Cheeses of Turkey: 2. Varieties ripened under brine

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Received 16 July 2007 – Accepted 11 October 2007

Abstract – Although a large number of traditional brined cheese varieties are produced in Turkey, very few are manufactured on an industrial level. The most popular brined cheese in Turkey is Beyaz peynir; other varieties produced at substantial levels include Otlu, Mihalic, Urfa, Malatya, Gaziantep, Hellim, Orgu, Ezine and Dil. Local production of these cheeses has increased significantly and some of them can be found readily throughout Turkey. The volume of milk used in the manufacture of traditional cheese varieties in Turkey is fairly high. Therefore, there is a need to fully understand the microbiological, chemical and biochemical changes that occur in traditional cheeses during processing and/or ripening, so that industrialisation of these products would be possible. This review describes the manufacturing practices, and microbiological and biochemical/chemical properties of traditional Turkish brined cheeses. The description of Beyaz peynir is updated, but other brined varieties are discussed initially.

cheeses of Turkey / brine / white cheese / proteolysis / microbiology / ripening

摘 要 – 土耳其干酪 2: 盐水成熟干酪的种类。摘要 尽管在土耳其传统盐水干酪的品种很多，但工业化生产的品种较少。其中最受欢迎的是 Beyaz peynir 干酪，其次是 Otlu、Mihalic、Urfa、Malatya、Gaziantep、Hellim、Orgu、Ezine 及 Dil 干酪。这些干酪在当地的产量逐年增加，有的干酪品种已经在全国范围内生产。在土耳其，用于生产传统干酪的原料奶的消耗量相当大。因此，有必要全面地了解传统干酪加工和成熟过程中微生物、生化和化学变化，使这些产品的工业化生产成为可能。本文介绍了传统土耳其盐水干酪的制作工艺，以及其微生物学、生物化学特性。着重介绍了 Beyaz peynir 干酪的最新研究进展，并对其它品种的盐水干酪进行了回顾。

土耳其干酪 / 盐水 / 白干酪 / 蛋白水解 / 微生物学 / 成熟

Résumé – Fromages de Turquie : 2. Variétés affinées en saumure. Bien qu’un grand nombre de variétés traditionnelles de fromages affinés soient produites en Turquie, très peu d’entre elles le sont au niveau industriel. Le fromage affiné en saumure le plus populaire en Turquie est le Beyaz peynir; d’autres variétés produites à des niveaux substantiels incluent les fromages Otlu, Mihalic, Urfa, Malatya, Gaziantep, Hellim, Orgu, Ezine et Dil. La production locale de ces fromages a augmenté significativement et certains d’entre eux peuvent être trouvés facilement partout en Turquie. Le volume de lait utilisé dans la fabrication des variétés de fromage traditionnelles en Turquie est assez élevé.

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Il y a donc besoin de bien comprendre les changements microbiologiques, chimiques et biochimiques qui interviennent dans les fromages traditionnels au cours de la fabrication et/ou de l'affinage de façon à rendre possible l'industrialisation de ces produits. Cette revue décrit les pratiques technologiques et les propriétés microbiologiques et biochimiques/chimiques des fromages turcs traditionnels saumurés. La description du Beyaz peynir est actualisée, mais d’autres variétés saumurées sont présentées pour la première fois.

fromage de Turquie / saumure / pâte fraîche / protéolyse / microbiologie / affinage

1. INTRODUCTION

Brined cheeses are manufactured mainly in Mediterranean and Balkan countries, including Turkey. They are produced under different names, i.e., Beyaz peynir (Turkey), Feta (Greece), Bjalo Salamureno Sirene (Bulgaria), Domiati (Egypt), Teleme (Greece, Romania, Turkey), Iranian White (Iran) and Beli Sir U Kriskama (former Yugoslavia) [33]. Some local varieties ripened under brine are also produced in the above-mentioned countries. Some examples in Turkey are Urfa, Gaziantep, Malatya, Orgu, Mihalic, Ezine, Dil, Otlu and Hellim (Fig. 1); Sfela, Batzos, Kalathaki Limnou in Greece [9]; Gibna beyda in Sudan, Mish in Egypt, Nabulsi in Jordan, Mudaffara in Sudan and Middle Eastern countries, Akawi in Lebanon and Syria [2]. In general, these cheeses have no rind and a salty and slightly acidic taste which arise from storage in a dense brine (12 to 18% NaCl) and the action of lactic acid bacteria during ripening, respectively. Therefore, salt and acid are the critical parameters for conservation of these types of cheese and are checked periodically during maturation to ensure the quality of the cheese.

The cheeses were produced originally from sheep’s or goats’ milk, but recently, cows’ milk or mixtures of these types of milk are used. Since the lactation period of sheep or goats is shorter than that of cows, the use of cows’ milk has increased gradually. However, some types of brined cheeses are produced in Turkey from sheep’s milk only. Ezine cheese is produced from milk of the Sakiz breed in Ezine county of Canakkale, which has obtained a designation “Controlled Geographical Origin”. Also, Urfa cheese is made traditionally from Awassi sheep’s milk in the Sanliurfa region.

2. BEYAZ PEYNIR (TURKISH WHITE BRINED CHEESE)

2.1. Chemical and technological aspects

Beyaz peynir is the most popular cheese variety in Turkey, representing about 60% of the country’s total cheese production; its manufacture dates back thousands of years [72]. The classical product is generally cubical or rectangular in shape with no rind [33]. Although no specific definition of Beyaz peynir is available in the Turkish Standards (TS) based on its moisture content, some researchers have defined the product as semi-hard [73, 74] or semi-soft [19]. According to the present Turkish Standards, Beyaz peynir is divided into four groups based on the % fat-in-dry matter (FDM):

- full-fat (minimum 45 g·100 g⁻¹ FDM);
- semi-fat (30–44 g·100 g⁻¹ FDM);
- low-fat (20–29 g·100 g⁻¹ FDM); and
- non-fat (< 20 g·100 g⁻¹ FDM).

The production technology and chemical, microbiological and biochemical properties of Beyaz peynir were reviewed by Hayaloglu et al. [33]. The manufacturing protocol for Beyaz peynir shows similarities to Feta cheese-making, with slight differences. Cows’, sheep’s, goats’ milk or