

Methods of Casein Isolation from Raw Sheep Milk, Cheese Curd and Fresh Sheep Cheese for Dynamic Light Scattering Analysis

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Abstract

Different isolation methods of casein from milk, cheese curd and fresh cheese are applied when preparing samples for its characterization. One of the most important characteristics of casein from different dairy products is the size of its particles. Dynamic Light Scattering (DLS) may be used as a method for size determination of casein particles. According to the literature, isolation of casein for DLS size measurement can be done by several different procedures. The aim of this preliminary research was: (i) to examine possibilities of casein isolation from raw sheep milk, cheese curd and fresh sheep cheese by the same method, (ii) to optimize preparation of isolated casein for DLS measurements, (iii) to examine applicability of DLS for the determination of the casein particles size. Samples of milk ($n=3$), cheese curd ($n=3$) and fresh sheep cheese ($n=3$) were collected three times during east Friesian sheep lactation period. First samples were obtained at the beginning of lactation period, second in the middle and third at the end of the lactation period. Two methods for casein isolation were used, one for isolation of casein from raw sheep milk [1]*, and the other for casein isolation from cheese curd and fresh sheep cheese [2]*. Size of casein particles, in the prepared suspensions, was determined by DLS using Zetasizer Nano ZS (Malvern, UK) operated with green laser (532 nm). For every sample measurements were repeated ten times. The mean size of casein particles isolated from milk was 175.63 nm, from cheese curd 11.71 nm and from fresh sheep cheese 11.77 nm. Obtained results are in the accordance with literature data. In conclusion, DLS is suitable and reliable method for determination of size of casein particles isolated from raw sheep milk, cheese curd and fresh sheep cheese.

Key words: casein, milk, curd, cheese, DLS

[1]*-ISO 17997-2:2004 Milk – determination of casein-nitrogen content, Part 2: Direct method

[2]*-Ridascreen Casein: Enzyme immunoassay for the analysis of bovine casein, Art.No.:R5102, R-Biopharm AG, Darmstadt, Germany, 2006.

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Metode izolacije kazeina iz sirovog ovčjeg mlijeka, sirnog gruša i svježeg ovčjeg sira za analizu dinamičkim raspršivanjem svjetlosti

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Sažetak

Za izolaciju kazeina iz mlijeka, gruša i sira, radi njegove karakterizacije, koriste se različite metode. Jedan od najznačajnijih parametara za karakterizaciju kazeina iz različitih mliječnih proizvoda je veličina njegovih čestica, koja se može odrediti i metodom dinamičkog raspršivanja svjetlosti (Dynamic Light Scattering – DLS). U literaturi su opisane i različite metode pripreme uzorka za mjerenje veličine izoliranog kazeina. Cilj ovog preliminarnog istraživanja bio je: (i) utvrditi mogućnost izolacije kazeina iz sirovog ovčjeg mlijeka, sirnog gruša i svježeg ovčjeg sira istom metodom, (ii) optimizirati pripremu izoliranog kazeina za mjerenje, (iii) utvrditi mogućnost mjerenja veličine kazeinske čestice metodom DLS. Uzorci mlijeka ($n=3$), sirnog gruša ($n=3$) i svježeg ovčjeg sira ($n=3$) prikupljeni su tijekom laktacije istočnofrizijskih ovaca. Prvi uzorci mlijeka, sirnog gruša i svježeg sira uzeti su početkom, drugi sredinom a treći krajem laktacije. Za izolaciju kazeina iz uzoraka korištene su dvije metode, jedna metoda za izolaciju kazeina iz mlijeka [1]*, a druga metoda za izolaciju kazeina iz sirnog gruša i svježeg sira [2]*. Veličina kazeinskih čestica u pripremljenim suspenzijama izmjerena je metodom DLS na Zetasizer Nano ZS Malvern, UK opremljenim zelenim laserom (532 nm). Mjerenje je za svaki uzorak ponovljeno 10 puta. Prosječna veličina kazeinskih čestica izoliranih iz mlijeka bila je 175,63 nm, iz sirnog gruša 11,71 nm, a iz svježeg sira 11,77 nm. Dobiveni rezultati su u skladu s podacima iz literature. Metoda DLS pokazala se kao prikladna i pouzdana metoda za mjerenje veličine kazeinskih čestica izoliranih iz sirovog ovčjeg mlijeka, sirnog gruša i svježeg ovčjeg sira.

Ključne riječi: kazein, mlijeko, gruš, sir, DLS

[1]*-ISO 17997-2:2004 Milk – determination of casein-nitrogen content, Part 2: Direct method
[2]*-Ridascreen Casein: Enzyme immunoassay for the analysis of bovine casein, Art.No.:R5102, R-Biopharm AG, Darmstadt, Germany, 2006.

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