halibut, haddock). Free from a fishmonger; save over time in freezer until you have 1 kg.
- 300 g **koji rice** — **GEM Cultures Koji Rice** or **Cold Mountain Koji Rice** (both online, \$20-30/kg)
- 80 g **non-iodized fine sea salt** — Diamond Crystal or Morton Kosher (must be non-iodized)
- 600 ml filtered water

No Limits

The Ingredients (Tier B)

- 1 kg high-quality fish trimmings from a premium fishmonger (Casablanca Seafood or Marky's in Miami — white fish preferred)
- 300 g koji rice (fresh if sourceable, dried otherwise)
- 80 g Sal de Ibiza or standard fine sea salt (non-iodized)
- 600 ml filtered water

The Equipment (Tier B — the difference-maker)

- **Dedicated fermentation chamber** (\$200-500 from home-brew supply companies) that holds $60^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$ reliably for 10 weeks. Alternative: modified wine-cooler fridge with commercial temperature controller. Worth it for serious fermentation practice.
- Heavy-duty gallon-size glass jar with airlock lid
- Dedicated fermentation thermometer (ambient temp monitoring)

EQUIPMENT

Your Kit

- Sous-vide circulator (Anova / Joule / Inkbird) capable of 60°C stable

- Insulated cooler (20-40 L — large enough to hold 1-gallon jar)

- 1-gallon glass jar with airlock lid (or fermentation-chamber alternative)

- Fine-mesh strainer + 3 layers cheesecloth

- Kitchen scale

- Probe thermometer (for temperature verification)

- Sterile 500-ml storage jars (for finished garum)

MISE EN PLACE

Before You Start

- Fish trimmings collected + thawed (freeze-thaw in batches until 1 kg accumulated)

- Koji rice measured

- Salt measured

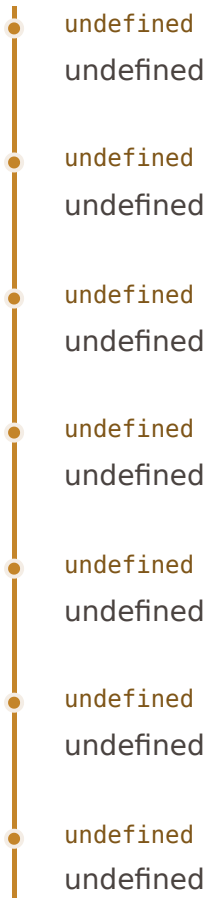
- Water measured + at room temp

- SV bath + cooler setup ready (60°C verified)

- Jar sterilized (boil 5 min)

MAKE-AHEAD

Timeline



METHOD

The Cook

1 Phase 1 · Setup + Combine — 30 minutes

1. Ensure SV bath + cooler setup is at 60°C + stable for 30+ minutes.
2. Sterilize the 1-gallon jar (boil 5 minutes).
3. In the sterile jar: combine 1 kg fish trimmings + 300 g koji rice + 80 g salt + 600 ml water.
4. Stir thoroughly to ensure salt is dissolved + ingredients are roughly combined.
5. Seal with an airlock lid. Transfer the jar to the 60°C cooler/SV setup.
6. Label with start date. Plan for 10 weeks of wait.



WHY THIS WORKS

The initial mixing provides uniform distribution of koji (the enzyme source) with the fish proteins + creates the salty-aqueous environment that favors beneficial fermentation while suppressing pathogens. The 4% total salt concentration is a compromise between safety (3%+ minimum for fish) + flavor (too salty at higher %). Sealing the jar prevents oxygen ingress + contamination; the airlock allows CO2 escape.

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Phase 2 · Fermentation + Weekly Checks — 10 weeks

1. Week 1: No visible change. Initial enzyme activity. No action needed.
2. Week 2-3: Fish pieces visibly breaking down. Water darkens to light-yellow. Weekly 10-min check: verify 60°C, check for mold (skim if present), note any smell changes.
3. Week 4-5: Fish is primarily broken down; koji rice is partially dissolved. Liquid is amber. Smell is strong but clean-fermented, not rotten.
4. Week 6-7: Deep amber liquid. Flavor clearly evolving. Taste cautiously: should be intensely umami, slightly sweet, complex.
5. Week 8-9: Darker amber liquid. Koji mostly dissolved. Flavor at peak.
6. Week 10: Ready to strain. Liquid is deep amber, smell is strong-umami-clean, flavor is intense + complex.
7. Weekly checks are essential for quality assurance. If temperature swung below 50°C or above 65°C at any point for an extended period, the batch may be compromised.



WHY THIS WORKS

Koji's protease enzymes (the key ones: kojic acid-producing proteases) cleave fish proteins into amino acids + peptides — the building blocks of umami flavor (monosodium glutamate is the most famous). Over 10 weeks at 60°C, the fish proteins convert from solid + structurally-intact to dissolved + broken-down, while the koji provides the enzymatic engine. The salt + temperature combination suppresses harmful bacteria while allowing the designed fermentation.

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Phase 3 · Strain + Store — Overnight

1. After 10 weeks: set up straining. Line a fine-mesh strainer with 3 layers of cheesecloth, placed over a large bowl.
2. Pour the fermented mixture through the cheesecloth slowly.
3. Let drip undisturbed overnight (8-12 hours). DO NOT squeeze.
4. The liquid that drips through is the finished garum — deep amber, slightly viscous, intensely umami.
5. Transfer the clear garum to sterile 500-ml storage jars (sterilized by boiling). Label with date.
6. The strained pulp (fish + koji residue) is still flavorful — grind in a food processor + use as a compound paste for marinades, or discard.
7. Keep garum refrigerated. Shelf life: 6+ months. Peak flavor in the first 2 months.



WHY THIS WORKS

The overnight drip separates clear liquid from solid residue via gravity; squeezing would push cloudy particles through + compromise clarity. The clear garum contains all the dissolved umami compounds + amino acids the fermentation generated.

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Phase 4 · Use + Application

1. Standard usage: 5-10 drops into any savory dish — soups, braises, stews, stir-fries, pasta sauces, bean dishes, grilled meats.
2. Acts as: umami multiplier (deepens existing flavors without shifting direction), protein flavor-enhancer (brings out savory notes in any cooked protein), modernist substitute for fish sauce or concentrated stock.
3. Applications: replace a splash of fish sauce in Southeast Asian dishes. Add 10 drops to tomato sauce to deepen. Brush onto steaks before final sear. Add to bean stews (fabada, callos) for 10 drops per pot.
4. Compatible with: Spanish cuisine (subtle), French cuisine (excellent), Italian cuisine (very good), Asian cuisine (compatible, varies by regional specifics), modernist/fusion cooking (ideal).
5. Not compatible with: very delicate vegetable-only dishes where the fish note would dominate; sweet-only desserts.



WHY THIS WORKS

Garum acts via the umami pathway — glutamate receptors on the tongue detect amino acids + signal savory satisfaction. 5-10 drops adds measurable glutamate without dominating flavor. The concentrated nature means small quantities go far; 500 ml of garum should last 6+ months at typical usage levels.

QUICK REFERENCE

Timing Cheat Sheet

STEP	TIME	CUE
Setup + combine	Week 1 T-0	Fish + koji + salt + water in jar; 60°C bath
Weekly checks	10 min per week × 10 weeks	Verify temp, check for mold, taste
Fermentation complete	Week 10	Deep amber, intensely umami flavor

STEP	TIME	CUE
Strain overnight	8 - 12 h	3 layers cheesecloth, no squeeze
Store	Week 1 0 T+ 1 2 h	Sterile jars, refrigerate

TROUBLESHOOTING

Emergency Protocols

 UNDEFINED

undefined

 UNDEFINED

undefined

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Technique Notes

● Universal: Koji as Enzymatic Accelerator

FERMENTATION TECHNIQUE · MODERNIST

Koji (*Aspergillus oryzae* grown on rice or barley) produces proteases + amylases that break down proteins + starches 10x faster than endogenous enzymes alone.

Applications: garum (this recipe), miso, soy sauce, sake, mirin, shio-koji marinades, accelerated fish sauces, modernist charcuterie. Master the koji-as-accelerator concept + it unlocks dozens of fermentation applications. Reference: Fermentation Encyclopedia §Koji; Ingredient Encyclopedia §*Aspergillus oryzae*.

● Universal: Roman Garum + Asian Descendants

CULTURAL LINEAGE · FISH SAUCE TRADITION

Fermented fish sauces are a universal food heritage: Roman garum (1st-4th century AD), Southeast Asian fish sauces (nuoc mam, nam pla, patis — all dating back to at least 1000 AD), Korean saeu-jeot, Japanese ishiru. All use the same fundamental mechanism: fish + salt + time + enzymatic breakdown. This recipe is the modernist adaptation that compresses the 3-6 month traditional timeline to 8-10 weeks via koji acceleration. Reference: Cultural Context §Cross-Cultural Fermentation; Ingredient Encyclopedia §Fish Sauces.

● Universal: 60°C as Protein-Breakdown Optimum

PRECISION TEMPERATURE · ENZYMATIC KINETICS

60°C is the temperature at which most protein-digesting enzymes work optimally — high enough for efficient catalysis, low enough that the enzymes themselves don't denature. Koji proteases specifically peak at 55-65°C. Below 50°C: enzymes slow to 30% activity. Above 65°C: enzymes denature + activity drops. 60°C is the compromise + the accepted standard for koji-accelerated ferments. Temperature discipline is the hardest challenge in home garum production. Reference: Food Science Core §Enzyme Kinetics; Fermentation Encyclopedia §Temperature Control.

● **Universal: SV-as-Fermentation-Chamber**

EQUIPMENT CREATIVITY · CROSS-RECIPE

A sous-vide circulator + insulated cooler is the cheapest reliable way to hold a specific temperature for weeks. Insulated cooler (5-10L) holds water + has enough thermal mass to stay at target temp with minimal SV usage (circulator runs intermittently to maintain). This setup works for: garum (this recipe), miso fermentation, tempeh production, yogurt, cured-meat drying chambers (with humidity additions). A \$200 SV + a \$30 cooler creates a fermentation chamber that rivals \$500 commercial equipment. Reference: Equipment Encyclopedia §Fermentation Chambers; Cross-Technique §SV Creative Applications.

● **Universal: Overnight Drip-Strain (Again)**

EXTRACTION TECHNIQUE · CROSS-RECIPE

Cross-reference: agua-tomate-lacto-fermentada (Batch 14 · this workspace). Same technique applies here: overnight drip through 3 layers of cheesecloth produces clear liquid. Don't squeeze. Applies to clarifications + extractions across fermentation + culinary contexts. The overnight drip is the extract-clarity technique. Reference: Extraction Encyclopedia §Clarification; Cross-Recipe §Clear Liquids.

● **No Limits: Dedicated Fermentation Chamber**

EQUIPMENT INVESTMENT · LONG-TERM PRACTICE

For anyone planning 3+ fermentation projects per year: a dedicated fermentation chamber (commercial-grade, \$200-500 from fermentation-supply companies like Northern Brewer or The Spice Lab) or a modified wine-cooler fridge with temperature controller is worth the investment. Benefits: more-reliable temperature hold, dedicated space (doesn't tie up cooler for weeks), ability to run multiple projects simultaneously, ability to handle projects that need humidity + temperature together (cured meats). For one-off garum, SV setup is fine; for a fermentation practice, dedicated equipment pays off. Reference: Equipment Encyclopedia §Fermentation Chambers; Investment Advice §Kitchen Equipment.

No Limits: Fresh Koji

INGREDIENT QUALITY · SPECIALIST SOURCE

Commercial dried koji rice works excellently for garum + is widely available (GEM Cultures, Cold Mountain online). Fresh koji (grown specifically for garum or other applications, typically by specialty makers near Japanese communities) is more-potent + produces slightly cleaner-flavored final product. Sources in the US: very limited, primarily around San Francisco or Portland Oregon. For most home cooks, dried is completely adequate. For Pablo specifically: dried is the pragmatic choice. Reference: Ingredient Encyclopedia §Koji Varieties; Sourcing §Fermentation Supplies.

PAIRING

What to Drink

Application — Seasoning Sparingly

5-10 drops per dish; apply BEFORE other seasonings to taste the base, then layer others

Start small. Garum is concentrated; 5-10 drops transforms a dish. Adding too much produces a dominant fish-sauce character; too little produces imperceptible umami. Test drops with taste assessments; find the right level for each dish.

Application — Meat Enhancer

Brush 5 drops onto steak before the final sear OR stir 5 drops into pan sauce

Garum + beef produces a restaurant-level savory depth. A small amount in pan sauce after a sear multiplies the meat's own flavor.

Application — Stew + Bean Booster

Stir 10 drops into the base of a bean stew (fabada, cocido, callos) — adds umami depth

Spanish bean stews benefit dramatically from a small garum addition. The fish character doesn't dominate; it deepens the bean/pork/vegetable base.

Application — Tomato Sauce Deepener

Add 5-10 drops to homemade tomato sauce or pasta sauce

Italian tomato sauces traditionally use anchovies or Parmesan rinds for umami; garum provides the same effect more cleanly + with less effort.

Application — Vegetable Enhancement

Add 5 drops + butter to roasted vegetables; or add to any vegetable broth as a quick umami boost

Vegetable dishes lift dramatically from garum addition. Works especially well with mushrooms, roasted Brussels sprouts, stews.

Application — Modernist Cocktail (Experimental)

Dirty martini with garum replacing olive brine: 2 oz vodka + 1/4 oz vermouth + 3 drops garum + 1 olive

Experimental + genuinely works. Garum's saltiness + umami complexity produces a more-complex martini brine. Unconventional but worth trying.

CONTEXT

Menu Ideas

Pantry Investment · 10-Week Project

Start the garum in week 1; check weekly; strain in week 10. During that 10-week period, plan 3-4 other cooking adventures (daily cooking continues). At week 10+: garum is ready + enhances everything Pablo cooks for the next 6 months.

Fermentation Education · 6-8 guests

Show off a garum batch in progress + use it in multiple dishes across a single dinner party. Use drops in: stuffed-mushroom amuse-bouche, pan sauce for the main, bean side dish, vegetable course. Let guests taste the versatility.

Cross-Cultural Restaurant-Grade · Weekly Cooking

Once garum is in the pantry, incorporate drops into ~1/3 of weekly savory dishes. The 500 ml lasts 6+ months + represents the single biggest leverage ingredient in modernist home cooking.

YOUR NOTES

Cook Log

Session Notes

Date: _____ · Serves: ____ · Rating: __ / 5

Use this space to record what you changed, what worked, and what you'd do differently next time. Your future self will thank you.



Stop following recipes. Start understanding food.

