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Fermentation in Ancient Mesopotamia, Beer, Bread, and More Beer

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Editor's note: *This publication contains the video of the talk from the Fermentology webinar series, as well as a lightly edited transcript of the lecture.*

Abstract

[Tate Paulette](#) is an archaeologist and Assistant Professor at NC State's Department of History. He studies agriculture, food, and fermentation in the ancient world, with a particular focus on Bronze Age Mesopotamia. He co-directs archaeological excavations at the site of Makounta-Voules-Mersinoudia in Cyprus ([Makounta-Voules Archaeological Project](#)), and he is currently working on a book about the history and archaeology of beer in Mesopotamia. In this talk, we will explore the foods and, especially, the fermented foods of ancient Mesopotamia. We will look at ancient recipes, royal inscriptions, administrative records, archaeological remains, artistic works, and more on our culinary tour through the famous "land between the rivers." Particular attention will be devoted to bread, beer, yogurt, and cheese, the fermented cornerstones of the Mesopotamian diet.

Watch the Talk

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Fermentation in Ancient Mesopotamia, Beer, Bread and More Beer | Fermentology mini-seminars

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Introduction

My name is Tate Paulette. I'm an archaeologist and a professor in the History Department at NC State. What I want to do here is give you a very brief introduction to the fermented foods of ancient Mesopotamia. Beer is what I know best, so that's going to be my focus.

We'll start off with a quick introduction to Mesopotamia and the evidence for fermented foods in Mesopotamia. Then we'll dive down into beer, starting first with the beers themselves and the people who drank them, and then focusing in on the brewing of beer. We'll end with a look at some experimental brewing that I've been involved in.

First, [Mesopotamia](#): where exactly are we today in space and time? In terms of geography, we're talking about a region that extends across parts of modern-day Iraq, Syria, and Turkey. We call this region Mesopotamia, Greek for "between the rivers." The timeline for this region stretched for thousands of years, beginning around 10,000 BCE. The focus here will be the period from about 4,000 to 300 BCE.

Archaeologists break this period down into the late Chalcolithic period, the Bronze Age, and the Iron Age. This 4,000-year span marks the heyday of Mesopotamian civilization. It takes us from the world's first cities, states, and writing during the late Chalcolithic or Uruk period into the dynamic world of the Bronze Age, a time of rising and falling political fortunes, diplomacy, trade, warfare, and extensive inter-regional connections, and then onward into the Iron Age, when the region was dominated by a series of imperial powers: Assyrian, Babylonian, Persian.

How exactly do we know what was going on in Mesopotamia? What kind of evidence do we have?

- First, we have archaeological remains. Over the past century and a half, archaeologists have explored hundreds of ancient settlements across the region, so we know a lot about the physical remains that these people left behind.
- Second, we have a massive written record. The [cuneiform](#) writing system was in use for about 3,500 years. Hundreds of thousands of clay tablets have been uncovered so far, and many times that number still await discovery.
- Third, we have all kinds of visual depictions to draw on inscribed in clay, chiseled in stone, painted on plaster, carved in ivory, cast in metal, et cetera.

There's so much that we could talk about here, and you are likely at least somewhat familiar with ancient Mesopotamia; big personalities like Sargon, Ashurbanipal, Nebuchadnezzar; legendary cities, like Uruk, Ur, and Babylon; and famous written works, like the [Epic of Gilgamesh](#), [Code of Hammurabi](#), or the [Enuma Elish](#).

But our topic today is fermented foods. I'm sure it not will surprise you to learn that fermented foods were a cornerstone of the Mesopotamian diet, as in most other parts of the world, past and present. The brewers, bakers, and cheese makers of ancient Mesopotamia may not have understood the scientific principles behind fermentation, exactly who or what was doing the fermenting, but they most certainly had a sophisticated practical understanding of the process.

When we get into the fourth millennium BCE, the starting point for our story here, we're not talking about people who were just discovering the wonders of fermentation. We're talking about the inheritors of a tradition that already stretched back thousands of years into the past. We may still have a hazy understanding of this deeper history, but the diversity of fermented foods and the cultural importance of these foods hints at a lengthy and complex back story.

Fermented Foods in Ancient Mesopotamia

Before we get into beer, let's quickly look at a few other key fermented foods.

Bread

First, bread. In Mesopotamia, bread was the quintessential food. In the Epic of Gilgamesh, for example, when the wild man Enkidu is being brought into human society, transformed into a civilized human being, he has to learn how to eat bread and drink beer. It's often assumed that the breads of ancient Mesopotamia must all have been unleavened flat breads, but that is not the case.

They certainly did produce flat breads, and cylindrical open-topped ovens are ubiquitous in the archaeological record: direct analogs for the tannur ovens used today across the Middle East for the same purpose. In Tell Beydar in Syria there are remains of a room that was packed full of these ovens. Bakers would have reached down in from the top of these ovens and slapped flat pieces of bread dough onto the hot interior surface.

But the range of breads in Mesopotamia was huge. For example, one so-called lexical list, a list of words all revolving around a common theme, lists 300 different types of bread. Many of these would have been leavened breads. And breads could get pretty fancy: sweet breads, spiced breads, fruit-filled breads, breads molded into the shape of hearts, hands, ears, heads, even breasts. And we have many archaeological examples of large domed ovens that would have been appropriate for baking these other types of bread, including some in the city of Mari in Syria.

Wine

How about wine? Mesopotamia was definitely a land of beer drinkers, but they were also not averse to some grape wine. In fact, wine was highly valued. Early on, it primarily came in as a rare and expensive import from hilly areas to the east, north, and northwest, which were more suited to vine cultivation. During the first millennium BCE, though, the Neo-Assyrian Empire, which was expanding out into these surrounding regions, started demanding large quantities of wine as tribute, making wines somewhat more common, even if it was still restricted largely to an elite segment of society.

An example of wine consumption can be seen in the famous banquet stela of the Neo-Assyrian King Ashurnasirpal II. To celebrate completion of his new capital city and palace at Kalhu, Ashurnasirpal had an enormous 10-day feast for almost 70,000 guests. This stela lists out the provisions required for the feast, including 10,000 loaves of bread, 10,000 jars of beer, and 10,000 skins of wine.

The stela features Neo-Assyrian King Ashurbanipal and Queen Ashur-Sharrat sipping wine in a garden under a grape arbor in the city of Nineveh. Also included is the decapitated head of the enemy King Te-Umman hanging in a tree. It's also important to mention that dates were abundant in Mesopotamia. As we'll see, date syrup was sometimes added to beer. During the first millennium BCE, though, they were also drinking a wine made from dates.

Dairy Products

The other big category of fermented foods in Mesopotamia was dairy products. Sheep, goats, and cattle were raised in large numbers, and their milk was transformed into a variety of different types of cheese, among other products. One of the earliest lexical lists from Mesopotamia is the so-called vessel list. The upper part lists the proto-cuneiform signs for different types of vessel and products kept in vessels. A portion of the list also shows different preparations of cheese. The rest of the list is devoted to textiles.

The site of Tell al-'Ubaid in Iraq features a well-known dairy scene, dating to about 2,500 BCE. On the right side of this scene, someone is milking a cow. On the left milk or a milk product is being poured through a filter into a vessel below, and some other activities involving large vessels.

Beer in Ancient Mesopotamia

OK, now let's get into the best of all the fermented foods, in my humble opinion, beer.

Evidence

As things currently stand, the earliest solid evidence for beer in Mesopotamia dates to about 3,400 BCE. This includes organic residue preserved inside a ceramic vessel at the site of Godin Tepe Western Iran. It was also around the same time that the first writing appeared, an early form of the cuneiform script known as proto-cuneiform.

Beer is all over the place in these early documents. An example are two accounting documents dating to about 3,000 BCE. The documents include signs depicting a jar of a particular type of beer, often indicating either a large or small jar. And to the left of each of these is a numerical notation, indicating the number of jars.

These signs are a little picture of a jar: some pointed, some with a round base, and then various kinds of identifying marks on the interior. From this point in time onward, beer is a constant in the cuneiform record. It appears in administrative records, lexical lists, poems, letters, royal inscriptions, law codes, medical texts. It's everywhere.

Ingredients and Types of Beer

What kind of beer are we actually talking about here? What exactly was this beverage known as *kas* in the Sumerian language, or *sikaru* in Akkadian? In the most basic sense, this is a barley-based fermented beverage. For much of the period that we're dealing with, the two key ingredients were malted barley and a special kind of barley bread or cake called *bappir*. Many beers also included emmer wheat, date syrup, and additional flavorings, but there's no evidence for the use of hops. Although the beers were sometimes referred to as filtered or strained, most probably included a significant amount of solid matter.

Cuneiform documents refer to a variety of different types of beer. For example, in the earliest texts, which we just saw some examples of, nine different types are mentioned, but are difficult to translate. During the early dynastic period, about 2,500 BCE, on the other hand, at least five types were recognized: golden, dark, sweet dark, red, and strained. By the Ur III period, about 2,100 BCE, beer was being categorized primarily in terms of its quality or strength: ordinary, good, and very good, or perhaps ordinary, strong, and very strong.

Alcohol Content

There's actually significant disagreement about the alcohol content of Mesopotamian beer. Here you see a pretty extreme example of one side of the argument, suggesting that this beer wasn't actually beer at all:

“In the case of Sumerian beer, it is unlikely that it was really beer that the Sumerians and their successors prepared from grain and consumed probably in large amounts. Given our limited knowledge of the Sumerian brewing process we do not even know for sure that the resulting product had any alcohol content at all.”¹

It's certainly possible that the Sumerian and Akkadian terms that we translate as beer encompass the broader semantic range than our own term. And perhaps the alcohol content of some of these beverages was negligible.

But I see no reason to ignore the fact that, in Mesopotamian literature, beer, like wine, was considered a potent force that could have a significant effect on imbibers. Sometimes beer made people happy. It lightened their mood. In the Epic of Gilgamesh, for example, Enkidu drink seven goblets of beer and begins to sing. And sometimes beer riled people up. It was beer and wine, for example, that launched Grain and Sheep into a heated debate about which of the two was superior.

Excessive beer consumption could also lead to poor decisions and regret. And the tale of Inana and Enki, for example, the two deities get a little tipsy and find themselves in a high-stakes competition. While Enki is feeling the effects of the beer, he gives Inana control over a whole series of divine powers that were in his possession. When the effects of the beer wears off, Enki desperately asks his minister Isimud where all his powers have gone. The answer: “my master has given them to his daughter.”

And just to hammer home this point about the negative effects of beer, we even have a tale about a man who comes home drunk and is unable to please his wife in bed. Suffice it to say that I do not believe that the beers of ancient Mesopotamia were necessarily low in alcohol content. In any case, beer was consumed in a wide variety of contexts: at feasts, festivals, and ritual ceremonies, for example, but also at home, on the job, and in neighborhood taverns.

Consumption

Beer was often consumed through long-reach straws. Surviving images depict one or more individuals seated around a large pot drinking through long straws are almost certainly depictions of beer consumption. There's

also another common image that involves the consumption of beer through a straw, but in a somewhat different context. I'm not going to describe this one in detail, but the scene involves a woman who is bent over drinking beer through a straw from a vessel that sits on the floor, and also a man.

A cylinder seal from the site of Hamoukar in Syria was found suspended on a necklace within a burial dating to the third millennium BCE. For context, a cylinder seal is a small stone cylinder carved with intricate designs that would have been rolled out in clay, producing the image in reverse and serving as a kind of signature for the bearer. This small green cylinder produces an impression depicting a similar scene to that discussed above, along with some other related activities of some kind.

When cups are shown, rather than straws, it's more difficult to be certain that we're dealing with beer, as opposed to some other beverage. But the ubiquitous banquet scene still gives us a good visual sense for one of the context where beer was regularly consumed in Mesopotamia.

So people were drinking a lot of beer, and they appreciated this beer. They didn't just want any old swill. Can we say anything more specific about what they liked? What was good beer supposed to taste like? Unfortunately, we don't get much in the way of tasting notes. The one adjective that appears regularly as a description of good beer is sweet. And we know that, at least some of the time, they added date syrup to their beer in order to sweeten it, so perhaps they liked their beer on the sweet side. And then occasionally there are concerns raised with the freshness of beer.

Brewing Beer

Let's focus in now on the brewing of beer. There's a lot that we could talk about here, but I'm going to focus on brewing ingredients, brewing equipment, and the brewing process. First, though, let me say that there's still a lot that we don't know about how beer was brewed in Mesopotamia. This partly comes down to the nature of the evidence available. For example, in the artistic record, we have nothing comparable to the detailed depictions of brewing in contemporary Egypt.

And although we do have some wonderful recipes for foods that included beer as an ingredient, no beer recipe or brewing manual has been preserved in the cuneiform record. We have to rely instead on more tangential descriptions and bits and pieces of evidence preserved here and there. But we still have a lot to work with:

- Thousands of administrative documents have been found that reference beer and brewing ingredients.
- An abundance of archaeological remains.
- Literary texts that offer some unusually detailed insight into the brewing process.

I'll briefly highlight a few of these as we look at ingredients, equipment, and the brewing process.

Ingredients

If you want to get a sense for what kind of beers we're talking about here, there's no better place to start than ingredients. For example, I said that we don't have any recipes for beer in Mesopotamia, but we do have documents that list the ingredients used to brew particular batches of beer. Beer was often brewed in large-scale breweries operated by palaces and temples, and these breweries had to keep careful tabs on their inputs and outputs; that is, the brewing ingredients that they received and the beer that they produced using these ingredients.

One of these documents is the early proto-cuneiform tablet discussed earlier, probably from a city of Uruk. The front side of the tablet tabulates the number of jars of four different types of beer distributed to particular people and for particular occasions. The backside then tallies up the brewing ingredients that were used to brew all that beer.

Also included on the tablet are the total number of jars of the four different types of beer. The barley groats and malt needed to brew each of those jar totals by beer type are then shown. And finally, you get all of that total together: so the total barley groats and malt needed for all of the jars combined.

A bit later in time, there is an account from the city of Girsu documenting the quantities and ingredients used to brew two batches of golden beer, each batch totaling about 45 liters. So golden beer was brewed with emmer wheat, malted barley, and *bappir*. This grain will contrast with some of the other beer styles that appear in similar records from Girsu; for example, dark beer and sweet dark beer.

One more example is a tablet from about 2029 BCE that documents the food and drink produced for a feast held in the city of Garshana to honor the death of a man named Shu-Kabta. For this feast, 320 liters of good beer and 640 liters of ordinary beer were brewed using *bappir*; good *bappir* for the good beer, ordinary for the ordinary beer; malted barley, and groats, again, good and ordinary.

We've learned about ingredients partly from texts like these, but the effort to understand exactly what these ingredients were requires engagement with a much broader range of source material. This is an ongoing effort, and one that Assyriologists (specialists in the languages of ancient Mesopotamia) have been working on for a long time.

What can we say in a very general sense about the ingredients used? Here's a list of the basics. First, these beers were built on a base of malted barley. So in that sense, they're related to many of today's beers. The second key ingredient was bacteria, often translated as beer bread, although this almost certainly misses the mark. As I've said, *bappir* seems to have been some kind of crumbly bread or cake, one that could be dried out and stored for later use. But there's a lot of disagreement about exactly what it was and where it would have fit into the brewing process.

Some have argued that *bappir* was not a bread at all, but rather some kind of roasted barley product. Others have envisioned something akin to biscotti. Personally, though, I find interpretations of *bappir* as something like a dried-out cake of sourdough starter more compelling, something like cakes of *nuruk*, a fermentation starter used in the Korean brewing tradition.

There is one key ingredient that doesn't appear on this list: yeast. This is a big question mark. We don't know how Mesopotamian brewers were starting fermentation; for example, whether they were just relying on naturally occurring airborne yeast dregs from a previous batch of beer, or something else. But there's a distinct possibility that *bappir*, the other key ingredient alongside malted barley, was actually the yeast source.

Some unmalted, or raw grains were used as adjuncts in Mesopotamian beers, especially barley and emmer wheat. And there's good reason to suspect that some roasted, toasted, or otherwise modified grain products were employed; for example, possibly some whose preparation involved a separate fermentation stage of some kind.

Date syrup, the primary sweetener in ancient Mesopotamia, was definitely added to some beers, but it's not clear exactly when this syrup would have been added. For example, was it added early in the brewing process to boost the concentration of fermentable sugars, and therefore the alcohol content of the final product, or was it added later as a sweetener?

And then finally, there's the frustrating category of so-called aromatics, additional flavorings that were added to beer. We know next to nothing about these. Some possibilities that were available and were used for other culinary purposes in Mesopotamia include:

- coriander
- cardamom
- mint
- fennel
- cumin
- watercress
- garlic
- mustard seed
- juniper berries
- tamarish
- honey
- dates
- figs
- plums
- pomegranates

- apples

Again, note that hops, an essential component of many beers today, do not appear on this list.

Brewing Equipment

Now let's look briefly at brewing equipment. Lots of brewing vessels and other equipment make an appearance in cuneiform documents. For example, one stanza from a drinking song that heaps praise on a series of vessels used in brewing and beer consumption-- the *gakkul* vat, the *lam-sa-re* vat, the *ugur-bal* jar, the *sa-gub* jar, and the *am-am* jar.

One big challenge, though, is figuring out exactly what these vessels might have looked like, and for example, they might match up with the ceramic vessels that are recovered in gigantic numbers on archaeological sites in the region. For example, in cuneiform documents, brewing vessels regularly appear together in pairs-- the *gakkul* with the *lam-sa-re*, the *nig-dur-bur* with the *lahtan*, the *namzitu* with the *namharu*.

Indeed, they seem to have functioned as a pair, with one pierced with a hole in the base, sitting above the other one. And they are sometimes said to have talked with one another, making a "dooble-dobble, dooble-dobble" sound, presumably the sound of liquid dripping or pouring from one to the other. These are often discussed as a fermentation or filtering vessel which set above a collecting vessel, although we actually have a poor understanding of how they fit into the brewing process.

For archaeologists, though, one detail here is crucial: that hole pierced in the base of the upper vessel. This is something that we can easily identify, and plenty of excavated examples are known, including several examples from the site of Tell Asmar in Iraq. In fact, organic residue analysis at the sites of Tell Bazi in Syria and Khani Masi in Iraq has revealed traces of beer within vessels just like these, and also in some other vessels that were found in association with them. So we're starting to get some preliminary sense for what a typical set of brewing vessels might have looked like.

There's also another really intriguing set of vessels, the so-called four part set, found in a series of burials dating to the third millennium BCE. The typical set includes a flat-bottomed cup, a strainer or bowl with pierced base, a cylindrical colander, and a large open vat. It's possible that these vessels were used in either the brewing or consumption of beer, but this remains an open question.

Process

That covers brewing ingredients and brewing equipment, but how did they actually brew the beer? Well, this is a tough question. One of the only descriptions of the brewing process comes from a literary text. The famous Hymn to Ninkasi goddess of beer. If you've heard anything about this document then you will know this is most definitely not a recipe for the brewing of beer. It's a poem or song that praises the goddess, and in the

process, seems to provide a very rough and flowery description of the brewing process, at least sort of arranged in step by step fashion. And it always appears alongside a drinking song.

Let's just look at a few verses to give you a sense for the flavor of this document.

“Ninkasi, you are the one who bakes the bappir in a big oven, puts in order the piles of hulled grain. Ninkasi, the fermenting vat, which makes a pleasant sound, you place appropriately on top of a large collector vat. Ninkasi, you are the one who pours out the filtered beer of the collector vat. It's like the onrush of the Tigris and Euphrates.”

There's a lot of room for leeway and disagreement in how one translates and interprets this hymn. Walther Sallaberger created diagram detailing the brewing process, drawing in part on his own updated translation of the hymn. This is my rough translation of his diagram from the German. Without going into the details, this interpretation basically sees a few key steps:

- First, preparation of the two key ingredients: *bappir*, which involves mixing a sourdough starter with barley, allowing this to ferment, and then baking it or drying it; and malted barley, which involves germinating the barley, halting the germination, and then grinding or crushing.
- Then there's a mashing stage, where each of these is independently crushed and steeped in water.
- This is followed by an initial fermentation stage, where the two matches are mixed together and allowed to ferment.

This results in a sort of intermediate product that can be dried out and stored for later use. There's then a final fermentation, where this product is mixed with water and allowed to ferment into beer for drinking. Again, this is just one hypothetical scenario, but hopefully it gives you some sense for what the brewing process might have looked like.

Experimental Brewing

One way to test out interpretations like this is actually to put them into practice; that is, to actually brew some beer. This falls under the broader rubric of what we call experimental archaeology, and a number of different groups have attempted this with Mesopotamian beer. For example, I've been involved with one experimental brewing effort that brought together scholars from the University of Chicago's Oriental Institute, where I was a grad student, and brewers from Great Lakes Brewing Company in Cleveland.

The goal was, as far as possible, to recreate the brewing process in Mesopotamia using authentic ingredients, technologies, and techniques. The experiment used all replicas based on actual vessels excavated by the Oriental Institute at archaeological sites in Iraq. As we've seen, there's a lot that we don't know about Mesopotamian brewing, so an effort like this requires a good bit of educated guesswork. And our brewing process differed in some respects from the example that I just showed you.

Given all this uncertainty, what do we get out of these brewing experiments? Ultimately, it's all about the questions that are generated. When we attempt to put something like this into practice, we're forced to confront a whole range of questions, uncertainties, and gaps in our knowledge, things that we might not have considered or might have ignored otherwise. This is one of the big reasons for doing experimental archaeology.

The next step, of course, is to actually go back to the data, back to the written record and back to the archaeological record with these questions in mind. But that doesn't mean that we can't let people sample the fruits of our labor. So far we've held a series of six tasting events in different cities. One of the beers that we made was christened Enkibru to go along with Gilgamesh, beer made using the same ingredients, but modern brewing equipment.

The Enkibru varied pretty significantly from batch to batch, but it ranged in alcohol content from about 3% to 8%. It was carbonated, often milky looking, and on the sour side. We flavored it with a shifting mixture of coriander, cardamom, fennel, dates, and juniper berries. And we experimented with adding date syrup, both before and after fermentation. Adding it before upped the ABV, while adding it later right before handing it out to tasters resulted in a sweet, some might say cloying beverage that was generally not a favorite.

The Gilgamesh was brewed on modern brewing equipment using the same ingredients, except on the *bappir* front. For the Enkibru, the *bappir*, a dried out cake of sourdough, served as our yeast source. For the Gilgamesh, on the other hand, we relied on one of Great Lakes' own strains of yeast. So this beer was much more familiar, carbonated, somewhere in the vicinity of a saison, but with some interesting elements coming from the herbs and spices that were added, and the date syrup.

I will say that usually about half of our tasters preferred the Enkibru, so don't let anyone tell you that Mesopotamian beer would have been nasty. They loved their beer, and many of us might have too. And of course, we always let everyone try the Enkibru through straws from a communal pot, usually reed straws, but in this case, fluorescent plastic.

Footnotes

1. Damerow 2012 [↔](#)