

Performance Summary

RAPID'*Salmonella* Method



Introduction

RAPID'*Salmonella* Agar is a chromogenic medium for the detection of *Salmonella* spp. after food and environmental samples are enriched in supplemented Buffered Peptone Water (BPW). The RAPID'*Salmonella* method allows the presumptive identification of motile and nonmotile *Salmonella* spp., lactose-positive *Salmonella* spp., and *Salmonella* Typhi and Paratyphi by detecting C8-esterase activity. Simultaneous screening of β -glucosidase activity permits the differentiation of *Salmonella* colonies from those of other *Enterobacteriaceae*. After incubation, *Salmonella* appear as readily identifiable, typically magenta, colonies, whereas non-*Salmonella* bacteria grow as blue or colorless colonies. The RAPID'*Salmonella* method has been rigorously tested and validated by internationally recognized validation agencies (Table 1).

Table 1. Validations for the RAPID'*Salmonella* method.

Validation	Certificate Number
AOAC	PTM 050701
NF Validation	BRD 07/11–12/05
NordVal	32

Inclusivity/Exclusivity Testing

Inclusivity testing is performed to verify that the method can detect *Salmonella* spp., while exclusivity studies test non-*Salmonella* strains to ensure there is no cross-reactivity. Exclusivity strains were enriched in nonselective broth for 24 hr at $41.5 \pm 1^\circ\text{C}$ and were tested at high levels. A target of 10–100 colony forming units (CFU) of each *Salmonella* inclusivity strain was cultured in supplemented BPW for 16–20 hr at both $37 \pm 1^\circ\text{C}$ and $41.5^\circ\text{C} \pm 1^\circ$ and then diluted to a low level ($\sim 10^3$) before testing. All colonies were confirmed regardless of morphology. Results from the 2018 NF Validation extension are shown in Table 2.

Table 2. Results of inclusivity/exclusivity testing.

Strains Tested	Positives Detected	Results
152 <i>Salmonella</i> strains tested	145/156	93% inclusivity
101 non- <i>Salmonella</i> strains tested	0/101*	100% exclusivity

* Confirmation included.

Limit of Detection

Limit of detection (LOD_{50}) is an estimation of the contamination level required to achieve positive detection in 50% of cases. This is measured by inoculating food matrices with *Salmonella* strains and carrying out the validated enrichment and detection protocols (Table 3).

The average LOD_{50} of the RAPID'*Salmonella* method was determined to be 0.7 (range: 0.6–0.9).

Table 3. LOD_{50} for the RAPID'*Salmonella* method.

Matrix/Strain Pair	LOD_{50} , CFU/sample size (range)
Potato salad/S. Mbandaka	0.6 (0.3–1.2)
Ground beef/S. Infantis	0.7 (0.4–1.3)
Raw milk/S. Derby	0.5 (0.3–0.9)
Liquid egg product/S. Enteritidis	0.7 (0.4–1.2)
Haddock fillet/S. Saintpaul	0.5 (0.3–0.9)
Dog food/S. Agona	1.1 (0.6–2.0)
Process water/S. Typhimurium	1.0 (0.5–1.8)
Infant formula/S. Anatum	0.8 (0.5–1.4)
Infant formula with probiotics/S. Cerro	0.3 (0.1–0.5)

Method Comparison/Matrix Studies

Matrix testing is critical to demonstrating the performance of a method compared to the reference method with real-world food samples. The RAPID'*Salmonella* method has been verified with external and internal testing on a wide variety of foods. No significant difference was found between the reference method and alternative method for all matrices tested (Table 4).

Table 4. Matrices tested with the RAPID[®]Salmonella method.

Category	Matrices
Composite foods RTE, RTRH, pastries and egg products	RTE: Mixed tuna with vegetables, cooked vegetable meal RTRH: Frozen peas with bacon, moussaka, shepherd's pie, spaghetti bolognese, beef bourguignon, paella, trout with spices, sole fillet with lemon, cod with creamed spinach, herring with herbs, seasoned beef, stuffing Pastries and egg products: Chocolate éclair, pastry, chocolate custard puff pastry, caramel cream puff, egg dessert, mayonnaise, chocolate meringue, confectioner's egg custard powder, egg pasta powder, fresh egg pasta
Meat products Raw and RTC, RTE and RTRH, deli	Raw and RTC: Ground beef, beef trim, beef shank, raw ham, lamb, pork chop, rump steak, pork belly, chicken breast, chicken parts with skin, chicken parts without skin, chicken thigh, chicken drumstick, rooster with skin, mechanically separated meat, duck gizzard, hen, turkey thigh, turkey meat, beef and pork meatball RTE and RTRH: Fresh sausage, dried sausage, beef carpaccio, pork, smoked duck, dried duck, chorizo Deli: Cooked ham, smoked ham, cooked pork shoulder, duck liver pâté
Dairy products Raw milk and products, heat processed, frozen	Raw milk and products: Raw cow milk, unpasteurized cow milk, raw sheep milk, unpasteurized sheep milk, raw cow milk cheese, unpasteurized cow milk cheese, unpasteurized goat cheese curd, fresh cream Heat processed: Milk powder, skim milk powder, whipped cream, pasteurized cheese, pasteurized milk, skim milk Frozen: Ice cream
Egg products Unprocessed, processed, dry	Unprocessed: Egg yolk, whole shell eggs, raw liquid egg product Processed: Pasteurized whole liquid egg Dry: Whole egg powder, egg white powder, egg yolk powder, powder for custard, powder for pancake mix, powder for egg preparation
Fishery products Raw and RTC, RTE and RTRH	Raw and RTC: Frozen breaded Alaskan hake, frozen grilled fish fillet, breaded hoki, frozen salmon fillet, frozen sole fillet, frozen cod fillet, fresh cod fillet, frozen sea bream steak, frozen tuna steak, fresh cutlassfish fillet, whiting fillet, coley fillet, ling fillet, raw salmon, mullet fillet RTE and RTRH: Smoked salmon, smoked herring
Produce Fresh, frozen, processed	Fresh: Cantaloupe, lettuce, cauliflower, mâche lettuce, red cabbage, tomato, green pepper, red pepper, zucchini, eggplant, leek Frozen: Green beans, artichoke hearts, mixed vegetables, spinach Processed: Grated white cabbage, grated carrots, grated celery, mixed crudité, frozen vegetable cakes, frozen creamed spinach, processed tomatoes, steamed green vegetables, frozen vegetable cake, ready-to-reheat vegetables
Dried cereals, fruits, nuts, seeds, and vegetables	Peanut butter, roasted tagine spices, roasted tandoori spices, coriander, cinnamon, parsley
Infant formula and cereals	Infant formula with and without probiotics, infant cereal with and without probiotics, infant formula ingredients (lactoproteins, maltodextrin, whey powders, caseinate, starch, nonfat dry milk, whey protein isolate)
Pet food and animal feed	Raw pet food, wet pet food, dry pet food, cat food, dog food, sausage for dog, animal feed, goat feed, chicken feed, pig feed, sheep feed, duck feed, dehydrated protein
Environmental samples	Process water, rinse water, wastewater, dust, food production environmental surfaces, surface wipe

RTC, ready to cook; RTE, ready to eat; RTRH, ready to reheat.

Visit bio-rad.com/RapidMedia for more information.

BIO-RAD is a trademark of Bio-Rad Laboratories, Inc. All trademarks used herein are the property of their respective owner.



**Bio-Rad
Laboratories, Inc.**

Life Science
Group

Website bio-rad.com **USA** 1 800 424 6723 **Australia** 61 2 9914 2800 **Austria** 00 800 00 24 67 23 **Belgium** 00 800 00 24 67 23 **Brazil** 4003 0399
Canada 1 905 364 3435 **China** 86 21 6169 8500 **Czech Republic** 00 800 00 24 67 23 **Denmark** 00 800 00 24 67 23 **Finland** 00 800 00 24 67 23
France 00 800 00 24 67 23 **Germany** 00 800 00 24 67 23 **Hong Kong** 852 2789 3300 **Hungary** 00 800 00 24 67 23 **India** 91 124 4029300
Israel 0 3 9636050 **Italy** 00 800 00 24 67 23 **Japan** 81 3 6361 7000 **Korea** 82 2 3473 4460 **Luxembourg** 00 800 00 24 67 23
Mexico 52 555 488 7670 **The Netherlands** 00 800 00 24 67 23 **New Zealand** 64 9 415 2280 **Norway** 00 800 00 24 67 23 **Poland** 00 800 00 24 67 23
Portugal 00 800 00 24 67 23 **Russian Federation** 00 800 00 24 67 23 **Singapore** 65 6415 3188 **South Africa** 00 800 00 24 67 23
Spain 00 800 00 24 67 23 **Sweden** 00 800 00 24 67 23 **Switzerland** 00 800 00 24 67 23 **Taiwan** 886 2 2578 7189 **Thailand** 66 2 651 8311
United Arab Emirates 36 1 459 6150 **United Kingdom** 00 800 00 24 67 23

