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Spices in Mesopotamian Food

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Abstract

The world's oldest culinary recipes exist in the form of clay tablets from ancient Babylonia dating to the 18th century BCE. In this talk, Patricia Jurado Gonzalez, Gojko Barjamovic and Pia Sørensen from Harvard University will introduce the history and science of the recipes, as well as their team's efforts interpreting and reproducing them. Their work follows an experimental approach and draws on expertise from their team's collective backgrounds in Assyriology, the life sciences, and culinary practice and history. Join us for this deep dive into culinary history — you may even come away knowing how to cook a 4,000 year old recipe!

The team that conducted this research includes:

- Patricia Jurado Gonzalez (Research Scholar, Harvard University),
- Gojko Barjamovic (Senior Lecturer on Assyriology, Harvard University),
- Pia Sørensen (Senior Preceptor in Chemical Engineering and Applied Materials, SEAS, Harvard University),
- Chelsea Alene Graham (Digital Imaging Specialist at the Institute for the Preservation of Cultural Heritage, Yale University),
- Agnete Wisti Lassen (Associate Curator of the Yale Babylonian Collection, Yale University),
- Nawal Nasrallah (Culinary historian, author, chef)

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Introduction

This is all about spices in Mesopotamian food, kind of. And we are going to go on a journey back in time to some of the oldest recipes literally carved in stone by exploring food in ancient Babylonia.

But: *Why food?*

I don't know if we have to convince this particular audience why we care about food. But I still think it's helpful to just take a step back and think about why this matters.

If we think about food in general, it really kind of structures society. If you think about everything from how you produce food to how that food is distributed with a transportation system, with a commerce system, how

that food is then cooked and enjoyed, it really sort of structures all of society and the entire food system.

It is also deeply connected to who we are. It kind of defines our life; everything from on an individual level to a communal level, whether it's everyday food, whether it's festive food, special occasion food, religious right food. Whether you're a commoner or a king, you have to eat every day. It affects our hierarchies, our group behavior.

It affects so much of life and of society in general — in big ways and small ways. This is true today, and it's been true all through history. So I want you to keep that in mind as we delve into this.

Ancient Mesopotamia

Our case here today is ancient Mesopotamia: the land between the two rivers, the Tigris and the Euphrates. This incredibly fertile alluvial plain where legend had it that the Garden of Eden itself was located. It is an exceptionally fertile area. Probably also, this is the very reason why this area is where the first cities and states arise.

With those first cities and states, we also get the first writing system in existence: the cuneiform writing system. What makes Mesopotamian history, and how we can write about it, so different from essentially any other type of ancient history, even up to pre-modern times, is related to this fact. Script came from there and came to be, from the beginning, to be tied into clay as a medium.

Clay & Mesopotamia

Clay in this area is ubiquitous. One could say that the whole area is made up of highly fertile clay that, aside from being really good for growing your vegetables, is excellent as a writing material.

Why is that important? Because in all other periods, in places from ancient history and up until essentially printing, the text that we have preserved are those that were either carved into stone or etched into metal because they were intended for preservation. Or they are texts that have survived through freaks of nature in various ways. Or they are texts that were intentionally copied down for posterity, be it in an Egyptian cloister or a European monastery or something along those lines.

Whereas from ancient Mesopotamia, because clay is soil, it is effectively indestructible and the writing material survives directly.

Importantly, there's no copyist, no intermediary needed. And the material being ubiquitous and extremely cheap means that a lot of people had access to the materiality of writing — they could write about all sorts of things that we normally never ever hear about in history.

As a result, we have these voices that we don't usually get in pre-modern history: the voices of women, the voices of children, the voices of the enslaved, and the voices of the poor. So we can find all these different

kinds of textual genres here that we don't otherwise typically have from the ancient world, or at least only in very small numbers. And one of these, of course, is food.

Here we have not some of the oldest, but *the oldest* food recipes as intended instructions for cooking understood. These are tablets that were written down about 4,000 years ago. We date them to around 1720 BCE now. There are three of those from Southern Iraq.

For the longest of times, they were not even recognized for what they were. It was due to a French astrologer, Jean Bottero, that they were identified in the first place as culinary texts.

There was a substantial interest in these texts from when they became known in the 1980s — and this is a continued interest with articles in the BBC and something on the radio about these. So they continue to crop up, and people are fascinated by the fact that they are the oldest recipes.

Bottero published two books offering translations and interpretations, one in French, which is scholarly, and one in English, which is more for a broader audience. And both are widely available — you could look at those if you wanted to.

Studying Clay Tablets

These indeed are also, then, recipes that fascinate us in the group here.

We have focused our attention on one particular tablet. While it's broken in one corner, enough of it is preserved that we can understand that it's a summary collection of about 25 recipes, all of those stews. And this tablet, unlike the other two, gives you brief directions and a statement at the end of the text, which then lists its contents as 21 meat stews and full-grain stews. In itself, it's interesting they have this distinction already of meat-based cuisine and vegetarian, if you wish, although not in the modern sense as they use animal fat.

Our focus is then on these texts. We'll explore some examples of recipes later on, but one thing we need to lay out now is that these texts are unique. They are very difficult to read and key terms in them were left untranslated by Bottero. This is important because, as with any food recipe, if there's one ingredient that you can't identify — then the whole dish may be totally different once you cook it without that ingredient or by putting in the wrong ingredient.

Imagine a lasagna but misreading the beef and meat, and understanding it as cauliflower. You would have a substantially different dish after that, in many ways. So this is something that we have tried with our group to understand better. We want to bridge the linguistic, the cultural, the historical gap that is between us and these texts — and hopefully get a slightly better understanding of those recipes than Bottero had.

Reading the Recipes

So how did we start this project? As people from different disciplines and from different expertises, we got together. We went to Nawal's kitchen. She is a food historian expert in Middle Eastern food traditions. That was super key in order to understand the cultural and historical context of the recipes.

And we also had in our team two formal culinary scholars. Therefore, we had an expert on cultural heritage, a scientific chef, and a chemical biologist specialized in food. We have all of these interdisciplinary approaches that were key in order to understand how to approach these recipes that were super deep with a huge historical gap.

So all in all, we're thinking the approach that we are taking is both a experimental and scientific approach and a cultural-historical approach.

Both of these have their merits and their challenges. Our hope is that by doing them together, that we're really looking at the problem from many angles and coming back to interpretations of these recipes that are as close as possible as we can get.

The Scientific & Experimental Approach

With training on the sciences: When I look at these recipes, there are certain questions that stand out. There are certain challenges. And then there are all these opportunities, all these merits that, as an experimental scientist, I want to go and do it with my hands and see what happens. So that's basically what we've done.

1. My first point here is that **cooking is an experimental science**. You can look and study recipes all you want, but you don't know how the dish tastes until you cook it. You don't know what happens and how the material behaves until you cook it. It's really experimental.
2. My second point is that **ingredients today really have the same chemical and physical properties today as they did thousands of years ago**. Biological materials are made of networks. They are primarily water. They behave a certain way when you manipulate them in certain ways. And that's the same today as it was thousands of years ago.
3. **The same is true for the various techniques that we use when we cook**. The way heat transfers through a material, especially in biological material, is the same today as it was thousands of years ago. When we make Maillard reactions happen on our steak, the chemical process is the same today as it was thousands of years ago. The same is true for fermentation, obviously. Charring, broiling, whisking, for any of these things — the process is the same.
4. A fourth point is about the human sensory experience. This really goes back to our experience as we experience the food. We can assume that **the sensory experience today is probably not so different from how it was thousands of years ago**.

5. **There are certain outer bounds to how our taste buds and olfactory receptors process this input**, even if there are cultural and personal preferences, different sensitivities, there is sort of somewhere (and maybe more so for some textures and tastes than others) some kind of outer bound for what is acceptable as food. Something that is just too bitter is just not going to be a palatable food. Something that is so hard that we can't really break into it, chew it, ingest it, and get energy from it is not going to be a very good food. And so there are these outer bounds. Within those, we can play and understand the recipes.
6. **Cultural traditions have stayed the same for centuries and for millennia**. And it is very likely that this is also true for some cooking traditions. And so by looking at how various techniques go back in time through later records, we can maybe understand something about the earliest records.

Those are the merits of this approach. And there are some challenges. None of these recipes have quantities listed. Often, the order of steps are not quite clear. So clearly, there is some implied understanding that the person who is doing this has some knowledge. It's true for these recipes, but it's also true for recipes until relatively recently, where many of the things that you do are implied — and you don't bother to write them down because the cook knows.

Then the last challenge is the challenge of ingredients. Often the translation is not entirely clear. But even in cases when we know the translation, it is not clear what part of an ingredient we're using. So let's say you mention cilantro. Well, does this refer to the leaf, the flower, the root, or the seed? It could be anything.

The Cultural & Historical Approach

This approach is, of course, where Bottero started out. He started out with what you call the [INAUDIBLE] and worked from there. What we're trying to do here is to combine the two methods, but that doesn't mean that we should not go to the cultural-historical approach. We have tried to widen out the scope of our search and look, for instance, to identify what the set of base ingredients would have been that was demonstrably in use around the time that this stuff was written down.

Here you have access to both textual sources and to archeological sources. Especially in the last three or four decades, there has been sort of an acute attention in archeology to the preservation of seeds, foodstuff, plant materials, the analyses of animal remains, bones, teeth, and stuff like that. So with all of that, you can produce a compendium of what you would have to cook in the first place.

The second thing is then to go through lexicography to actually try and see whether the ingredients that are mentioned in these recipes might turn up in other contexts. And they do sometimes, sometimes in medical recipes, sometimes in recipes for dyes or inventories of plants where they occur alongside other plants in maybe meaningful groups. This allows you to sometimes second-guess the identity of a given ingredient — or at least place it in a category.

An ingredient may turn up with legumes. Elsewhere it's used as a colorant or it's used as an antiseptic. One thing leading to the other, you can sometimes tease out meanings. Our team member Nawal, whom is a local Iraqi and a food historian, has assembled a large knowledge of local dialect and words that are still in use in the mountainous areas of Iraq, where you might find dialects that retain what are, effectively, the same words as our texts have — ancient words.

And finally, what Nawal's an expert in is medieval cooking. Basically, she has worked on two very large medieval cooking manuscripts. One of them is from Iraq, from the 11th century AD. And there you will find a couple of recipes that are astoundingly similar to some of the things that we are dealing with here. In fact, the tradition for producing stews, broths, and soups as a staple is still very much a part of Iraqi cuisine today.

All of those things can help you together with going back and forth with the experimental method to identify things. But of course, the recipes use lots of unknown terms, the terms that might survive might have shifted their meaning over time, and there can be false analogies to later practices. So we have to be very, very careful.

And in every case, we go back and also see: **Can we get something from the archeology? Can we look at the cooking wares and see what techniques they would have had? What kinds of ovens did they have at disposal? What sort of vessels would they have baked in, et cetera?**

Cooking in the Garden of Eden

We also want to know what this cuisine looked like, so: **What were the main ingredients?**

So the main ingredients are listed here in seven key groups:

1. **Cereals — bread, porridge, and beer.** The first and one of the most important groups were the cereals, since the staple food was mainly beer and bread. They basically had barley and endless amounts of wheat, sesame, millet, but mainly barley. So it was essentially fermented into bread and beer, but sometimes also into porridge as the porridge was also fermented. They had more than 300 types of bread. They had even categorized the different types of flour, depending on the size.
2. **Sweeteners.** They had a lot of access to sweeteners
3. **Meat.** They had a lot of meat. As mentioned previously, 21 one out of 25 stews were meat-based. And the fat that they would use to cook the stews was sheep tail fat — even though they had also sesame oil and other vegetable fats, they were mainly using sheep tail fat.
4. **Game, fish, crustaceans, and insects.**
5. **Dairy.** They also have some dairy. A lot of the stews, you will see that they have milk added. But they also had the sense of fermenting milk and having this yogurt called [INAUDIBLE] that was [INAUDIBLE] into sour. It was also sometimes added into the stews and we don't know if it was also as a way of thickening.

6. **Greens and herbs.** Mesopotamia has very complex flavors. You can see in other recipes a lot of herbs like cilantro, coriander, arugula, and mustard seeds. And in almost all of them, they also had leek, onion, and garlic listed together. So they also like a lot of [INAUDIBLE].
7. **Fruit, nuts, and aromatics.**

It was a very complex and sophisticated cuisine for being dated 4,000 years ago.

Culinary Taste

And we can say something about the culinary taste. There are three points that we would like to point out since this is about spices and fermentology. And so: **What is special about Babylonian food? How is it different from what you might find in an Iraqi restaurant today?**

Well, first of all, there seem to be the standard condiments that are around on any table when they eat, that are mentioned again and again in texts, which you would presumably combine with, for instance, your stews according to taste. Those would be vinegar and fish brine. The fish brine is fermented — like the later Greek [GREEK], Roman garum, or Arabic [ARABIC] that you may already know. Of course, the culinary descendants are still in use around the Mediterranean today, and you will know it from Southeast Asian food and so on. They seem to have formed a culinary pair for taste and balance. And often, they occur in the texts as a pair — which is interesting. So we can imagine this taste as probably umami and sour.

Then there was another profound difference between their cuisine and ours, plus those that are around in the area today. And that is that they don't have food that packs heat in the same way. Apparently, we have a love or need for that. Some cultures incorporate heat more than others. If you go to South Asia, you will have very hot food, not so much maybe in Iraq.

But nevertheless, something like pepper is pretty ubiquitous today. These people did not have access to pepper. Pepper is a plant that comes from South Asia later on into the region. So instead, they're trying to get that effect using other means — for instance, spicy greens that you can use as garnishes. You might pound up the green part of the leek in order to get a peppery taste. You might combine things like fresh arugula, spring leek, shallots, and garlic to get that peppery taste.

And finally, there's a huge variety of kitchen herbs and spices. Most of those remain unknown. So here, you get a sense of the challenges that we're facing: we have their names, but we don't know what they are.

We do know about half a dozen — and some of them even have the same name to this day. Like [NON-ENGLISH] is [ARABIC] in Arabic and Turkish and so on. Saffron asparanu is the same word also in English. Kamunu or cumin is also a survivor that has gone into the English language. And sesame, which is not a spice, is another one. It's called [AKKADIAN] in Akkadian.

That gives you a sense of the spice palette that we're dealing with.

Recipe for *pašrūtum*

Time for a recipe. This is one of four recipes we're going to explore — and we're starting with this one because it is, in some ways, a more simple recipe. It is one of the few recipes that is fully vegetarian.

What we have done is develop a 2D rendering of the cuneiform to see how it would be written out. In doing so, we compile the transliteration, so that's the interpretation of the sign written out, and then the transcription, how you would actually write out the words. And then we also produce an English translation.

The title of the dish is *pašrūtum*. So a few words about this recipe. As mentioned previously, it's one of the few vegetarian recipes. It's relatively simple. It's kind of milder in flavor.

You really just sort of sauté the vegetables in some fat. You add the water, the liquid. You add the leek and the garlic to give it a little bit of heat. And then at the end, you put on some dried sourdough.

It's unclear what the title actually refers to, but we think the sourdough may be a hint to that. So *pašrūtum* means to untie or to unwind. As such, we're hypothesizing that it could be a comfort dish. It's a milder dish. Or that it could have something to do with what happens when you add the dry sourdough to the liquid and it kind of unfurls itself and spreads into the stew.

Recipe for *mê puhādi*

For the second recipe, we chose it actually because it has two ingredients that were very common in these recipes. It has meat — it has a lamb. Then it has milk in the recipe as part of the liquid that it has. Also, I would like to highlight that it has salt — which is mentioned in a lot of recipes. So they already had this sense of flavor super developed.

I would also like to point out these dried barley cakes. This is called *vapiru* bread. And you may have heard of this because a lot of beer experts call it the ancient beer bread because it was thought that it was dried malted barley that was carried out by the people. And then when they wanted to make beer, they were fermenting this *vapiru* bread.

But it was also added into the stews. And we think that one of the main reasons, like they do also nowadays, is in order to soak part of the liquid and to thicken the broth. So we think that they already had a sense of texture as well as flavor as it was a very rich and strong stew.

Recipe for *mû elamūtum*

The third recipe we chose for its exoticism.

What is interesting in itself is that they have the concept that a dish is called something. It's called lasagna or pizza or whatever — or in this case *mû elamūtum* broth.

The other thing about this one is that this is a foreign dish. Elam is a part of the world which today belongs within the territory of the state of Iran, the westernmost part of Iran. And it is a very culturally separate and different area than southern Iraq, but sees the rise of large cities and states around the same time, about 3,500 BC or so, give or take.

Here is another side of cuisine, this notion that other people have other dishes and you can import those. And they even tell us, after the recipe is done, they tell us [NON-ENGLISH]. The original name of this dish is zukanda. So there's a bit of food ethnography here, from 1720 BC, which I find deeply fascinating.

Another thing that is interesting about this dish is that its ingredients are foreign, or at least one of them — namely dill. They are also using blood as a thickener. You might find that in other contexts. But dill is not found in any of the other recipes in this or any of the other two tablets that we have.

And it's an interesting phenomenon that to this day, dill is not very common in Iraqi food — it exists, but it's used in rather special circumstances. Whereas those of you who are familiar with Iranian-Persian cooking will know that dill is ubiquitous. It might be total coincidence, but it might be one of these things where very deeply ingrained things around taste, which you don't mess around with.

For certain things like Christmas or Yom Kippur or whatever you fancy, you will cook in certain ways — as your grandfathers and grandmothers did. You don't mess with this kind of stuff. Dill may be such a cultural survivor. So we found that rather interesting.

Recipe for tuh'u

This is the last recipe — and I think we're ending on a high note. This is, I think, one of the more successful recipes in the sense that it's delicious. We've cooked this together many, many times. We think that the name, tuh'u, means red beet. It is somewhat similar to a Eastern European borscht. It has that beet and it has meat — making it another meat dish.

You really just sauté the leg of lamb. You add in spices again. You'll add the onion, arugula, cilantro, the beets, and the coriander and some cilantro. It's a very stewy, rich dish that is lamby and very, very, very delicious.

There is one word involved with this recipe: the word samidu. This is one of those examples where I think the experimental approach really helped us out. We thought that the translation for this was soapwort. Soapwort is a plant. It is occasionally used in cooking. But when it is, it's in a very special context. And we added this in with a stew and basically tasted the stew, and it was extremely bitter, extremely bitter. And so we basically thought: this is crazy. So then we started over and we added just a little bit, and it was still extremely bitter. And the other thing that kept happening was that as it was boiling; it was foaming and foaming enormously. And Patricia, who is the gastronomist on the team, was like: this foaming agent is amazing. This is better than lecithin. This is better than what most chefs use in their kitchen.

I think for us what ended up happening was Gojko went back to the books. We reconsidered and realized that a more accurate translation may be Persian shallots. This sort of rounds off the onion, arugula, and leek. Fitting better in the dish, it seems like a more reasonable translation. So that was one thing that happened — it really made us reconsider the recipe.

The other thing that happened was that Patricia and I went off and investigated the foaming properties of soapwort and found that it is very useful in a culinary context as a foaming agent. It has a beautiful, brilliant white color, foams very strongly, and can be used in all kinds of contexts.

Looking to Bread

We worked with the recipes. We got to a point where we were kind of satisfied with what we thought it can do and what we could do with them, so to say, and how far we could get in the reinterpretation of them. And if you compare them to Bottero's, there are only subtle differences, which I think is a good sign. The fact that we can agree on the content shows that we've probably got some of it right, at least.

Now, we have moved on to another project, one on bread. Because among the many foodstuffs consumed by humans, that is arguably, historically, one of the most significant.

And in Mesopotamia, one of the very profound markers of that transition from what was essentially village life everywhere in the world up until this time and then suddenly people start moving together in large groups and forming communities with stratification politically, with specialization in terms of you're the potter and you're the policeman.

Bevel Rim Bowl

And with that, you get this particular type of pottery known as the Bevel Rim Bowl, which is not much of a stunner to look at. It's a very basic thing. But it appears by the tens of thousands on sites across the Near East, essentially from the Sinai to Pakistan — but with a market concentration around Iraq, Syria, Southern Turkey, and Western Iran. And it's up to 80% of all pottery that has been preserved from a period from around 3,500 BC where all of this happens.

It is also, therefore, you can say, the first known mass-produced item. Forget about the Ford T. It was not made in a potter's wheel, but it was created in a mold by pressing clay down into a mold. Typically, they have a volume of about 1 liter. And we don't know what they were for. There is a general agreement that being so many of these, they had to have had some core economic feature in early society — but people have discussed this back and forth for a couple of generations now.

However, people have already earlier pointed out that there seems to be an apparent connection iconographically between a particular sign that appears on the very earliest tablets, when writing is still kind of half-pictorial, and the Bevel Rim Bowl.

And that sign in later texts where we can actually read the text properly, we know that that was read as ninda, which means bread. So in that case, maybe these vessels were used to produce bread and to distribute bread and, therefore, wealth in these early societies on a massive scale.

However, there's a problem with this interpretation that people have pointed out early on. And that is that by far, the most common cereal was barley. It's about 80% of the Mesopotamian harvest at any given year. A problem with barley is that it lacks the gluten to raise and produce a vital bread. Simply pouring a barley dough into a Bevel Rim Bowl, as we know from trying it, will produce an inedible brick.

The aim of our project now is twofold.

1. We want to identify ingredients and procedures that would allow us to actually use Bevel Rim Bowls for bread production and see if it's possible in a way that is viable and suited for mass production.
2. And secondly, we combine this with the analysis of later actual specimens of bread that have turned up at our museum at Harvard from the later Bronze Age.

How do we plan to approach experimentally all of these unaddressed questions and all of these hypotheses the archeologists have been going through? So first, we want to test which greens they would use. Like, was it just barley? Was it barley with a little bit of wheat? They were using liquid doughs. Instead of adding another grains, they were just adding much more water than we add nowadays in order to not have these inedible bricks of barley.

Also, how was exactly the flour that they were using? What type of yeast they were using to leaven the bread? Was it just legumes, like some of the archeologists defend, or some type of sourdough? What were all this yeast that they were using in order to leaven these breads?

Also, did they have other additives? We just have one recipe that we identify with bread in the tablets so we can have a sense of how did they look like.

So we have all of these unaddressed questions. We went to the lab and we already did some tests, but we are still working on all of these important key questions to understand how was the oldest bread-baking process.