

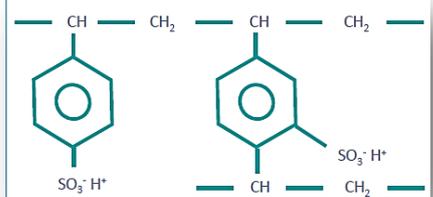
Not All Resins Are Created EQUAL!!

Bloodstream infections (septicemia) can cause substantial morbidity and mortality. The presence of antibiotics in the blood samples has always been a challenge for prompt lab diagnosis to reduce the occurrence of septic shock and to increase survival rates.

Becton Dickinson (BD) first introduced resins into blood culture sciences more than 23 years ago. Resins are cationic and non-ionic exchangers that neutralize many different antibiotics and other potentially inhibitive substances which might be present due to the (pre-)treatment of the patient. Studies showed that BD BACTEC Plus media is capable of rapidly and effectively reduce the concentrations of a wide range of generally used antibiotics in blood culture ⁽¹⁻⁵⁾.

Roles/Functions of resins:

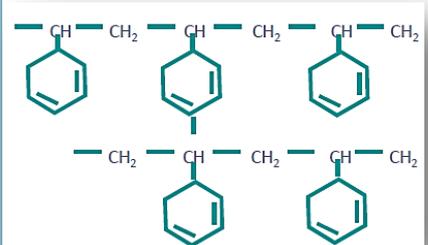
- Proven to effectively neutralize a wide variety of antimicrobials
- Lyse blood cells so that intra-cellular organisms are set free and can grow faster
- Provide the organisms with growth-centres to enhance speed and recovery rate (up to 40% more)
- No interference with Gram stain readings ^(6,7)



1. Cationic exchange resins

brown

Bind ionically to positively charged antimicrobials like aminoglycosides ⁽⁸⁾.



2. Polymeric adsorbent resins

white

Bind to hydrophobic regions of virtually any antimicrobial agent ⁽⁸⁾.



Studies on BD BACTEC Plus Media:

Selection of blood culture media matters- BACTEC use in the critically ill facilitates earlier organism detection and antibiotic decision making

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World Federation of Societies for Intensive & Critical Care Medicine meeting (Aug 2013)

The BACTEC blood culture system **isolates over two times more pathogens** than the BacT/Alert system. Twice as many antibiotic decisions were made after Gram stain notification and **three times** as many after speciation because of isolation exclusively in the BACTEC system ($p < 0.0001$).

JOURNAL OF CLINICAL MICROBIOLOGY, Mar. 2007, p. 816–821
0095-1137/07/\$08.00+0 doi:10.1128/JCM.02064-06
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Comparison of BACTEC PLUS Blood Culture Media to BacT/Alert FA Blood Culture Media for Detection of Bacterial Pathogens in Samples Containing Therapeutic Levels of Antibiotics[∇]

Diane Flayhart,^{2†} Anita P. Borek,² Teresa Wakefield,² James Dick,^{1,2} and Karen C. Carroll^{1,2*}

The BACTEC PLUS system recovered **95.1%** of strains **from test bottles (with β-lactam antibiotics, gentamicin/penicillin and vancomycin)** and 100% of strains from growth control bottles (no antibiotic); the BacT/Alert FA system recovered 25.1% of strains from test bottle and 96.9% of strains from growth control bottles.

As presented at the 105th General Meeting of the American Society for Microbiology, 2005.

Ability of BD BACTEC Plus Blood Culture Bottles versus BacT/Alert FAN Blood Culture Bottles to Detect Bacterial Pathogens in Samples Containing Vancomycin

FLAYHART, D., BOREK, A., WAKEFIELD, T., DICK, J., AND K. CARROLL

The BACTEC Plus system recovered **95%** of challenge and control organisms **in the presence of vancomycin**, as compared to 21% of the BacT/Alert FAN system.

THE NEW MICROBIOLOGICA, 27, 235-248, 2004

USE OF SIMULATED BLOOD CULTURES FOR ANTIBIOTIC EFFECT ON TIME TO DETECTION OF THE TWO BLOOD CULTURE SYSTEMS BACT/ALERT AND BACTECTM 9240

E. F. Viganò, E. Vasconi, C. Agrappi, P. Clerici, P. Melloni

The BACTEC PLUS system recovers more pathogens with **shorter time to detection** than the BacT/ALERT FAN system when **beta-lactam antibiotics (Ampicillin, Cefotaxime)** are present at trough concentration and in the presence of **vancomycin**.

Resin Types	Antimicrobial Class	Drug/Sub-class
1. Cationic exchange	Aminoglycosides	gentamicin, amikacin
2. Polymeric Adsorbent	β -lactams	penicillin, ampicillin, oxacillin, piperacillin-tazobactam, flucloxacillin
	Cephalosporin	cefotaxime, cefuroxime, ceftazidime, cefixime, cefepime, cefotetan, cefamandole, ceftizoxime, cefoperazone, ceftazolin, cefoxitin, ceftriaxone
	Glycopeptides	vancomycin, teicoplanin
	Glycylcycline	tigecycline
	Quinolones	moxifloxacin, ciprofloxacin, levofloxacin, sparfloxacin, gatifloxacin, garenoxacin, gemifloxacin
	Lipopeptides	daptomycin

* BD BACTEC Resins manage to prevent recovery failures caused by the antimicrobial activities of anticancer and immunosuppressive drugs in blood culture bottles ⁽⁷⁾.

**Similar function of cationic exchange & polymeric adsorbent resins, but
DIFFERENT**

neutralization of actual spectrum of antimicrobials !!



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