

# Kumiss - A discussion thereof.

History of Kumiss / Caracosmos / Airag:

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Barony of Saint Florian de la Riviere, Lochac, Known World



Airag (or Kumiss, it's Russian name) is fermented horse milk, traditionally brewed by the Mongols and other horse tribes on the steppes. It was often drunk by other cultures, such as the Russians as a health tonic. William Rubruck was a Flemish Franciscan missionary and explorer

who kept a journal of his travels to Karakorum, at that time, the seat of Great Khan Möngke in 1254. He not only is surprised to discover many Western Europeans living in Karakorum but even describes a great silver fountain built by a Parisian Silversmith. One of the spouts dispensed Caracosmos, a form of clarified Kumiss. The journal article states:

### **[The Khan's palace at Karakorum]**

Mangu had at Caracarum a great palace, situated next to the city walls, enclosed within a high wall like those which enclose monks' priories among us. Here is a great palace, where he has his drinkings twice a year: once about Easter, when he passes there, and once in summer, when he goes back (westward). And the latter is the greater (feast), for then come to his court all the nobles, even though distant two months journey; and then he makes them largess of robes and presents, and shows his great glory. There are there many buildings as long as barns, in which are stored his provisions and his treasures. In the entry of this great palace, it being unseemly to bring in there skins of milk and other drinks, master William the Parisian had made for him a great silver tree, and at its roots are four lions of silver, each with a conduit through it, and all belching forth white milk of mares. And four conduits are led inside the tree to its tops, which are bent downward, and on each of these is also a gilded serpent, whose tail twines round the tree. And from one of these pipes flows wine, from another cara cosmos, or clarified mare's milk, from another bal, a drink made with honey, and from another rice mead, which is called terracina; and for each liquor there is a special silver bowl at the foot of the tree to receive it.

Between these four conduits in the top, he made an angel holding a trumpet, and underneath the tree he made a vault in which a man can be hid. And pipes go up through the heart of the tree to the angel. In the first place he made bellows, but they did not give enough wind. Outside the palace is a cellar in which the liquors are stored, and there are servants all ready to pour them out when they hear the angel trumpeting. And there are branches of silver on the tree, and leaves and fruit. When then drink is wanted, the head butler cries to the angel to blow his trumpet. Then he who is concealed in the vault, hearing this blows with all his might in the pipe leading to the angel, and the angel places the trumpet to his mouth, and blows the trumpet right loudly. Then the servants who are in the cellar, hearing this, pour the different liquors into the proper conduits, and the conduits lead them down into the bowls prepared for that, and then the butlers draw it and carry it to the palace to the men and women.



Image on the left is a 18th century Artist's rendition of the silver tree at Karakorum, as described by William of Rubruck.

Another source, Selections from the Tarikh-i-Rashidi by Mirza Muhammad Haidar, Dughlat (1546-47), backs up the story of the potency of Kumiss:

#### **V. [On the medicinal powers of kumys (fermented mare's milk).]**

At this time a certain Ahmad Mirza, one of the Timuri Mirzas of the line of Mirza Shah Rukh, having fled [from his own country] had come [to Moghuhstan]. He had [with him] a sister, for whom Amir Sayyid Ali conceived a great affection; so much so that Amir Khudaidad and others begged her to become Amir Sayyid Ali's wife. She, however, refused, saying: "I cannot stay in Moghulistan, but if he will accompany me to my own country, it can be arranged." She then immediately set out for her own country, accompanied by Amir Sayyid Ali. When she arrived at Andijan) Mirza Ulugh Beg dispatched a man to kill Ahmad Mirza, and himself married his sister, at the same time throwing Amir Sayyid Ali into prison at Samarkand, where he remained one year. Here he fell sick of dysentery, and when on the point of dying, Amir Ulugh Beg sent for the doctors, whose remedies, however, were all without effect. One day somebody brought some kumiz. The Mirza implored the doctors, saying: "As the medicines have done me no good, I should much like to try a little kumiz, for which I have a great craving." They at last agreed [to grant his request] as a desperate experiment, saying: "It will very likely give him strength." They then gave him as much kumiz as he wanted, and from that moment he began to show signs of recovery. On the following day they gave him some more, and he became perfectly well. [Sayyid Ali eventually made his way back home, where he became involved in the ultimately successful rebellion by which Vais Khan, with Timurid support, seized the throne.]

#### **We even have a description from William Rubruck himself on how it tasted:**

This cosmos, which is mare's milk, is made in this wise... When they have got together a great quantity of milk, which is as sweet as cow's as long as it is fresh, they pour it into a big skin or bottle, and they set to churning it with a stick [...] and when they have beaten it sharply it begins to boil up like new wine and to sour or ferment, and they continue to churn it until they have extracted the butter. Then they taste it, and when it is mildly pungent, they drink it. It is pungent on the tongue like rapé wine when drunk, and when a man has finished drinking, it leaves a taste of milk of almonds on the tongue, and it makes the inner man most joyful and also intoxicates weak heads, and greatly provokes urine.

There are variants made from donkey, cow (Caracosmos), and camel (shubat) milk also. A distilled version called arkhi was known but not before the 13-14th century at the very earliest.

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## So Why was Kumiss produced and drunk?

So, Why Kumiss? My theory is that Horsemilk is very high in Lactose (40% higher than cow's milk) but low in Fat and Protein, which would make it a very rich source of nutrients for steppe cultures that relied heavily on the horse. The only issue is that many Central Asian Tribes have very high levels (over 90%) of Lactose Intolerance. Although it's not known if the fermentation of Kumiss was accidental or intentional, it is a very efficient way of removing lactose from milk making it very digestible, with the positive side benefit of a small amount alcohol, usually 1-3%. The lactose in milk is not normally able to be consumed by Brewer's Yeast (*Saccharomyces cerevisiae*), being a complex culture (SCOBY) with *Lactobacillus*, there is the ability to efficiently breakdown the lactose, rendering it safe to drink. The *Lactobacillus* cultures excrete Lactase, an enzyme that breaks down Lactose into Glucose, absorbs the Glucose and excretes Lactic Acid. The yeast robs the Glucose and excretes Alcohol and Carbon Dioxide. The reaction is feed-forward. The more the yeast robs the glucose, the more the *Lactobacillus* produces lactase. This results in a very efficient method of removing lactose, thus rendering the Kumiss relatively low in lactose.

## How the Mongols made it?



Although we don't have any descriptions of how the Mongols of old made Airag, we do have a lot of information on how it is currently made. During the foaling season the Mongolian herdspeople milk the mares. This is done by leading the foal to his/her mother and allowing the foal to feed naturally for a while. The foal is then led to one side and the mare milked, usually by the woman.

The milk is filtered through a fine sheet of muslin and is then placed in a leather or goatskin bag that hangs in the Southwest part of the Ger (round felt tent, also called a Yurt) where it is churned traditionally for 1000 times. The Southwest is the warmest part of the Ger. Sometimes a vat of larchwood (Gan) is used, where a wooden masher called a buulur is used to stir the

Kumiss.

No culture is normally added, but the bags or vats would normally be inoculated with the correct culture. Cultures would be shared if they went sour. Stirring it in the bag in the warmth along with the culture would start the fermentation process that creates a mild alcoholic “liquidy” yoghurt style drink. The stirring would assist in the breaking up of the curd.

When a guest arrives they are traditionally asked to churn the milk in the leather bag. After a few days, the Airag is filtered again, and is ready to drink. The left over curds were often dried and pressed into a cake form, called Aaruul.

Hospitality mandates to present a bowl of airag to each visitor. A Mongolian will normally empty it, but it is also acceptable to just take a sip and return the bowl. To reject the offer right away would be gravely impolite.

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## Arkhi - Kumiss Distillate



Occasionally, the Mongols distilled the airag to make a clear spirit called Arkhi with their homemade distillery. A bowl of airag is placed in the bottom of the metal barrel shape container, an empty bowl is fitted inside it towards the top of the barrel and a third bowl of cold water is placed at the top. All of this is placed on top of the stove, which is heated by dried animal dung. The airag is heated, evaporates and condenses on the bottom of the cold bowl and drops into the empty bowl. This can produce Arkhi up to 10-20% alc depending on the still.

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## How can you make it?

Making Kumiss is quite easy to do. The important thing to remember, for people brewing other things, you need to keep Kumiss and its cultures well away from your normal brewing in case of cross-contamination.

- Firstly, get your milk.
- If you are lucky and you've got Mares Milk, you don't need to adjust your milk.
- If you have cows milk, you need to select a milk that is close as possible to horse milk, and add extra powdered lactose (available at good homebrew shops) to match the % required for Horse Milk (see the table in the next section). Or you can leave your cows milk as is and make Caracosmos.
- Gently heat your milk to 38 degrees Celcius.
- Add your Cultures:

Lactobacillus (several cultures are capable of doing the job (Lactobacillus bulgaricus, Streptococcus lactis, etc.). You can either go

crazy trying different cultures or you can use a yoghurt culture. You want to aim for a lactobacillus strain with a habit of not firming up too much. A drinking yoghurt culture is perfect for this.

Yeast (*Saccharomyces cerevisiae*) - a simple plain, neutral flavoured beer yeast suffices here. Don't use a wine or any other high attenuating yeast. Avoid Baker's yeast, as it will impart a strong yeast flavour to your kumiss.

- Put into a small homebrewing fermenter, leaving some head space as the kumiss can foam quite a bit. One option is to get a winecask bag after the contents have been drunk, take off the lid, and place a rubber bung and airlock in its place... This does a fine job at simulating a goatskin and allows for easy agitation. You need to agitate every few hours for a couple of days.
- When the kumiss has stopped bubbling, you filter the liquid through a muslin cheesecloth and chill.
- Serve with a side of boiled mutton or dumplings, and enjoy.

## The Biochemistry behind it:

For 100ml of milk, you want to be adding about 10-20 grams of lactose. You can either do the math to balance or just overpitch the lactose. Over-pitching doesn't seem to have too much effect, the product stays about the same, but you'll get some higher alcohol and some bleed through of lactose.

#### **Cow Milk**

Water: 87.8%  
Dry Matter: 12.2%  
Protein: 3.5%  
Fat 3.5%  
Lactose 4.5%

#### **Horse Milk**

Water: 90.0%  
Dry Matter: 10.0%  
Protein: 2.2%  
Fat 1.1%  
Lactose 6.1%

#### **Sheep Milk**

Water: 87.8%  
Dry Matter: 12.2%  
Protein: 3.5%  
Fat 3.5%  
Lactose 4.5%

#### **Goat Milk**

Water: 82.5%  
Dry Matter: 17.5%  
Protein: 6.5%  
Fat 6.1%  
Lactose 4.6%

#### **Pig Milk (for completeness :P )**

Water: 80.0%  
Dry Matter: 20.0%  
Protein: 7.3%  
Fat 8.4%  
Lactose 3.3%

According to Joyce Toomre (Koumiss in Mongol Culture: Past and present), koumiss nowadays is prepared with 2 starter cultures, *Streptococcus lactis* and *Lactobacillus bulgaricus*... (both cultures should be available from cheese making supply companies). Although her article does not discuss yeast, a yeast is also required to make kumiss work.

Other minor cultures that have been identified in Kumiss Cultures have been:

- *Streptococcus cremoris*
- *Streptococcus diacetylactis*

- *Leuconostoc cremoris* (this culture will give the kumiss a slimy texture, and is probably an unwanted contaminant, but is desired in some milk products such as Kefir and Viili)
- *Lactobacillus plantarum*
- *Leuconostoc mesenteroides* (adds a buttery flavour, diacetyl, to the flavour profile)
- *Lactobacillus casei*
- *Saccharomyces florentinus*

*Streptococcus lactis* (also known as *Lactococcus lactis*) produces quantities of lactic acid, partially hydrolyses milk proteins, and increases digestibility of milk. It also produces chemicals (bacteriolysins) that inhibits other harmful micro-organisms. *Lactobacillus bulgaricus* has been used to culture yogurt in Eastern Europe for a very long time and it's no surprise to see it in Kumiss cultures... It has similar properties to *Streptococcus lactis*. *Lactobacillus bulgaricus* also produces small amounts of acetaldehyde which is apparently important for the final flavor profile.

The third culture required is a yeast (*Saccharomyces Cerevisiae*), of which the Kumiss maker can select any low alcohol neutral tasting version they wish. The import thing is that the 3 cultures work in unison and not to select a yogurt bacteria strain know for a high rate of firming (clabbering) the curd and to avoid any culture that gives a ropy or slimy consistency.

### **References:**

(1994) Milk and Milk Products from Medieval to Modern Times - Proceedings of the 9th International Conference on Ethnological Food Research - Edited by Patricia Lysaught. It contains an article: "Koumiss in Mongol Culture: Past and present" by Joyce S. Toomre. - This article is a great help for those interested in Kumiss.

There is also a GREAT website which contains many period texts of travellers to Mongolia and are available here:

<http://depts.washington.edu/uwch/silkroad/culture/food/food.html>

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The main Cookbook on Yuan Chinese food and drink (Yin Shan Cheng Yao) is actually completely devoid of references to milk products. Theories here is that they were 'too mundane' to be mentioned, considered to have no medicinal qualities at that time/place and thus omitted (unlikely) or that milk products weren't available in that time/place (1456/Capital) and were omitted. Perhaps it was because the author was Chinese. The recipes themselves record the intrusion of alien (and some believe unsophisticated) Mongol cookery based on mutton into Chinese cuisine. It was written by Hu Szu-Hui, who probably came from a bilingual Chinese-Turkic family in northwest China and who served as imperial dietary physician to several short-lived descendents of Qubilai Qan in the early 1300s. Although useless as a reference for Kumiss, it does contain information on other Mongol/Yuan Chinese alcoholic drinks.