

FERMENTED MILKS AROUND THE WORLD

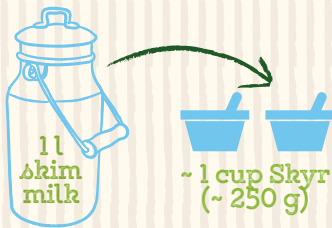
For centuries, fermented milks have provided essential nutrients and health benefits in human diets. Milk fermentation is as simple as adding live ferments to milk, leading to dozens of popular recipes around the world. How different are they? Get the science facts about Greek yogurt, lassi, skyr, laban,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

WHAT IS SKYR?

VERY THICK YET SKIM IS WHAT MAKES IT UNIQUE!



- Skyr is a fermented fresh acid-curd soft cheese made from SKIM milk ⁽¹⁾.
- Intense straining gives it a DENSE TEXTURE, so thick that a spoon will stand up in it.



FERMENTATION'S PROCESS

SKIM MILK + LACTIC ACID BACTERIA

- Needed for good quality skyr: *Streptococcus thermophilus* and *Lactobacillus delbrueckii ssp. bulgaricus* ^(1, 2, 3), as in a classic yogurt
 - Feed on the sugar content of milk (mainly lactose) yielding lactic acid → lowering sugar content, lowering pH that coagulates milk proteins
 - Lactobacilli produce aromatic diacetyl & acetaldehyde ⁽⁴⁾
- Occasional in skyr: *Lactococcus spp* & *Lactobacillus casei* ⁽⁵⁾

CULTURAL ORIGINS

- Skyr is a central part of the Icelandic diet and culture, brought 900 years ago by the Vikings from Norway ^(1, 6, 7)
- Originally made from ewe's milk, it is produced from cow's milk since the 20th century ^(2, 8)



- ♥ Skyr's origins
- ♡ Skyr's fans



TASTE*

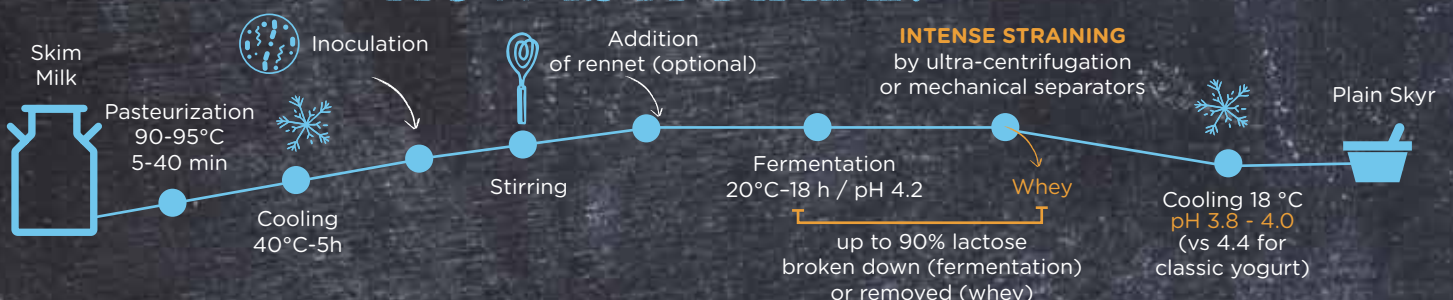
- Sour
- Sweet
- Bitter
- Cheesy flavor

TEXTURE*

- Liquid
- Creamy
- Fizzy
- NO • Set (as fermentation occurs in the pot)
- YES • Stirred (after fermentation, then packed)

* compared with plain yogurt

HOW IS IT MADE? (2, 5)



NUTRITION & HEALTH BENEFITS



→ HIGH IN PROTEIN

- May benefit weight loss by improving satiety in the long term ⁽⁹⁻¹¹⁾
- A key element of a quality breakfast by avoiding cravings and nibbling ⁽¹²⁾
- Contributes to the maintenance of muscle mass ⁽¹⁰⁾, particularly interesting for athletes and elderly

→ LOW IN LACTOSE

- As 90% is transformed during fermentation or removed by straining
- Also low in sugars ⁽¹³⁾



DID YOU KNOW?

Even though most Icelanders consider it as a fresh dairy, as it is eaten like yogurt ⁽³⁾, Skyr is rather a cheese:

- Intense straining increases concentration as in cheese making ⁽⁶⁾
- Rennet – curdling enzymes found in cows stomach - may be added to encourage coagulation, as permitted in Icelandic regulation ⁽¹⁾

SKYR-LIKE PRODUCTS ⁽¹⁾



- **Quarg** in Germany
- **Tvorog** in Russia
- **Labneh** in the Middle East



WHEN TO EAT?

- For breakfast or snacking
- Eaten plain during a meal
- Used for cooking

1001 WAYS TO ENJOY IT



- Locally served cold, in some milk and topped with cream. Icelanders do not stir it together to keep a mouthfeel of the various textures ^(2, 7, 14)
- Often flavored with berries and fruits ^(1, 2)
- Crucial for a skyr cake (revisited cheesecake) or a skyr amisu (revisited tiramisu)
- As a nonfat alternative to cream when cooking or as a topping ⁽⁷⁾

References

1/ **Gudmundsson G**, Kristbergsson K. Modernization of Skyr Processing. Eds Springer, 2016. 2/ **Tamime A**. Structure of Dairy Products. Eds Blackwell Publishing, 2007. 3/ **Valsdóttir T**. Traditional skyr vs large scale production: effect of production methods on sensory experience. Matis educational material, 2018. 4/ **FAO**. Production of Cultured Milk. Milk Processing Guide Series. 5/ **Hui YH**. Handbook of Food Products Manufacturing. Eds Wiley, 2007. 6/ **Brotherthon C**. What is skyr? Cook's Illustrated, 2016. 7/ **Bethune M**. This is how Iceland really does skyr. Kitchnn, 2017. 8/ **Slow Food Foundation for Biodiversity**. Traditional Icelandic skyr. 9/ **Bendtsen LQ** et al. Effect of dairy proteins on appetite, energy expenditure, body weight, and composition: a review. *Advances in Nutrition* 4:418-438, 2013. 10/ **Efsa**. Scientific opinion related to protein. *Efsa Journal* 8:1811, 2010. 11/ **Njike VY** et al. Snack food, satiety, and weight. *Advances in Nutrition* 7:866-878, 2016. 12/ **O'Neil CE** et al. The role of breakfast in health: definition and criteria for a quality breakfast. *Journal of the Academy of Nutrition and Dietetics* 114:S8-S26, 2014. 13/ **Efsa**. Regulation 1924/2006 on nutrition and health claims. 14/ **Amilien V**. Icelandic food culture. *Anthropology of Food*, S7, 2012. 15/ **USDA**. FoodData Central. Skyr yogurt, plain, ID: 371112, 2017. Yogurt, plain, ID: 356692, 2017. Milk, nonfat, ID:173432, 2019. 16/ **Open Food Facts**. Skyr. 17/ **ISGEM**, the Icelandic food composition database.



NUTRITION FACTS

COMMON PORTION SIZES:



1 container (140-150 g)

In average, for 100 g of plain skyr ^(15,16)

CALORIES

48-62 kcal

- Dairy protein: all essential amino acids

PROTEIN

8.8-10 g

- About twice the protein in plain yogurt (5.7 g ⁽¹⁵⁾)
- Dairy protein: high biological value, provides all essential amino acids

CALCIUM

84 mg ⁽¹⁵⁾

- Dairy calcium, well absorbed

FATS

0-0.2 g

- Made from skim milk
- Nevertheless, has a creamy mouthfeel

SUGARS ⁽¹⁵⁾

2.7 g

- Around 40% less than in plain yogurt ⁽¹⁵⁾

OTHER NUTRIENTS

Vit B1*: 0.1 mg ⁽¹⁾

Zinc: 0.4 mg 0.5 mg ⁽¹⁷⁾

Vit B2*: 0.29 mg ⁽¹⁾

* higher than in skim cow's milk ⁽¹⁵⁾



YOGURT
IN
NUTRITION

INITIATIVE FOR A BALANCED DIET