



iMethod™ Applications for
Food and Beverage Analysis

A Rapid iMethod™ Application for Screening Pesticides V.2.4 for Cliquid® Software

Summary of 9 test modules included in the iMethod™ Application



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Tools for routine testing labs for easy implementation of pesticide screening in food, water, and other consumer products for screening or quantitative analysis applications

Overview

With more than 800 pesticides currently in use there is growing concern by government agencies about the effect of pesticide exposure on human health. As a result, the residue level of pesticides in food, water and other consumer products are highly regulated. While analytical techniques like GC or GC/MS have traditionally been used for pesticide analysis, LC/MS/MS has quickly become the technique of choice due to the ability to analyze a more diverse set of pesticides faster and with better sensitivity and less sample preparation.

The following description outlines an overview of the AB SCIEX iMethod™ Application for Pesticide Screening and Quantitation using a 3200 Q TRAP® system, 4000 Q TRAP® system, or the QTRAP® 5500 LC/MS/MS system. This iMethod™ application consists of 9 pre-configured methods, designed for either quantitative analysis or for qualitative screening using QTRAP® technology. See Table 1 for the comprehensive list of tests included in this iMethod™ Application.

The iMethod™ application contains multiple sample preparation approaches, including EN 15662, AOAC Method 2007.01, and several others, instrument parameter information, and expected retention times for 3 different HPLC systems – the Shimadzu Prominence, the Agilent 1200, and the Eksigent ekspert™ ultraLC 100 and 100XL. The iMethod™ application also includes the required analytical columns for the analysis. Solvents, standards and any supplies required for sample preparation are not included.

Please note that the use of QTRAP® system technology is recommended for use with the screening method provided and that the associated library is not included and may be purchased separately. The compound library includes 603 pesticide compounds, and the catalogue can be used to create customized test methods according to any desired list of compounds.

Experimental details

The methods included in this iMethod™ application can be utilized for the routine screening of up to 535 pesticides or quantitative analysis of selected lists of pesticides from food samples using the QuEChERS extraction and cleanup technique, although several other sample preparation approaches, including one for the analysis of pesticides in water by direct injection, are provided within the method SOP. The methods use external calibration standards and matrix spike recoveries to correct for sample and instrument variability and are based upon the use of a 3200 Q TRAP® system, 4000 Q TRAP® system, or the QTRAP® 5500 LC/MS/MS system.

Quantitation Methods

Included below in Table 2 is an outline of the list of pesticide compounds included in the 5 quantitative analysis modules within this iMethod™ application. The methodology for this iMethod™ Application was developed to quantify each pesticide at < 10 ppb in order to meet regulatory requirements.

Example sample preparation procedures are provided for fruits and vegetables, based upon a simple sample homogenization, centrifugation, extraction and dilution. These procedures may require additional optimization based upon the actual composition and consistency of the fruit or vegetable under investigation. Deuterated and/or C13-labeled internal standards of known concentrations are added during sample preparation to monitor sample recovery. Additionally, iDQuant™ Standards kits, which contain 204 common pesticides in 10 easy-to-use and certified mixes, may also be used with this iMethod™ application to simplify standards preparation or for internal or external calibration.

Table 1. Summary of the 9 tests included in the iMethod™ Application

Test	Application	Description
General pesticide screening	<i>QTRAP screening method</i>	Screening of 535 common pesticides in a single injection
EU MRL pesticide screening, positive ionization	<i>QTRAP screening method</i>	Screening of 352 pesticides regulated by the EU, using positive ESI
EU MRL pesticide screening, negative ionization	<i>QTRAP screening method</i>	Screening of 32 pesticides regulated by the EU, using negative ESI
Pesticide screening using iDQuant™ Standards Kit	<i>QTRAP screening method</i>	Screening of 214 pesticide compounds, all of which are included in the iDQuant™ Standards Kit
Acidic pesticides analysis	<i>Quantitative analysis method</i>	Method for the quantitative analysis of 19 acidic pesticide compounds
Carbamate pesticides analysis	<i>Quantitative analysis method</i>	Method for the quantitative analysis of 47 carbamate pesticide compounds
Organophosphorous pesticides analysis	<i>Quantitative analysis method</i>	Method for the quantitative analysis of 29 organophosphorous pesticide compounds
Phenyl urea compound analysis	<i>Quantitative analysis method</i>	Method for the quantitative analysis of 15 phenyl urea compounds
Triazine pesticides analysis	<i>Quantitative analysis method</i>	Method for the quantitative analysis of 16 triazine pesticide compounds

Figure 1: Sample chromatogram of a 300 pesticides mix spiked by API 3200™ LC/MS/MS system (100 ng/mL)

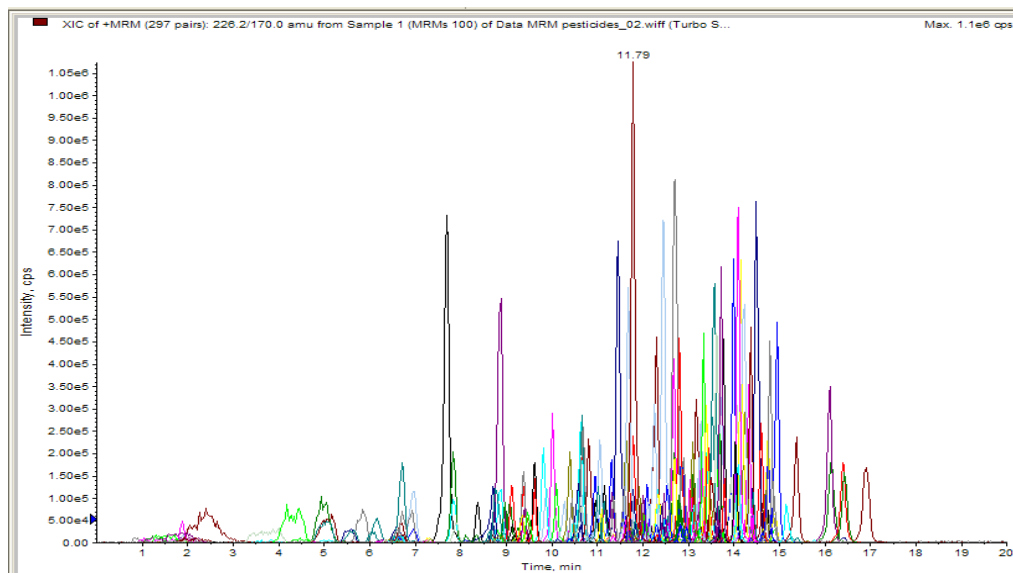


Table 2. Summary of the compounds included in the quantitative analysis test modules

Acidic pesticides	Carbamate Pesticides	Organophosphorous pesticides
2,4,5-T	3-Hydroxycarbofuran	Acephate
2,4,5-TP	Alanycarb	Azinphos methyl
2,4-D	Aldicarb	Azinphos-ethyl
2,4-DB	Aldicarb-sulfone	Chlorfenvinphos
2,4-DP	Aldicarb-sulfoxide	Chlorpyrifos
Bentazon	Aminocarb	Coumaphos
Bromoxynil	Bendiocarb	Demeton-S-methyl
Clopyralid	Benfuracarb	Demeton-S-methyl-sulfone
Dicamba	Benomyl	Diazinon
Dinoseb	Butocarboxim	Dichlorvos
Dinoterb	Butocarboxim-sulfoxide	Dicrotophos
Fluoxypyr	Butoxycarboxim	Dimethoate
Imazapyr	Carbaryl	EPTC

loxynil	Carbofuran	Famphur
MCPA	Carbosulfan	Fenthion
MCPB	Chloroprotham	Malathion
MCPD	Dimepiperate	Mevinphos
PCP	Dioxacarb	Naled
Triclopyr	EPTC	Parathion
	Esprocarb	Parathion-methyl
Phenyl urea compounds	Ethiofencarb	Phorate
Chlortoluron	Ethiofencarb-sulfone	Phorate sulfoxide
Diflubenzuron	Ethiofencarb-sulfoxide	Pirimiphos-ethyl
Diuron	Fenobucarb	Pirimiphos-methyl
Fenuron	Fenothiocarb	Sulfotep
Fluometuron	Fenoxycarb	Sulprofos
Isoproturon	Furathiocarb	Tetrachlorvinphos
Linuron	Iprovalicarb	Tokuthion
Methabenzthiazuron	Isoprocab	Triazophos
Metobromuron	Methiocarb	
Metoxuron	Methiocarb-sulfone	Triazine pesticides
Monolinuron	Methomyl	Ametryn
Propanil	Oxamyl	Atrazine
Siduron	Phenmedipham	Cyanazine
Tebuthiuron	Pirimicarb	Desethyl-atrazine
Thidiazuron	Promecarb	Desisopropyl-atrazine
	Propamocarb	Hexazinone
	Propoxur	Metazachlor
	Pyributicarb	Metolachlor
	Terbucarb	Metribuzin
	Thiobencarb	Prometon
	Thiodicarb	Prometryn
	Thiofanox	Propazine
	Thiofanox-sulfone	Sebutylazine
	Thiuram	Simazine
	Triallate	Terbutylazine
	XMC	Terbutryn

Get additional details on customizing a pesticide screen for your specific laboratory application by contacting AB SCIEX at support@absciex.com.

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