

Food Safety Related Analytes

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Food Safety Related Analytes

Introduction

Food safety has become a growing concern for both consumers and regulatory authorities, primarily driven by the rising incidence of foodborne illnesses worldwide. Food safety hazards that pose risks to human health mainly include intentional food adulteration, excessive or improper application of pesticides and antibiotics, overuse of chemical preservatives during food processing, illegal use of artificial fruit-ripening agents, microbial contamination, improper food storage, transportation and handling practices, as well as various contaminant residues derived from environmental pollution and agrochemical exposure.

To prevent and control such risks, stringent regulatory frameworks have been established worldwide, imposing strict limits on the levels of potential contaminants in the environment and food products.

The effective supervision of food safety is highly dependent on the use of reliable analytical methods to achieve accurate screening of contaminants in various specimens across different scenarios. The antibodies and paired conjugates developed by us can be used to establish immunoassays for accurate, rapid and portable monitoring of some common contaminants.

Products

Analytes	Conjugate	Antibody
DHA (Dehydroacetic acid)	√	√
Chloramphenicol	√	√
Sulfonamide	√	√
Ceftiofur	√	√
Meropenem	√	√
Amikacin (AMK)	√	√
Sibutramine (SBT)	√	√
Cephalexin	√	
Penicillin	√	
Tetracycline	√	
Norfloxacin	√	

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Dehydroacetic Acid

Dehydroacetic acid (DHA) has been used worldwide in the past decades as a preservative in processed foods, cosmetics and personal care products, due to its low-cost and powerful antimicrobial properties against bacteria, yeasts and molds. Investigations have revealed that DHA exists a relatively high acute and chronic toxicity on different animals and humans via complicated mechanisms. To date, some countries permit the use of DHA as food additive but its addition must be controlled within a maximum level according to specific legislation. The National Health Commission of China has issued the GB 2760-2024, a food safety national standard for food additives, specifying that DHA being banned as food additive for bread, pastries and several other foods since February 8, 2025. Reliable analytical method is required for the determination of DHA for consumer safety and to ensure regulatory compliance. Our monoclonal anti-DHA antibody with the paired antigen allow sensitive detection of DHA with LOD < 2ng/mL by DELFIA.

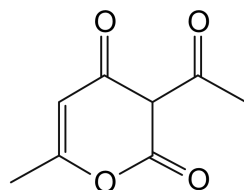


Fig. 1. The chemical structure of DHA

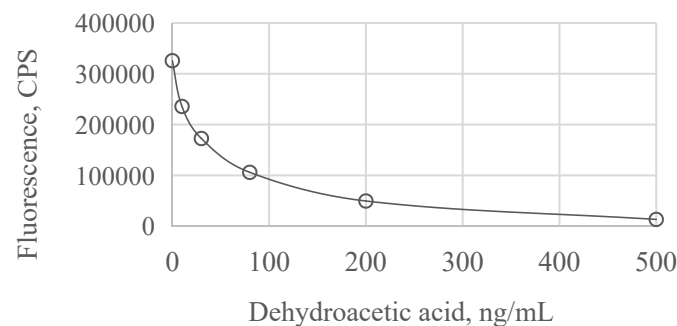


Fig. 2. The typical calibration curve for DHA-DELFI using McAb-61

Product Type	Catalog #	Description
Mouse monoclonal antibody	<ul style="list-style-type: none"> Anti-DHA McAb-61 	LOD < 50ng/mL by DHA-DELFI. No cross-reactivities were observed with 500 µg/mL of benzoic acid, sorbic acid, salicylic acid, sodium cyclamate, saccharin sodium, vanillin, methylparaben, calcium propionate, and ethylparaben.
Conjugate	<ul style="list-style-type: none"> DHA-PEG-OVA 	Paired with antibodies for DHA testing.

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Meropenem

Meropenem is a first-line β -lactam antibiotic widely used in the treatment of complicated and serious infections. Owing to its wide inter-individual variability in pharmacokinetic, standard dosing is not adequate for optimal therapy of critically ill patients or patients with renal insufficiency, TDM of meropenem is useful for achieving personalized drug administration. Our anti-Meropenem McAb can be used for developing sensitive and specific meropenem immunoassays for accurate monitoring of this drug.

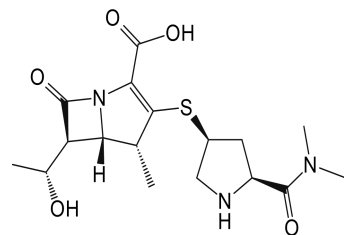


Fig. 1. The chemical structure of meropenem

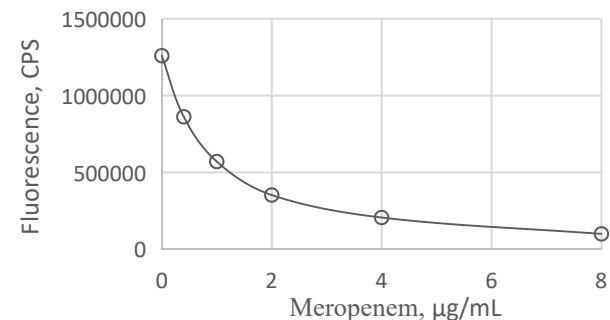


Fig.2. Typical calibration curve of meropenem-DELFI using McAb-15

Product Type	Catalog #	Description
Mouse monoclonal antibody	<ul style="list-style-type: none"> Anti-Meropenem McAb-15 	Used for developing immunoassay with LOD < 0.1 $\mu\text{g/mL}$ by DELFIA. The cross-reactivities are less than 0.2% with imipenem, doripenem, biapenem and ertapenem.
Conjugate	<ul style="list-style-type: none"> Meropenem-PEG-BSA Meropenem-PEG-Biotin 	Paired with anti-meropenem antibodies for meropenem testing.

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Amikacin (AMK)

Amikacin (AMK) is a semi-synthetic aminoglycoside antibiotic that actions by disrupting bacterial protein synthesis after binding to the 30S ribosome of susceptible organisms. It is effective for a broad spectrum of bacterial infections, especially severe multidrug-resistant Gram-negative bacteria, such as *Pseudomonas aeruginosa*, while also showing activity against *Nocardia* spp. and *Mycobacterium* spp. Like other aminoglycosides, AMK has narrow therapeutic index with significant intra- and inter-individual pharmacokinetic variability. AMK is associated with ototoxicity and nephrotoxicity when being overdosed, in the meanwhile, a high proportion of patients fail to achieve the therapeutic target for AMK efficacy when with insufficient medication, potentially placing them at higher risk of treatment failure. TDM of AMK is helpful for optimizing dosage regimens to achieve improved safety and efficacy. Our anti-AMK McAb can be used to develop AMK immunoassay with LOD less than 65pg/mL, which show no cross-reactivity with other aminoglycoside antibiotics with similar structure.

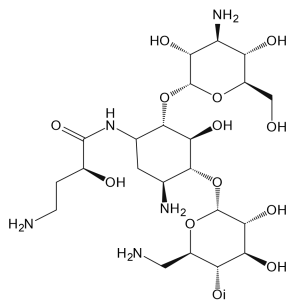


Fig. 1. The chemical structure of AMK

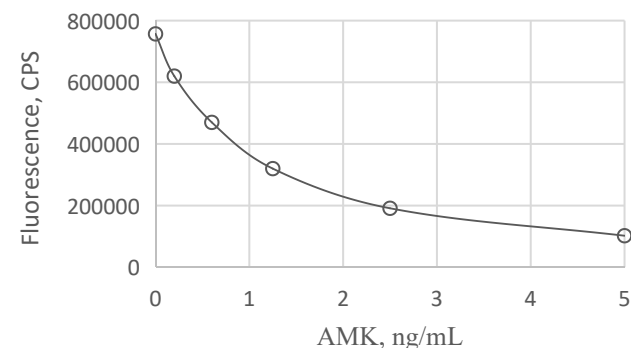


Fig. 2. Typical calibration curve of AMK-DELFA using McAb-36

Product Type	Catalog #	Description
Mouse monoclonal antibody	• Anti-AMK McAb-36	Used for developing AMK immunoassay with LOD < 65pg/mL by DELFIA. No cross-reaction was detected with kanamycin and topomycin up to 100µg/mL.
Conjugate	• AMK-OVA	Paired with anti-AMK antibodies for AMK testing.

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Sibutramine (SBT)

Sibutramine (SBT) is a racemic mixture of enantiomers (+) and (-) of 1-[1-(4-chlorophenyl)cyclobutyl]-N,N,3-trimethylbutan-1-amine, and has been widely used as an appetite suppressant for weight-loss. To be used for reduction of body weight, SBT is often added in different natural herbal medicines, functional foods and soft drinks. Although SBT is effective for treating obesity, ingestion of SBT will increase the risk of cardiovascular and nonfatal stroke, and often lead to symptoms such as headaches, restlessness, malaise, tachycardia and confusion. Up to now, FDA, European Commission, and the Ministry of Health of the People's Republic of China have banned the addition of SBT in weight loss supplement, and recommended that its production and sale be stopped. Determination of SBT in various matrices is crucial to for effective supervision and control of the abuse of SBT. Our monoclonal anti-SBT antibody and its paired conjugates are designed for developing sensitive SBT immunoassays.

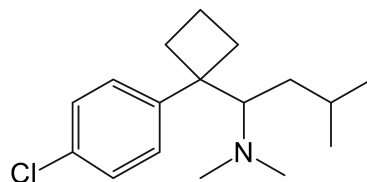


Fig. 1. The chemical structure of SBT

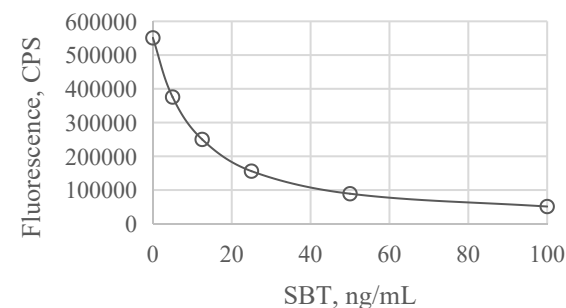


Fig. 2. Typical calibration curve for SBT-DELFA using McAb-45

Product Type	Catalog #	Description
Mouse monoclonal antibody	<ul style="list-style-type: none"> Anti-SBT McAb-45 	<p>LOD < 1ng/mL by SBT-DELFA. The cross-reactivities of the McAb-45 with the metabolites of SBT, N-desmethysibutramine (M1) and N,N-bidesmethysibutramine (M2) are ~82% and ~3.9%, respectively. No cross-reactivities were observed with 50 µg/mL of sildenafil and fenfluramine.</p> <p>Any conjugation reaction performed via the primary amine groups of McAb-45 will result in loss of its activity. It is recommended to use anti-mouse IgG secondary antibody for labeling or solid-phase coating.</p>
Conjugate	<ul style="list-style-type: none"> SBT-PEG-BSA 	Paired with anti-SBT antibodies for SBT testing.