



Quantitative Polymerase Chain Reaction (qPCR) is cutting edge molecular technology that analyzes for the genetic material called deoxyribonucleic acid (DNA) that is found in every cell. DNA is unique for every individual organism. Using qPCR allows for the detection of fungi, bacteria and certain viruses by identifying the presence of their specific DNA in their genome.

qPCR analysis of fungi and certain bacteria is performed at EMSL Analytical Inc. under a Patent License Agreement with the EPA National Exposure and Research Laboratory. EMSL is currently developing several methods using qPCR for the detection of pathogenic bacteria and viruses that are of interest to the indoor air quality, food, consumer products, and pharmaceutical industries.

qPCR can detect the presence of small quantities of organisms whether they are alive, dead or cannot be cultured. For these reasons, qPCR is a fast, accurate, sensitive and specific alternative analysis that has many advantages over traditional microbiological methods that involve microscopic direct examination or culturing.

Key tests include (but not limited to) the following:

PCR - WATER DAMAGE PANELS

- Environmental Relative Moldiness Index (ERMI)
- American Relative Moldiness Index (ARMI)
- Water Damage 10 Panel
- Water Damage 15 Panel
- Water Damage 20 Panel
- *Aspergillus/Penicillium* Screen

PCR - ASPERGILLUS PANELS

- *Aspergillus* Comprehensive 15 Panel
- *Aspergillus* Common 10 Panel
- *Aspergillus* Nosocomial 6 Panel

PCR - PENICILLIUM PANELS

- *Penicillium* Comprehensive 13 Panel
- *Penicillium* Comprehensive Mycotoxin 9 Panel

PCR - FECAL CONTAMINATION INDICATORS

- *E. coli*
- Total *Enterococcus*
- Total *Bacteroides*
- Human *Bacteroides*

PCR - LEGIONELLA TESTING

- Broad Screen for 50 *Legionella* spp. and *Legionella pneumophila*
- *Legionella pneumophila*
- *Legionella micdadei*
- *Legionella sainthelensi/cincinnatiensis*
- *Legionella maceachernii*

PCR - TOTAL or HUMAN BACTEROIDES

PCR - PATHOGEN DETECTION PACKAGES

- MRSA - Methicillin-Resistant *Staphylococcus aureus*
- *Mycobacterium tuberculosis*
- *E. coli* O157:H7
- *Salmonella*
- Enteroviruses



PCR - Water Damage Panels

PCR - Environmental Relative Moldiness Index (ERMI) 36 Panel	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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This package was developed by the EPA and is being studied as a tool to help qualify the moldiness of homes.

Group I (Water Damage Indicators): <i>Aspergillus flavus, Aspergillus fumigatus, Aspergillus niger, Aspergillus ochraceus, Aspergillus penicillioides, Aspergillus restrictus, Aspergillus sclerotiorum, Aspergillus sydowii, Aspergillus unguis, Aspergillus versicolor, Aureobasidium pullulans, Chaetomium globosum, Cladosporium sphaerospermum, Eurotium (A) amstelodami, Paecilomyces variotii, Penicillium brevicompactum, Penicillium corylophilum, Penicillium crustosum, Penicillium purpurogenum, Penicillium spinulosum, Penicillium variabile, Scopulariopsis brevicaulis, Scopulariopsis chartarum, Stachybotrys chartarum, Trichoderma viride, Wallemia sebi</i> Group II (Ubiquitous Fungi): <i>Acremonium strictum, Alternaria alternata, Aspergillus ustus, Cladosporium cladosporioides v1, Cladosporium cladosporioides v2, Cladosporium herbarum, Epicoccum nigrum, Mucor & Rhizopus group, Penicillium chrysogenum, Rhizopus stolonifer</i>	M180	\$720	\$540	\$360	\$250	\$195
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PCR - American Relative Moldiness Index (ARMI)	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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This package was developed by the EPA to correlate with the ERMI above using fewer fungi.

Group I: <i>Aspergillus niger, Aspergillus ochraceus, Aspergillus penicillioides, Aspergillus restrictus, Aspergillus sydowii, Eurotium (A) amstelodami, Chaetomium globosum, Paecilomyces variotii, Penicillium chrysogenum, Wallemia sebi.</i> Group II: <i>Alternaria alternata, Cladosporium cladosporioides v1, Cladosporium herbarum</i>	M179	\$450	\$360	\$195	\$150	\$100
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PCR - EPA 36 Panel	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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This package includes the same fungi as in the ERMI but no ERMI index is included.

Use this package for non-dust samples or when the index is not needed.

PCR - Water Damage 20 Panel	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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This package is a subset of the EPA's ERMI Group I fungi that are commonly associated with water damaged environments.

<i>Aspergillus flavus, Aspergillus fumigatus, Aspergillus niger, Aspergillus ochraceus, Aspergillus penicillioides, Aspergillus sclerotiorum, Aspergillus sydowii, Aspergillus unguis, Aspergillus versicolor, Aureobasidium pullulans, Chaetomium globosum, Cladosporium sphaerospermum, Eurotium (A) amstelodami, Paecilomyces variotii, Penicillium brevicompactum, Penicillium corylophilum, Penicillium crustosum, Penicillium spinulosum, Penicillium variabile, Stachybotrys chartarum</i>	M181	\$590	\$445	\$295	\$200	\$150
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PCR - Water Damage 15 Panel	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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The following package is a subset of the EPA's ERMI Group I fungi that are commonly associated with water damaged environments.

<i>Aspergillus flavus, Aspergillus fumigatus, Aspergillus niger, Aspergillus sydowii, Aspergillus versicolor, Aureobasidium pullulans, Aureobasidium pullulans, Chaetomium globosum, Cladosporium sphaerospermum, Eurotium (A) amstelodami, Paecilomyces variotii, Penicillium brevicompactum, Penicillium corylophilum, Penicillium spinulosum, Penicillium variabile, Stachybotrys chartarum</i>	M182	\$490	\$386	\$245	\$175	\$120
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PCR - Water Damage 10 Panel	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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The following 10 organisms form a screen for fungi that are commonly associated with water damaged environments.

<i>Aspergillus/Penicillium Group, Aspergillus fumigatus, Aspergillus versicolor, Aureobasidium pullulans, Chaetomium globosum, Cladosporium sphaerospermum, Paecilomyces variotii, Stachybotrys chartarum, Scopulariopsis brevicaulis, Trichoderma viride</i>	M184	\$350	\$300	\$155	\$125	\$100
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Create Your Own Fungal Panel (Price per species)	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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Inquire for up-to-date list of species available in which to create your own fungal panel. More species will continue to be added over time and with client interest. Any number of individual available fungal species can be substituted in the above Water Damage Panels (at no cost) or added to the panel for an extra cost per species.

PCR - Wood Rot Fungi 10 Panel	Code	1 Week	2 Weeks
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The following 10 fungi are common wood rot fungi detected by Nested-PCR & confirmed by DNA Barcode Sequencing.

<i>Serpula lacrymans, Serpula himantioides, Meruliporia incrassata, Coniophora puteana, Antrodia vaillantii, Antrodia serialis, Postia placenta, Tapinella panuoides, Gloeophyllum trabeum, Donkioporia expansa</i>	M232	\$1,500	\$1,250
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PCR - Aspergillus Panels

PCR - Aspergillus Comprehensive 15 Panel	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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Comprehensive package of all available Aspergillus species.

<i>Eurotium (A) amstelodami, Aspergillus flavus, Aspergillus fumigatus, Emericella (A.) nidulans, Aspergillus niger, Aspergillus ochraceus, Aspergillus parasiticus, Aspergillus penicillioides, Aspergillus restrictus, Aspergillus sclerotiorum, Aspergillus sydowii, Aspergillus terreus, Aspergillus unguis, Aspergillus ustus, Aspergillus versicolor</i>	M186	\$500	\$375	\$250	\$180	\$125
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PCR - Aspergillus Common 10 Panel	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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Package of the most commonly encountered Aspergillus species.

<i>Eurotium (A) amstelodami, Aspergillus flavus, Aspergillus fumigatus, Emericella (A.) nidulans, Aspergillus niger, Aspergillus ochraceus, Aspergillus parasiticus, Aspergillus sydowii, Aspergillus ustus, Aspergillus versicolor</i>	M187	\$400	\$300	\$155	\$125	\$100
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PCR - Aspergillus Nosocomial 6 Panel	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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Package of the most common species responsible for aspergillosis and nosocomial Aspergillus infections.

<i>Aspergillus flavus, Aspergillus fumigatus, Emericella (A.) nidulans, Aspergillus niger, Aspergillus terreus, Aspergillus versicolor</i>	M188	\$280	\$210	\$140	\$115	\$90
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PCR - Penicillium Panels

PCR - Penicillium Comprehensive 13 Panel	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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Comprehensive package of commonly found Penicillium species in indoor environments.

<i>Penicillium aurantiogriseum, Penicillium brevicompactum, Penicillium chrysogenum, Penicillium citrinum, Penicillium corylophilum, Penicillium crustosum, Penicillium expansum, Penicillium fellutanum, Penicillium purpurogenum, Penicillium roquefortii, Penicillium simplicissimum, Penicillium spinulosum, Penicillium variabile</i>	M189	\$400	\$300	\$200	\$155	\$105
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PCR - Penicillium Comprehensive Mycotoxin 9 Panel	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
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Comprehensive package of all available mycotoxin producing Penicillium species.

<i>Penicillium aurantiogriseum, Penicillium brevicompactum, Penicillium chrysogenum, Penicillium citrinum, Penicillium crustosum, Penicillium expansum, Penicillium roquefortii, Penicillium simplicissimum, Penicillium variabile</i>	M190	\$350	\$280	\$150	\$120	\$95
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** Same Day Turn-Around-Times (anything less than 24hrs) are subject to restrictions including but not limited to Lab operational hours.



PCR/DNA - Rapid Pathogen Detection

Bacteria	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
<i>Anaplasma phagocytophilum</i> – Anaplasmosis	M261	\$500	\$400	\$250	\$180	\$150
<i>Borrelia burgdorferi</i> Lyme disease qPCR	M196	\$500	\$400	\$250	\$180	\$150
<i>Chlamydoiphila psittaci</i> avian zoonosis	M234	\$500	\$400	\$250	\$180	\$150
<i>Clostridium botulinum</i> PCR	M206	\$500	\$400	\$250	\$180	\$150
<i>Clostridium chauvoei</i> , blackleg disease nested PCR	M198	\$500	\$400	\$250	\$180	\$150
<i>E. coli</i> O157:H7 qPCR	M140	\$500	\$400	\$250	\$180	\$150
<i>Helicobacter pylori</i> qPCR	M207	\$500	\$400	\$250	\$180	\$150
MRSA - Methicillin-Resistant <i>Staphylococcus aureus</i> , qPCR	M203	\$500	\$400	\$250	\$180	\$150
<i>Mycobacterium avium</i> qPCR	M144	\$500	\$400	\$250	\$180	\$150
<i>Mycobacterium tuberculosis</i> by real-time PCR	M159	\$500	\$400	\$250	\$180	\$150
<i>Salmonella spp.</i> , qPCR	M141	\$500	\$400	\$250	\$180	\$150
<i>Shigella spp.</i> , qPCR	F122	\$500	\$400	\$250	\$180	\$150
Fungi	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
<i>Histoplasma capsulatum</i> NIOSH Nested PCR	M208	\$500	\$400	\$250	\$180	\$150
<i>Cryptococcus neoformans</i> qPCR	M143	\$500	\$400	\$250	\$180	\$150
Virus	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
Enteric Viruses	M142	N/A	N/A	\$500	\$420	\$350
Norovirus (Norwalk)	M204	N/A	N/A	N/A	N/A	\$350
Human Polyomavirus JC virus, BK virus	M216	N/A	N/A	N/A	N/A	\$350
Protozoan and Parasites	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
<i>Acanthamoeba spp.</i> , qPCR	M147	\$500	\$400	\$250	\$180	\$150
<i>Babesia microti</i> – Babesiosis	M260	\$500	\$400	\$250	\$180	\$150
<i>Baylisascaris procyonis</i> , raccoon roundworms	M236	\$500	\$400	\$250	\$180	\$150
<i>Giardia spp.</i> , qPCR	M149	\$500	\$400	\$250	\$180	\$150
<i>Naegleria fowleri</i> , nested PCR	M197	\$500	\$400	\$250	\$180	\$150
Insect	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
Bed bug (<i>Cimex lectularius</i>), qPCR	M146	\$500	\$400	\$250	\$180	\$150
PCR - DNA Sequencing	Code	6-10 Days				
Identify fungal or bacterial isolates by PCR & DNA Sequencing (Price is per isolate)	M192	\$185				
PCR/DNA - Authentication						
Food DNA Authentication	Code	3 Days	4 Days	1 Week		
Black Truffle Oil, Oat, Rice, Fruit, Fish, Meat, etc., PCR and DNA Sequencing	F130	Call	\$500	\$250		
Forensic and Legal Sample Authentication	Code	3 Days	4 Days	1 Week	2 Weeks	
Human Originated Biological Materials DNA Analysis (human mtDNA, human STR etc.)	M299	N/A	N/A	Call	Call	
Plant DNA Authentication	Code	3 Days	4 Days	1 Week		
<i>Cannabis sativa</i> (marijuana), PCR and DNA Sequencing	M193	N/A	\$500	\$250		
Tree, Wood DNA identification, PCR and DNA Sequencing	M194	N/A	\$800	\$500		
Animal/Insect Source Tracking DNA Authentication	Code	3 Days	4 Days	1 Week		
Mitochondrial DNA Detection, PCR and DNA Sequencing	M195	Call	\$500	\$250		
PCR - Legionella Panels						
PCR - Legionella - If viability is needed, see culturable tests page 21, separate sample required	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
<i>Legionella pneumophila</i> , <i>Legionella micdadei</i> , <i>Legionella sainthelensi/cincinnatiensis</i> , <i>Legionella maceachernii</i>	M162	\$450	\$350	\$185	\$155	\$125
Broad Screen for 50 <i>Legionella spp.</i> and rapid detection of <i>Legionella pneumophila</i> by real-time PCR	M163	\$450	\$350	\$165	\$135	\$105
<i>L. pneumophila</i>	M103	\$450	\$350	\$125	\$105	\$85
<i>L. micdadei</i>	M102	\$450	\$350	\$125	\$105	\$85
<i>L. sainthelensi/cincinnatiensis</i>	M104	\$450	\$350	\$125	\$105	\$85
<i>L. maceachernii</i>	M101	\$450	\$350	\$125	\$105	\$85
PCR - Fecal Contamination Indicators	Code	3 Hrs**	6 Hrs**	1 Day	2 Days	3 Days
<i>E. coli</i> (100 mL sample required)	M200	\$300	\$250	\$115	\$85	\$65
Total <i>Enterococcus</i> (100 mL sample required)	M096	\$300	\$250	\$115	\$85	\$65
<i>Bacteroides spp.</i> (100 mL sample required)	M095	\$300	\$250	\$115	\$85	\$65
Human <i>Bacteroides spp.</i> , qPCR (100 mL sample required)	M199	\$300	\$250	\$115	\$85	\$65

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