

MC-Media Pad

How to handle difficult to test matrices

The MC-Media Pad is designed as a convenient method for rapid routine testing of microbial contamination in food and beverage samples throughout production, from raw materials, to finished products. The MC-Media Pad solution is composed of a series of ready-to-use pads for total count and specific detection and enumeration of indicator organisms.

Each MC-Media Pad consists of a fabric pad coated with a dedicated culture media formulation, placed on an adhesive support with a transparent gas permeable cover.

MC-Media Pads have been specifically developed for the testing of 1 mL food samples.

An extensive list of food and beverage matrices described in the AOAC-PTM and MicroVal validation reports¹ and detailed in the document entitled MC-Media Pad: A Convenient and Approved Method for Counting Contaminants in Food and Beverage products², have been tested with the MC-Media Pad product range to demonstrate equivalency with control methods. The objective of this study is to show additional performance data, handling recommendations and interpretation guidelines for food and beverage products that exhibit special characteristics such as high salt content, strong colored background, high viscosity, high fat or sugar content, high acidity or enzymatic activity.

Method

MC-Media Pad RAC (Rapid Aerobic Count), MC-Media Pad CC (Coliform), MC-Media Pad EC/CC (*E. coli* & Coliform) and MC-Media Pad YM (Yeast & Mold) were used in this study.

Food and Beverage Matrix Selection

10 different food and beverage products with special characteristics were selected to challenge MC-Media Pad performances and are listed in the table below.

Food products	Characteristic
Mozzarella	Cheese products with potential enzymatic activity
Brie	
Powdered Pecorino	
Flavored yogurt	Dairy product
Black pepper	Dehydrated product
Dry soup	
Chocolate pudding	Cooked product
Cola	Acidic and high sugar content products with a black colored background
Inverted sugar syrup	Viscous product with high sugar content
Mayonnaise	Fatty and viscous product

Sample Preparation

Portions of 10 g or 10 mL of each food sample were added to a stomacher bag or blender cup. 90 mL of diluents (sterile 0.9% NaCl solution (Sodium chloride - MilliporeSigma Cat. 1.06400.1000) was then added to the stomacher bag or blender cup and stomached or homogenized for 2 mins (Enrichment Sample Homogenizer ESH - MilliporeSigma Cat. 5.42765.0001).

A portion of 0.1 g of black pepper was diluted with 99.9 mL of sterile 0.9% NaCl solution following the same sample preparation method.

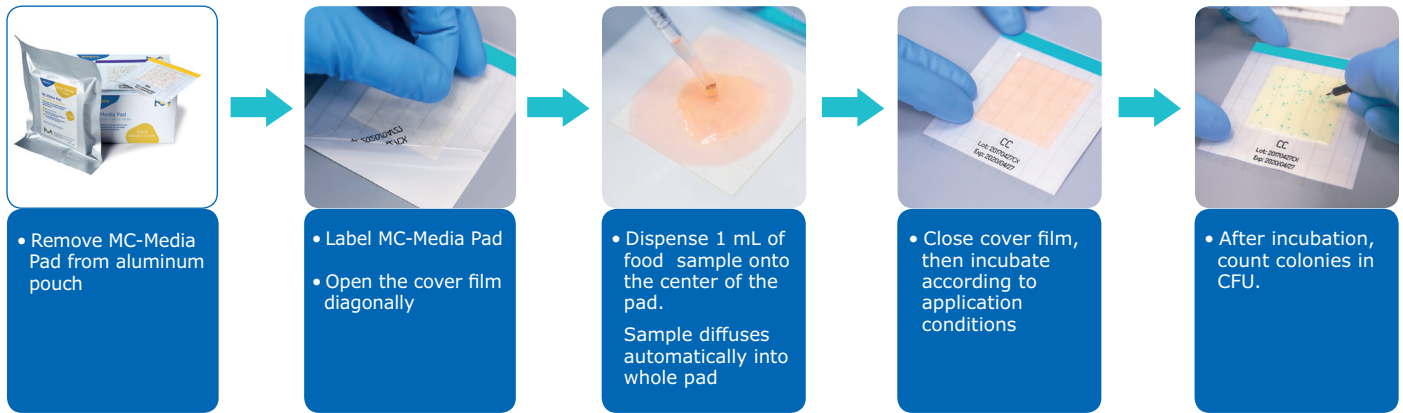
One additional 1:10 dilution step in the same diluent may be required depending on food matrices.

pH may be adjusted to 7 with 1N NaOH for acidic products.

Sample homogenate was then inoculated with 20 to 80 CFUs of *Escherichia coli* ATCC® 25922, or *Salmonella typhimurium* ATCC® 14028 for MC-Media Pad Rapid Aerobic Count, MC-Media Pad Coliform, MC-Media Pad *E. coli* / Coliform and with *Saccharomyces cerevisiae* ATCC® 9763 or *Mucor racemosus* ATCC® 42647 for MC-Media Pad Yeast / Mold.

Incubation times and temperature were in accordance with that described in the user guide of each MC-Media Pad reference.

MC-Media Pad Protocol



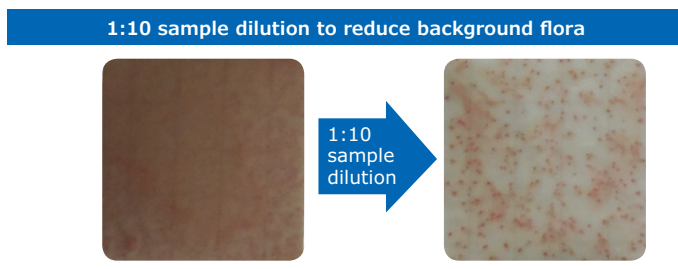
Results

Dairy and cheese products: Mozzarella, Brie, powdered Pecorino and flavored yogurt

Total count with MC-Media Pad in cheeses:

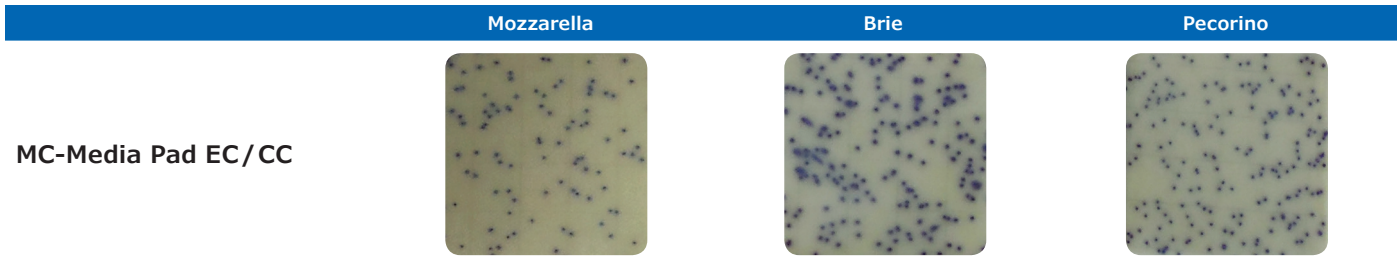
	Mozzarella	Brie	Pecorino
MC-Media Pad RAC			

Results showed that total count enumeration with MC-Media Pad RAC is compatible with cheese products. When there is significant background flora, an additional dilution step is performed to avoid the appearance of a red layer on the pad and for a count below 300 CFU as shown in the example below with Brie.

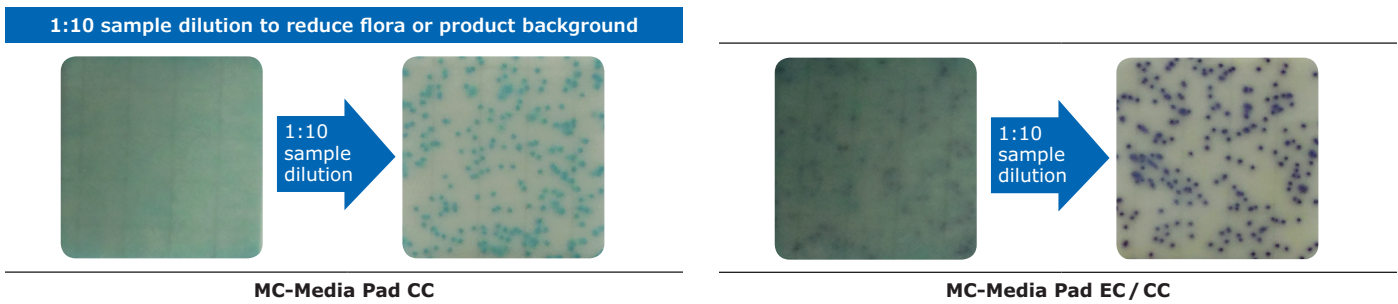


Coliform and *E. coli*/coliform enumeration with MC-Media Pad in cheeses:

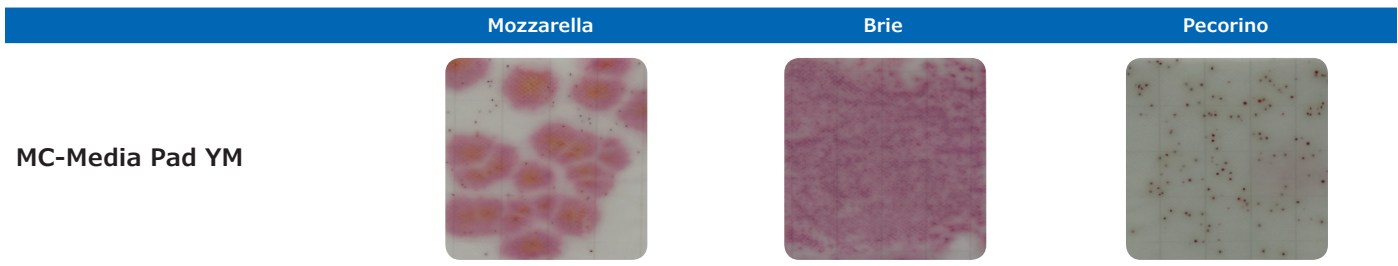
	Mozzarella	Brie	Pecorino
MC-Media Pad CC			



Results showed that coliforms and *E. coli* & Coliform enumeration with MC-Media Pad CC and MC-Media Pad CC/EC is compatible with cheese products giving rise to blue/blue-green colonies of coliform and red-purple/navy of *E. coli*. When there is significant background flora or an enzymatic activity of the product generating a blue/blue-green background, an additional dilution step is necessary to avoid getting a blue layer on the pad for a count of below 300 CFU, as shown in the example below with Brie matrix.

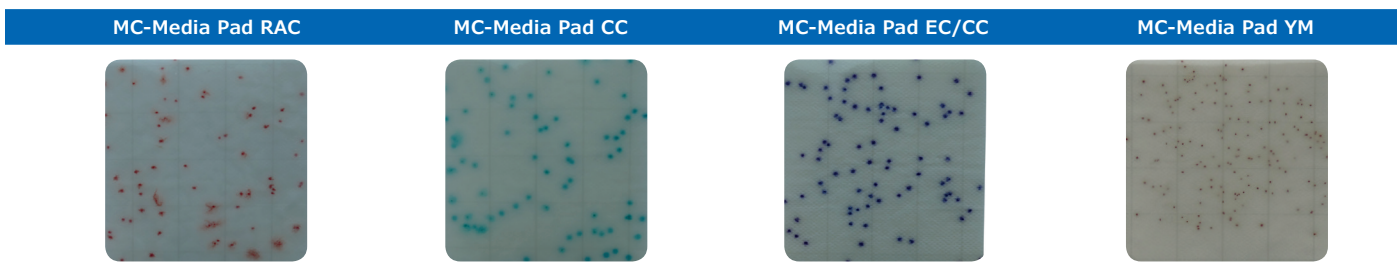


Yeast and Mold enumeration in cheeses with MC Media Pad YM:



Results showed that enumeration of yeasts and molds with MC-Media Pad YM is compatible with cheese products. A significant background in the Brie sample due to molds required an additional 1:10 dilution step to ease enumeration.

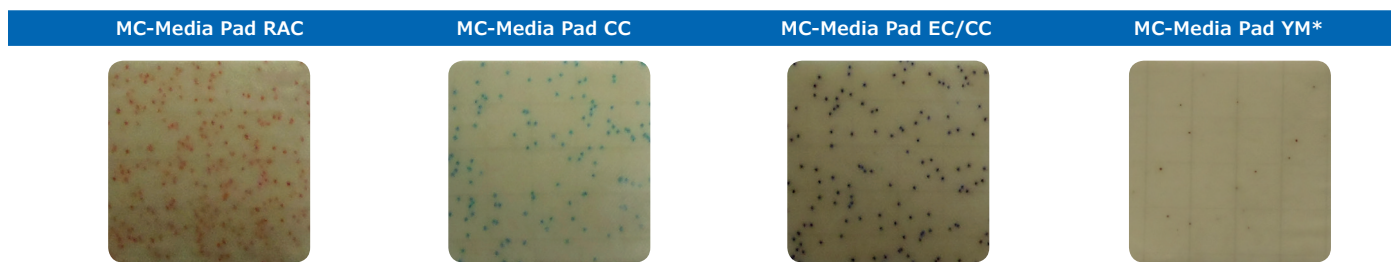
Flavored yogurt:



Results showed that detection and enumeration of yeasts and mold contaminants in yogurt can be achieved with and without an additional 1:10 dilution step. One 1:10 dilution step may be added in the protocol to remove background color from some products improving colony contrast and facilitating counting.

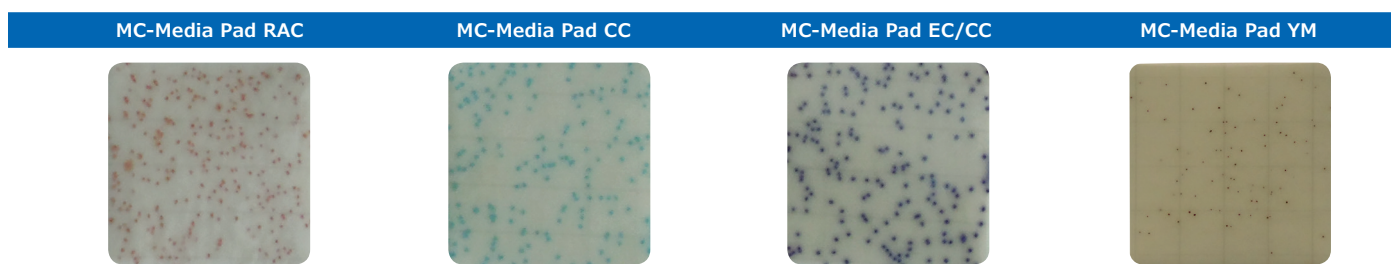
Dehydrated product testing: black pepper and dried soup

Black Pepper:



* Colonies are more visible on the original MC-Media Pad than it appears on the picture.

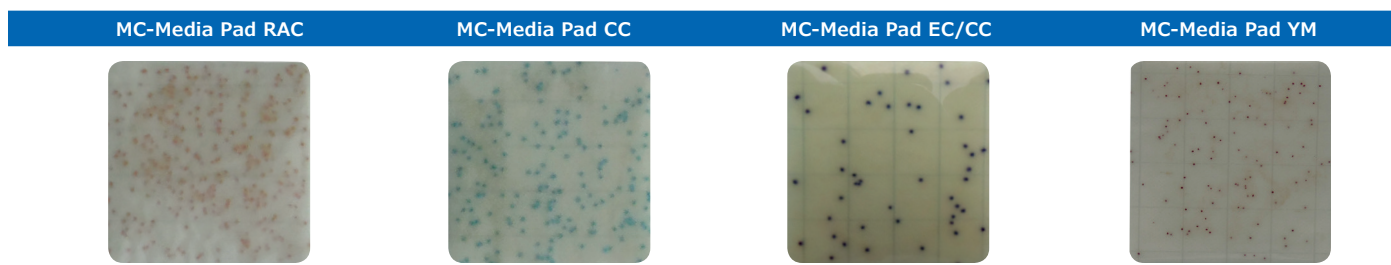
Dried soup:



Detection of contaminants is achieved with the 4 MC-Media Pad references exhibiting growth performance and staining according specifications. There are no background or particles in the pad. Results are obtained following the described protocol with and without an 1:10 additional dilution step. Pictures presented here summarized growth and staining with an additional 1:10 dilution step.

Cooked product

Chocolate pudding:



Detection of contaminants in chocolate is achieved with and without an additional 1:10 dilution step. One 1:10 dilution step has been added in the protocol to remove background brown color (see example below).

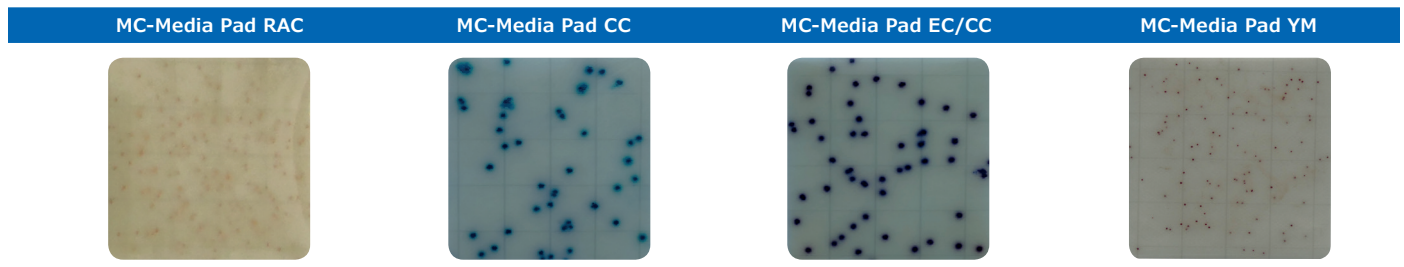


Detection of *E. coli* in MC-Media Pad EC/CC with 1:10 food product dilution (right side) and without dilution (left side)

Enumeration conforms in both cases but colored background is removed after 1:10 dilution.

Acidic and high sugar content product

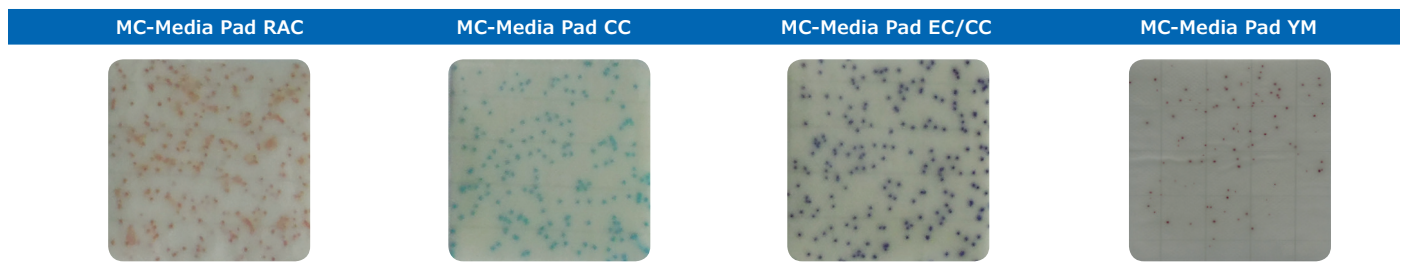
Cola:



Detection and enumeration of contaminants in cola product is easily achieved after pH adjustment to 7 with 1N NaOH.

Fatty and viscous product

Mayonnaise:



Depending on product viscosity, an additional dilution step may be required to enhance sample diffusion to whole pad. It was not necessary for the mayonnaise. Results show that contamination in fatty and viscous product can be enumerated with MC-Media Pad solution.

Conclusion:

Results generated in this study demonstrate that MC-Media Pads can be used to easily detect and enumerate indicator organism contamination in challenging food and beverage matrices with properties including high sugar or fat content, high viscosity, high acidity or enzymatic or colored backgrounds.

In addition to the suitability for difficult to test matrices, MC-Media Pads provide some benefits in terms of color-coding, handling, time to results for yeasts and molds in 48 hours, and improved read-out using chromogenic substances / specific dyes allowing a fast and convenient control of microbial contamination.

References

1. MC-Media Pad Rapid Aerobic Count AOAC cert -no 091702, MicroVal cert-no 2015LR52
MC-Media Pad Coliform AOAC cert -no 100402
MC-Media Pad E. coli & Coliform AOAC cert -no 070901
MC-Media Pad Yeast & Mold AOAC cert -no 111401, MicroVal cert -no 2015LR51
2. MC-Media Pad: A Convenient and Approved Method for Counting Contaminants in Food and Beverage products

EMDMillipore.com/MC-MediaPads

MilliporeSigma
400 Summit Drive
Burlington, MA 01803

To place an order or receive technical assistance

In the U.S. and Canada, call toll-free 1-800-645-5476

For other countries across Europe and the world, please visit: EMDMillipore.com/offices

For Technical Service, please visit: EMDMillipore.com/techservice

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