

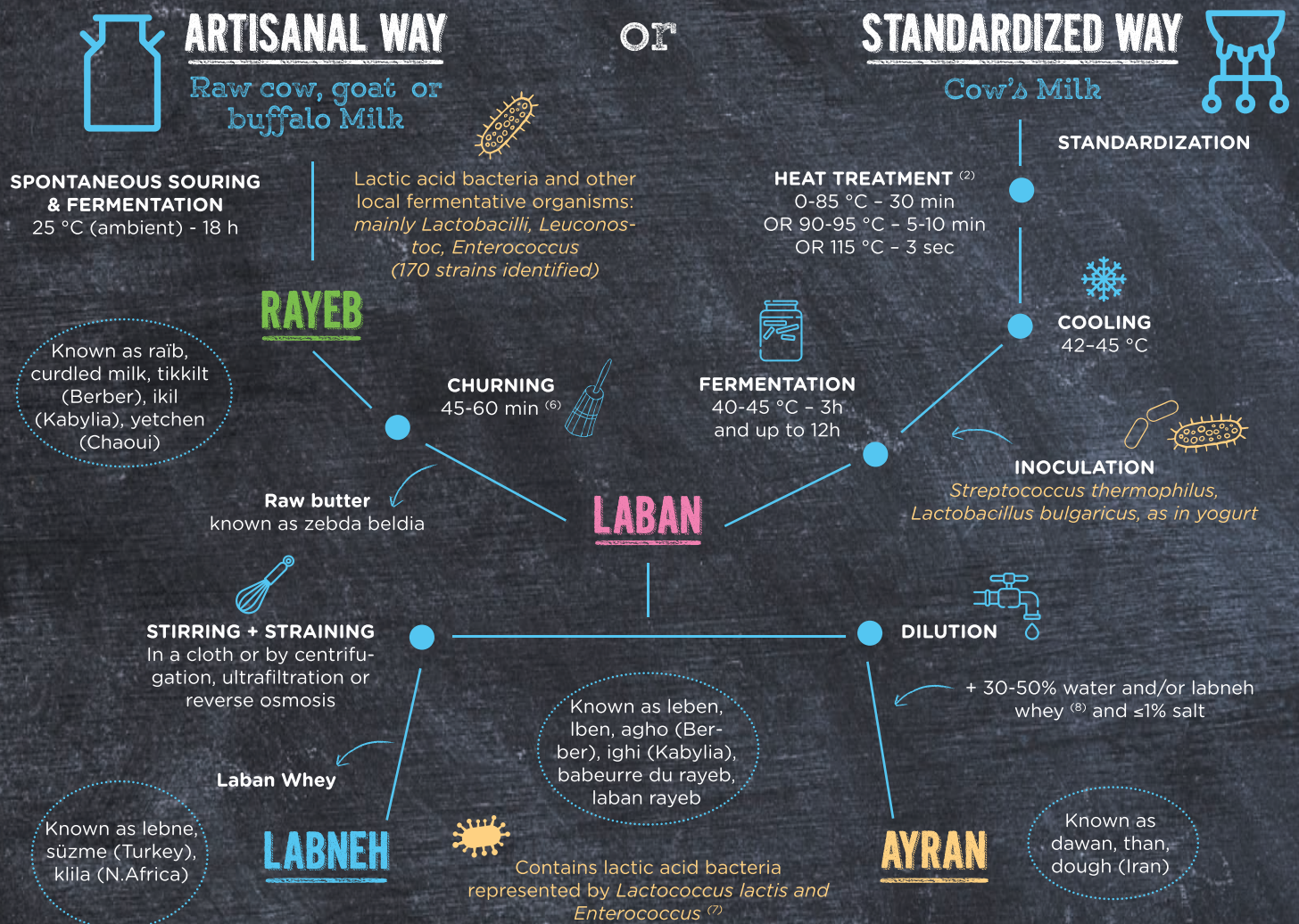
# FERMENTED MILKS AROUND THE WORLD

For centuries, fermented milks have provided essential nutrients and health benefits in human diets. Milk fermentation is as simple as adding live ferments to milk, leading to dozens of popular recipes around the world. How different are they? Get the science facts about Greek yogurt, lassi, skyr, laban, ayran, kefir... and many more.

## MIDDLE EAST & AFRICA: RAYEB, LABAN, LABNEH, AYRAN & AMASI

Fermented milks have originated in the Middle East more than 10,000 years ago and have remained essential in the diet of most Arab countries<sup>(1,2)</sup>. Although the know-how varies considerably between different localities, farms and milks, some parameters are commonly found and presented below as these products specifications.

### HOW ARE THEY MADE? (2, 8)



### AMASI, IN SUB-SAHARIAN AFRICA (9-11)

African traditional recipes of fermented milk include omashikwa in Namibia, fulani in Burkina Faso, kule naoto in Maasai lands<sup>(9)</sup>. **AMASI**, the typical sour milk produced in South African regions (South Africa, Zimbabwe, Lesotho, and more particularly among the Zulus), is becoming quite trendy worldwide!

**Other names for amasi:** maas, mukaka wakakora or zifa

**Traditional recipe:** raw milk is poured in clay pots or calabashes, left at room temperature for a spontaneous fermentation for several days (mesophilic *Lactobacillus lactis* are predominant)<sup>(9,10)</sup>. Then, whey is drained through a hole<sup>(9)</sup>, yielding a thick curdled milk usually consumed unsweetened<sup>(11)</sup>. Standardized productions are commonly found too, either plain or flavoured.





# NUTRITION FACTS (2- 4, 6, 7, 12-17)

Average values with a variability according to process, ingredients and brands.

For 100 g or 100 ml	RAYEB	LABAN	LABNEH	AYRAN	AMASI
<b>Taste</b>	• Fresh & sour	• Sharp & acidic <sup>(2)</sup> • Strong butter-milk flavor <sup>(6)</sup>	• Tangy	• Creamy	• Sour as yogurt • Milky as cottage cheese
<b>Texture</b>	• Smooth, similar to yogurt	• Similar to yogurt or fresh cheese <sup>(7)</sup>	• Thick, creamy mouthfeel	• Liquid, sometimes with a foamy head	• Smooth <sup>(12)</sup>
<b>Energy</b>	• 57 kcal <sup>(13)</sup> or 238 kJ	• 42 kcal <sup>(14)</sup> or 176 kJ	• 154 kcal <sup>(16)</sup> or 644 kJ	• 50 kcal <sup>(15)</sup> or 209 kJ	• 64 kcal <sup>(12)</sup> or 268 kJ
<b>Protein (g)</b>	• 2.5 <sup>(13)</sup>	• 2.6 <sup>(6)</sup> - 5 <sup>(2)</sup>	• 12.9 <sup>(16)</sup>	• 2.1 <sup>(15)</sup>	• 3.3 <sup>(12)</sup>
<b>Calcium (mg)</b>		• 110 <sup>(3)</sup>	• 144 <sup>(16)</sup>	• 62 <sup>(15)</sup>	• 162 <sup>(12)</sup>
<b>Fats (g)</b>	• 2.5 <sup>(13)</sup>	• 1.3 - 3.1 <sup>(2)</sup> • 3.5 (due to churning) - 15 <sup>(3)</sup>	• 10.8 <sup>(16)</sup>	• 2.5 <sup>(15)</sup> (skim)	• 3.7 <sup>(12)</sup>
<b>Sugars (g)</b> (Lactose in plain products)	• 3.1 <sup>(3)</sup> • 20% lower than milk <sup>(3)</sup>	• 4 <sup>(14)</sup> • 2.7% in traditional laban <sup>(6)</sup>	• 1 <sup>(16)</sup> • 70-80% less than in yogurt (straining) <sup>(15,17)</sup>	• 4.6 <sup>(15)</sup>	• 3.7 <sup>(12)</sup>

## NUTRITION & HEALTH BENEFITS



- **Refreshing & hydrating:** welcome in warm climates.
- **Part of traditional diets:** central staple in the Middle Eastern & African dietary habits and cuisine.
- **High quality dairy proteins:** dairy protein contains all essential amino acids <sup>(18,19)</sup> which can be resourceful in Middle Eastern diets traditionally scarce in animal protein.
- **Reduced in lactose:** fermentation and straining reduce the level of lactose in milk. These foods should be well tolerated by lactose maldigestors (70% prevalence in the Middle East, 66% in northern Africa and 63% in sub-Saharan Africa <sup>(20)</sup>).
- **Live bacteria improve digestion:** by releasing their own lactase in the gut, live bacteria improves digestion of lactose in lactose maldigestors <sup>(21)</sup>.
- **Ferment strains produce some vitamins:** niacin, folic acid, and to a lesser extent B1, B2, B6 and B12, and enhances calcium assimilation <sup>(2, 22)</sup>. This could therefore improve the nutrient-density of the diet in populations where the prevalence of micronutrient deficiencies can be of concern <sup>(2)</sup>.



## FAVORITE WAYS TO ENJOY THEM

### → Raïb or Rayeb

- As a fresh beverage or a drink during meals <sup>(3, 4)</sup>
- As a snack on its own, on the go
- Enjoyed during Ramadan or in the summertime

### → Laban

- Cooked as a soup
- Poured on couscous



### → Labneh <sup>(23)</sup>

- For breakfast with olive oil, pita bread & zaatar
- Rolled into balls and stored in olive oil

### → Ayran <sup>(24)</sup>

- As an appetizer, plain or with a couple of mint leaves



### → Amasi <sup>(9, 10, 12)</sup>

- An anytime drink, plain or with honey
- Poured over maize porridge as a main meal
- Substitute for buttermilk when baking
- Recovery drink after the gym

## References

1/Marth EH & Steele J. In: Applied Dairy Microbiology. CRC Press, Chapter 22, 2001. 2/Béal C & Chammas G. In: Handbook of Animal-Based Fermented Food and Beverage Technology, CRC Press:181-212, 2012. 3/Samet-Bali O & Attia H. African Journal of Biotechnology 11:6744-6749, 2012. 4/Samet-Bali O et al. African Journal of Microbiology Research 6:2169-2175, 2012. 5/Koskoy A & Kilic M. Food Hydrocolloids 18:593-600, 2004. 6/Benkerroum A & Tamime AY. Food Microbiology 21:399-413, 2004. 7/Abd El Gawad IA et al. Journal of American Science 6:728-735, 2010. 8/Tamime AY & Robinson RK. In: Tamime and Robinson's Yoghurt. CRC Press, Chapter 5, 2007. 9/Schutte LM. Thesis, University of Stellenbosch, 2013. 10/Moyane JN & Jideani AO. African Journal of Food Science 7:56-62, 2013. 11/Todorov et al., 2008. Brazilian Journal of Microbiology 39:178-187, 2008. 12/Milk South Africa Consumer Education Project. 13/Debbabi H et al. Journal of New Sciences 56:3653-3659, 2018. 14/Openfoodfacts, for Laban. 15/USDA FoodData Central, for Ayran. 16/Musaiger AO. Food Composition tables for Kingdom of Bahrain. For Labneh p.46, 2011. 17/Anses. Table de composition nutritionnelle des aliments Cical, 2017. 18/Yogurt in Nutrition Initiative, 2014. 19/Hoffmann JR & Falvo MJ. Journal of Sports Science and Medicine 3:118-130, 2004. 20/Storhaug CL et al. The Lancet Gastroenterology and Hepatology 2:738-46, 2017. 21/Efsa. Efsa Journal 8:1763, 2010. 22/Titchenal CA & Dobbs J. Journal of Food Composition and Analysis 20:717-724, 2007. 23/Get to know labneh, 2016. 24/Ayran, Turkey's favorite summer drink. Daily Sabah 2014.