



Determination of water content with 774 KF Automated Oven Sample Processor in samples that are Maillard reaction producing

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Abstract: The water is obligatory quality indicator of all foodstuffs. However, its determination is not always easy because it could result in loosing of volatile compounds (heating) sample degradation or transformation. Results from heating methods will often show amount of all volatile compounds and not just water. The second problem caused by heating is Maillard reaction, during which water is produced in samples with high sugar and protein content. It is hard to distinguish water that is originally from sample and water produced by Maillard reaction. That asks for determination of two “kinds” of water: originally present in a sample and water produced in Maillard reaction. Karl Fischer titration is the most promising method for water determination which relies on chemical reaction of water. Our investigation used the method that combines the 774 Oven Sample processor (Metrohm) with coulometric Karl Fisher titration and as the control method classical volumetric Karl Fischer titration. The model systems were different combinations of whey protein and maltodextrin. Some 550 determinations, including parallels were made. The results have indicated, depending on proteins-maltodextrin ratio, a range of 0.34 % to 0.80 % of total sample water was produced in Maillard reaction.

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Sažetak

Određivanje sadržaja vode je obavezan indikator kvaliteta hrane. Ipak, njeno određivanje nije uvijek jednostavno jer može doći do gubitka isparljivih komponenti (zagrijavanje) degradacije ili transformacije uzorka. Metode koje koriste zagrijavanje će često pokazati količinu svih isparljivih komponenti a ne samo vode. Drugi problem zagrijavanja je Majarova reakcija gdje se proizvodi voda u uzorcima sa visokim sadržajem šećera i proteina. Teško je razlučiti vodu koja je originalno u uzorku i vodu koja je proizvedena Majarovom reakcijom. U tim slučajevima je neophodno odrediti dvije „vrste“ vode: ona koja je normalno prisutna u uzorku i ona koja nastaje u Majarovoj reakciji. Titracija po Karl-Fischeru je metoda za određivanje vode koja najviše obećava i koja koristi kemijsku reakciju vode. Naše istraživanje kombinira 774 Automated Karl Fischer Oven Sample Processor sa kulometrijskom Karl-Fischer-ovom titracijom sa klasičnom Karl Fisher volumetrijskom titracijom kao kontrolnom metodom. Modelni sistemi su bile kombinacije proteina sirutke I maltodekstrina, u različitim odnosima. Uključujući paralelke, urađeno je oko 550 određivanja. Rezultati pokazuju da, ovisno o odnosu proteina sirutke i maltodekstrina, sadržaj vode porijeklom iz Majarove reakcije iznosi 0,34% do 0,80% od ukupnog sadržaja vode.