TECHNICAL DATA SHEET
PROTEON DUO MILK EXPRESS

Scope

PROTEON DUO MILK EXPRESS is an immunochromatographic test in the form of rapid strips for the detection of milk proteins in foods and surfaces. The assay is based on the detection of casein and β-lactoglobulin, which react with specific antibodies bound to red particles on the test strip.

The double detection of these major proteins is especially useful since with a single test the presence of milk can be detected, regardless of its origin. Furthermore, the detection of these two groups of proteins is an advantage when analyzing highly processed foods, since caseins are more resistant to high temperatures.

Applicability

The Proteon Duo Milk Express test can be applied to detect milk proteins in solid and liquid foods, rinse waters and work surfaces.

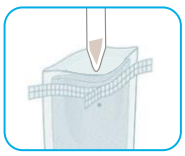
Test procedure

Detailed information on the procedure is available in the product script.

Analysis of food and rinse waters

1g/10 ml AB
1 mL/9 ml AB

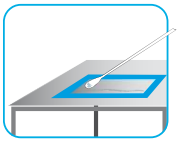
Rub the mixture
1-2 min approx



Collect the
filtered sample

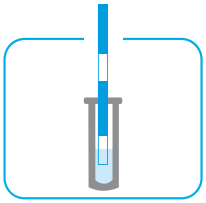
Analysis of surfaces

Dip a swab in
0.5 ml of AB

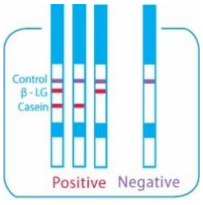


Swab the surface

Stir



Introduce the strip
and wait for 10 min
(15-25 °C)



Results

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Analytical parameters of the test

Table 1. Analytical parameters of the Proteon Duo Milk Express test

Detection limit in food[1]	Casein: 2 ppm (2.4 ppm of milk proteins) BLG: 0.25 ppm (2.5 ppm of milk proteins)
Detection limit on surfaces[2]	0.7 µg milk proteins (β-lactoglobulin test line) 0.7 µg milk proteins (Casein test line)
Working range[3]	1-40000 ppm milk protein

[1]The detection limit of the test is calculated using the POD (Probability of detection) method.

[2]In the application of work surfaces the detection limit was calculated by analyzing a stainless steel surface.

[3]Concentrations above 40 g/kg of milk protein can give negative results. It is recommended to carry out an additional dilution in the extraction phase of these samples.

The detection limit was confirmed by analyzing different matrices fortified with UHT milk. Among the validated matrices are juices, liqueurs, ice creams, infant formulas, yogurts, vegetable drinks, salad dressings, sausage and pate.

The effect of thermal processing was analyzed by studying the detection of milk powder in matrices before undergoing thermal treatment. These matrices were made in the pilot plant of the University of Zaragoza, simulating industrial manufacturing conditions. The detection level was located at 1 ppm of milk in cooked matrices (sausages), 1 ppm of milk in baked matrices (sliced bread) and 1 ppm of milk in sterilization processes (pâté).

Specificity

Specificity was evaluated against a panel of basic ingredients. The results are shown in Table 2. All these matrices were analyzed in parallel with the Sandwich ELISA test against casein and β-lactoglobulin to confirm the absence of milk proteins.

Table 2. Results of the specificity assays of the Proteon Duo Milk Express test

Ingredient	*Result*	*Ingredient*	*Result*	*Ingredient*	*Result*
Raw almond	NEGATIVE	Sesame	NEGATIVE	Pea	NEGATIVE
Cashew	NEGATIVE	Buckwheat	NEGATIVE	Kiwi	NEGATIVE
Walnut	NEGATIVE	Oats	NEGATIVE	Carrot	NEGATIVE
Pecan nut	NEGATIVE	Wheat	NEGATIVE	Coconut	NEGATIVE
Brazil nut	NEGATIVE	Corn	NEGATIVE	Cocoa	NEGATIVE
Pistachio	NEGATIVE	Rye	NEGATIVE	Lecithin	NEGATIVE
Hazelnut	NEGATIVE	Barley	NEGATIVE	Hake	NEGATIVE
Poppy seeds	NEGATIVE	Chickpeas	NEGATIVE	Chicken	NEGATIVE
Pumpkin seeds	NEGATIVE	Lentils	NEGATIVE	Egg	NEGATIVE
Pinions	NEGATIVE	Soy	NEGATIVE		
Sunflower seeds	NEGATIVE	Beans	NEGATIVE		

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Conversion factors

Table 3. Conversion factors between milk and milk proteins.

Milk powder	Total proteins	β-lactoglobulin	caseins
1 ppm	0.35 ppm	0.03 ppm	0.28 ppm

Bibliography

A Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers (http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri= CELEX:32011R1169&from=ES)

Bobe G, Lindberg GL, Freeman AE, Beitz DC. Short communication: Composition of Milk Protein and Milk Fatty Acids Is Stable for Cows Differing in Genetic Merit for Milk Production. J Dairy Sci. 2007 Aug; 90(8):3955-60.

Ng-Kwai-Hang KF, hayes JF, Moxley JE, Monardes HG. Relationships between milk protein polymorphisms and major milk constituents in Holstein-Friesian cows. J Dairy Sci. 1986; 69(1): 22-26.

Guidance on food allergen management for food manufactures (2013), Food and Drink Europe, Brussels, Belgium (http://www.fooddrinkeurope.eu/uploads/press-releases_documents/temp_file_FINAL_Allergen_A4_web1.pdf)

Appendix M: Validation Procedures for Quantitative. Food Allergen ELISA Methods: Community Guidance and Best Practices. AOAC 2012 (http://www.eoma.aoac.org/app_m.pdf)

Appendix F: Guidelines for Standard Method Performance Requirements. Official Methods of Analysis (2016), AOAC INTERNATIONAL, Rockville, MD, USA (http://www.eoma.aoac.org/app_f.pdf)

Standard Method Performance Requirements (SMPRs®) for Detection and Quantitation of Selected Food Allergens. AOAC SMPR 2016.002. AOAC INTERNATIONAL, Rockville, MD, USA (https://www.aoac.org/aoac_prod_imis/AOAC_Docs/SMPRs/SMPR%202016_002.pdf).

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De Luis R, Mata L, Estopañán G, Lavilla M, Sánchez L and Pérez MD. Evaluation of indirect competitive and double antibody sandwich ELISA tests to determine β-lactoglobulin and ovomucoid in model processed foods. Food and Agricultural Immunology 2008; 19 (4): 339-350.

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