

Food applications for T.C.S

Substances	Food products	Target Analyte	Sample concentration/preparation	Analytical method
Fatty Acids	Dairy products(milk and cheese), and other foods except dairy products, and edible oils	Fatty Acids	In the first place, fatty Acids needs to be converted in to FEMEs(Fatty Acid Methyl Ester) in the process of sample preparation before GC-FID analysis to measure saturated fat, monounsaturated fat, and polysaturated fat. For esterification, homogenized sample go through extraction process by ester, and after the extraction, ester should be slowly evaporated by a nitrogen evaporator at 35~40°C.	GC-FID
Biotin & Vitamins	infant formula, pediatric nutritional formula and milk formula	Biotin & Vitamin K1	After sample extraction, in the clean-up process, immunoaffinity column is used for purification of vitamins prior to sample analysis with HPLC. In the clean-up process biotin eluent by methanol needs to be dried up by a nitrogen evaporator at 70°C.	LC-MS
Pesticide residues	Food	Azimsulfuron, Bensulfuron-methyl, Chlorsulfuron, Cinosulfuron, Cyclosulfamuron, Ethoxysulfuron, Flucetosulfuron, Halosulfuron-methyl, Imazosulfuron, Iodosulfuron-methyl-sodium, Metsulfuron-methyl, Pyrazosulfuron-ethyl, Thifensulfuron-methyl		HPLC-UVD
Multi class multi residue analysis - Antimicrobials and a veterinary drug	Veterinary meats and eggs	Nandrolone, Naloxone, Nalidixic acid, Norfloxacin, Novobiocin, Danofloxacin, Dapsone, Desfuroylceftiofu, Doxycycline, Diphenhydramine, Difloxacin, Ractopamine, Loperamide, Roxithromycin, Rifaximin, Lincomycin, Marbofloxacin, Methomyl, Metoclopramide, Metronidazole, Metronidazole-OH, DL-methylephedrine, Monoacetyl dapson, Valnemulin, Virginiamycin M1, Berberine, Sarafloxacin, Sulfaguanidine, Sulfadoxine, Sulfadimethoxine, Sulfadiazine, Sulfamerazine, Sulfamethazine, Sulfamethoxazole, Sulfamethoxypyridazine, Sulfamonomethoxine, Sulfaquinoxaline, Sulfachlorpyridazine, Sulfaclozine, Sulfathiazole, Sulfaphenazole, Sulfisoxazole, Scopolamine, Spiramycin, Ciprofloxacin, Cyproheptadine, Amoxicillin, Aminopyrine, Acriflavine, Antipyrine, Altrenogest, Ampicillin, Erythromycin, Emamectin B1a, Enrofloxacin, Ormetoprim, Orbifloxacin, Ofloxacin, Oxolinic acid, Oxytetracycline, Olaquinox : 3-methyl quinoxaline-2-carboxylic acid, MQCA(MQCA, 3-methyl quinoxaline-2-carboxylic acid), Oleandomycin, Yohimbine, Josamycin, Carbadox : Quinoxaline-2-carboxylic acid, QCA, Carbendazim, Clenbutero, Chloramphenicol,Chlortetracycline, Tylosin A, Tetracycline, Tulathromycin, Trimethoprim, Tripelennamine, Tiamulin, Thiamphenico, Tildipirosin, Tilmicosin, Fenobucarb, Phenothiazine, Pefloxacin, Praziquantel, Florfenicol, Florfenicol amine, Flumequine, Nafcillin, Desacetyl cephalirin, Dicloxacillin, Benzylpenicillin, Cefazolin, Cephalirin, Cefalonium, Cefoperazone, Cefquinome, Oxacillin, Cloxacillin, Ronidazole, Metronidazole, Ceftiofur, Diethylcarbamazine, Acetanilide, Tetramethrin, Tetramisole, Phenacetin, Cephalixin	Meats excluding eggs: A homogenized sample (2g) is introduced into a centrifugation tube and add 10 mL of acetonitrile into the tube. ④ The mixture is shaken for 10 minutes and subsequently, centrifuge the sample at 2,700g for 10 minutes and then the supernatant liquid is taken. ⑤ Add 10mL of 100% acetonitrile to the remaining liquid and mix it for 10 minutes. The supernatant liquid is taken and centrifuge the sample at 2700g for 10 minutes once again. The supernatant from ④ + ⑤ is then transferred to a 50 mL tube containing 1 g of C18 power. The 10mL acetonitrile saturated in hexane is added to the tube and then shake the tube for 1 minutes and the centrifuge the sample at 2,700 g for 10 minutes. Remove hexane in the top layer and then the acetonitrile is transferred to a new centrifugation tube and evaporate to dryness below 50 °C under a gentle stream of nitrogen. The residue is dissolved in 2 mL of methanol and 2mL of 0.1% formic acid and extract sample by ultrasound for 5 minutes and then filter with a 0.2 µm PVDF membrane filter.	LC-MS/MS
Harmful substances in foods	Smoked and grilled meat products & Edible oil	PAHs - Benzopyrene	In the SPE extraction process, sample eluent in 20 mL of Hexane:Dichloromethane(3:1) needs to be evaporated at 40°C to dryness.	HPLC-FLD

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Harmful substances in foods	Hydrolyzed vegetable proteins(taste of soups, sauces, meat products, snacks, etc.) & Soy sauces	<i>3-Monochloro-1,2-propanediol (3-MCPD) and 1,3-dichloro-2-propanol (1,3-DCP) are not only produced in the manufacturing process of foodstuffs such as hydrolyzed vegetable proteins and soy sauce but are also formed by heat processing in the presence of fat and low water activity.</i> MCPD(3-Monochloropropane-1,2-diol)	In the extraction process, collect eluent in an evaporator flask and evaporate sample by vacuum at 35°C to 1mL, and then transfer sample into a graduated test tube and evaporate the sample by a nitrogen evaporator to 100 µL.	GC-MS
		1,3-dichloro-2-propanol (1,3-DCP)	(Nonfat liquid, lipoprotein liquid, alcoholic liquid, and nonfat solid samples) Samples (10 g) were weighted in a tube, followed by the addition of internal standard solution (1,3-DCP-d5, 10 µg/mL, 50 µL). The resulting mixtures were extracted using 15 mL methyl tert-butyl ether (MTBE). Then, the extracts were then dehydrated using 1g anhydrous sodium sulfate (Na2SO4), filtered, and evaporated to 1 mL under a gentle stream of nitrogen.	GC-MS
	Fatless - Milk, Apple juice, Porridge	N-Nitrosamines(N-nitrosodimethyl amine, N-nitrosomethylethylamine, N-nitrosodiethylamine, N-nitrosodibutylamine, N-nitrosopiperidine, N-nitrosopyrrolidine, and N-nitrosomorpholine)	Evaporate 6 mL eluents in MC:MeOH (95.5 v/v) to 1mL by a nitrogen evaporator at 25°C.	GC-PCI-MS/MS



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