

Monitoring Of Air Pollution In Agricultural Settings: A Systematic Review Of The Literature

Supplementary Material

Table S1. Summary of the characteristics of the experimental design adopted in the different studies considered in this review (aim of the study; pollutants investigated; year and period of monitoring/sampling; country; area). S/M: Sampling/Monitoring; W: Winter; SP: Spring; SU: Summer; F: Fall.

Reference	Aim of the Study	Pollutants	Year of S/M	S/M Period	Country	Area
(Ali-Sak et al. 2021) [45]	<ul style="list-style-type: none"> Measure the peak expiratory flow rates before and after pesticide application and record upper and lower respiratory tract complaints among children. Explore the relationship of these data with PM₁₀ and PM_{2.5} levels. 	PM _{2.5} ; PM ₁₀	2016	SU	Turkey	Villages scattered over an area of 40 km ² : Giyimli, Küçük Minareli, Büyük Minareli and Bozyazı.
(Barnig et al. 2012) [46]	<ul style="list-style-type: none"> Compare indoor endotoxin concentrations in air and dust samples from randomly selected dwellings in an urban and rural environment. 	Dust; Endotoxin	-	W	France	-
(Blanes-vidal et al. 2012) [47]	<ul style="list-style-type: none"> Evaluate the association between NH₃ concentrations measured and estimated at non-urban air quality monitoring stations, and prevalence of odor annoyance in local residential communities. Study the link between seasonal patterns in NH₃ measurements and public perception of the seasonal variation on odor pollution. 	NH ₃	-	W; SP; SU; F	Denimark	Areas with different degree of agricultural activity.
(Buczaj et al. 2014) [32]	<ul style="list-style-type: none"> Measurements of concentrations of asbestos fibres in ambient air in rural environment. 	Asbestos fibres	2009-2011	W; SP; SU; F	Poland	Rural areas: Lublin and Wlodawa countries.
(Campos-Ramos and Arago 2009) [25]	<ul style="list-style-type: none"> Give insight and detailed of the analysis of the morphological characteristics and chemical composition of atmospheric particles at individual level. 	PM ₁₀	2006-2007	W; SP; SU; F	Mexico	Centro Universitario de Investigaciones en Ciencias del Ambiente (CUICA), located 12 km from the city of Colima, considered as a regional background station.
(de Assuncao et al. 2014) [30]	<ul style="list-style-type: none"> Measurements of concentrations of PAH and estimated the incremental cancer risk in Araraquara. 	PAHs	2009	SU; F	Brazil	Three sites: one in the city center and two in rural localities.
(Green et al. 1990) [33]	<ul style="list-style-type: none"> Characterize, through chemical and mineralogical analysis, the airborne particulates at representative rural sites. Assess their potential for toxic effects on humans, in terms of risk for pneumoconiosis in exposed farmer populations. 	TSP	1973-1979	SP; SU	Canada	Six farm sites: south central region (Red Deer), representative of a predominantly grain growing district with minimal use of irrigation; six farm: south eastern region (Medicine Hat), which is mainly forage combined with irrigated crop production.

(Jimenez et al. 2006) [38]	<ul style="list-style-type: none"> Characterize the air quality in Pullman, WA during the fall 2002 prescribed field burning season. 	PM _{2.5} ; CO ₂ ; OC; Levoglucosan	PM ₁₀ ; NO _x ; EC;	2002	F	USA	One central monitoring site located on the roof of a building at Washington State University (WSU) in Pullman, WA (elevation = 770 m, approximately 12 m above street level).
(Le Blond et al. 2017) [27]	<ul style="list-style-type: none"> To estimate occupational exposure levels to PM₁₀ during the commercial production of sugar from sugarcane. Assess its potential impacts on human health. 	PM ₁₀		2007-2008	SU; F	Ecuador; Brazil	Commercial sugarcane-growing estates.
(Loftus et al. 2016) [31]	<ul style="list-style-type: none"> To investigate associations between PM_{2.5} and pediatric asthma exacerbations in an agricultural community of Washington State. 	PM _{2.5}		2010	SU	USA	Area covering approximately 300 square miles and characterized by a high density of large-scale agricultural operations, including tree fruit orchards and dairy farms.
(Maesano et al. 2019) [40]	<ul style="list-style-type: none"> Determine the effects on respiratory health from exposure to PM of 4 sizes, TSP and 19 VOCs (from 5 VOC families), objectively measured in dwellings and workplaces, among farmers drawn from the Environmental Factors of Allergic and Respiratory Diseases study (FERMA), conducted in the Auvergne region of France. 	UFP; PM _{2.5} ; TSP; VOCs	PM ₁ ; PM ₁₀ ;	2012	W; SP	France	French farmers.
(Maw et al. 2002) [36]	<ul style="list-style-type: none"> Assess the losses of NO_x from grass and maize silage, and their potential nutritional, atmospheric and health implications. 	NO; NO ₂		1998-2000	W; SP	-	n.a.
(Pavilonis et al. 2013) [29]	<ul style="list-style-type: none"> To quantify airborne concentrations of PM₁₀, PM_{2.5}, and endotoxin in an intensely agricultural area. Compare findings with reported concentrations from urban areas. Identify factors contributing to rural PM and endotoxin concentrations in both ambient and indoor air in homes. Evaluate the effect of seasonal variation on PM and endotoxin levels. 	PM _{2.5} ; Endotoxin	PM ₁₀ ;	2007-2011	-	USA	Intensely agricultural area: the majority of the land area in the county was devoted to agricultural production (86%), with approximately 318,160 acres considered cropland, pastures, and trees. The primary crops grown in the county were corn and soybeans, accounting for 157 and 57 tonnes harvested in 2009, respectively.
(Ramli et al. 2021) [44]	<ul style="list-style-type: none"> Determining the compositions of trace elements and the morphological properties of fine particles. Establish a causal connection between rice straw open burning and ambient air quality in Bagan Serai, Perak, Malaysia. Investigate the chemical, biological, and morphological properties of fine particles from the emissions and the 	PM _{2.5}		2020	F	Malaysia	n.a.

potential impacts on the air quality in the neighbouring areas.

(Reinhardt et al. 2011) [34]	<ul style="list-style-type: none"> Characterize exposure to smoke among a rural population in Rondônia during the peak of the burning season. 	CO; HCHO; PM _{3.5} ; Acrolein; Benzene	1995	SU	Brazil	Northwest of central Theobroma in an open agricultural research field. The nearest road was ~70 m away to the southwest, downwind of the predominant wind direction.
(Ryu et al. 2007) [39]	<ul style="list-style-type: none"> Investigate the chemical characteristics of biomass burning aerosol and its impact on regional air quality during an agricultural waste burning period in early summer in the rural areas of Korea. 	PM _{2.5} ; PM ₁₀	2003	SU	South Korea	Mobile laboratory trailer at the Gwangju Institute of Science and Technology, which is located in a northern suburb of Gwangju and surrounded by rural areas from north to east of the sampling site.
(Sevimoglu and Rogge 2016) [35]	<ul style="list-style-type: none"> Gain insight into differences between size-segregated airborne PM concentrations at Belle Glade and Delray Beach during an entire year with special emphasis on PM exposure levels during sugarcane harvesting and growing seasons. Determine exposure levels of PAHs associated with different particle size fractions. 	PM ₃ ; PAHs; PM ₁₀	1996-1997	W; SP; SU; F	USA	Delray Beach is located roughly 60 km east and 36 km south of Belle Glade. This sampling site is typically under the impact of traffic-related and industrial emissions. The major industries include electric power production, construction, aircraft testing, computer and electronics manufacturing, waste incineration, concrete and asphalt production. Belle Glade is located in the western part of Palm Beach County, where sugarcane growing is the major agricultural crop and the largest sugarcane-producing industry in the continental United States.
(Swanepoel et al. 2011) [26]	<ul style="list-style-type: none"> To determine whether farming activities on a clay soil farm generated time-weighted average respirable quartz concentrations above OELs Test the hypothesis that the level of exposure to respirable quartz follows a declining gradient from sandy to sandy loam soils with less potential for high exposure from clay soils. 	Respirable dust; Quartz	2006-2009	W; SP; SU; F	South Africa	Three farms located in the Free State and North West provinces of South Africa: (i) north western part of the Free-State province (being about 1500 ha in size); (ii) southern and eastern part of the North West province.
(Wei et al. 2019) [42]	<ul style="list-style-type: none"> Determine microbial community structure and abundance between biomass burning events and non-biomass burning events. Understand the potential eco-physiological function of bacterial and fungal community. Identify the main environmental variables in shaping community structure and abundance. 	PM _{2.5} ; CO; SO ₂ ; O ₃ ; NO _x ; Inorganic aerosols (NH ₄ ⁺ , NO ₃ ⁻ , SO ₄ ²⁻ , Cl ⁻); Mineral cations (Na ⁺ ,	2014	SU	China	Yucheng is located almost in the center of the North China Plain. The sampling site was inside the Yucheng Comprehensive Experiment Station of Chinese Academy of Sciences, which located about 50 km northwest of Jinan and downwind of Jinan in summer. The experimental field was in a highly intensive agricultural area surrounded by

			K ⁺ , Mg ²⁺)	Ca ²⁺ ,				arable land and without major pollution sources nearby.
(Xing et al. 2020) [43]	<ul style="list-style-type: none">▪ Explain the concentration, composition, source and transmission of PM2.5-bound PAHs at rural, suburban, and urban in central China during summer harvest activity.▪ Clarifying the potential PAH sources through MDR and PCA-MLR.▪ Clustering trajectories by HYSPLIT model for potential pollution source areas.▪ Evaluate the human health risk of PAHs by ILCR model.	PM2.5; PAHs	2017	SU	China		Wuhan in the central of China, is a mega city. Pingdingshan and Suizhou located in north of Wuhan, are less developed city/county: (i) the sampling site in Wuhan is the roof of the 8th floor in Hubei Environmental Monitoring Center Station, adjoining Bayi Road. This location is approximately 25 m above the ground with intensive human activities of the large city; (ii) Pingdingshan site is situated on the roof of the residents' committees in Baofeng. This site is located in the central and western of Henan province; (iii) Suizhou site is located the north of Hubei province and is surrounded by hills with no industrial emissions.	
(You et al. 2008) [37]	<ul style="list-style-type: none">▪ Describe the levels and variability of airborne concentrations for VOC.▪ Identify factors that determine airborne concentrations of VOC.▪ Produce statistical models that can be used to gain insight into the impact of major oil and gas facilities on the airborne VOC concentrations in the rural areas of Western Canada.	VOCs	2001-2002	W; SP; SU; F	Canada		The monitoring sites were located in the vicinity of approximately 33,000 beef cattle in some 200 herds selected across a geographic area associated with primary oil and gas industry in British Columbia, Alberta, and Saskatchewan.	
(Zbieranowski and Aherne 2012) [41]	<ul style="list-style-type: none">▪ Assess the spatial and temporal variation in ambient atmospheric gaseous (NH₃, NO₂ and HNO₃) concentrations.▪ Estimated dry deposition at four sites spanning a transect in major land use types across southern Ontario (intensive agricultural, urban - agricultural transition, urban, and rural background).	NH ₃ ; HNO ₃	NO ₂ ; 2010-2011	W; SP; SU; F	Belgium; Canada		(i) The intensive agricultural site was located at the road side beside a farm field where cattle occasionally grazed; (ii) he high-density urban site (TOR) was located +/- 250m south of Highway 401 at the Environmental Monitoring and Reporting Branch of the MOE in Etobicoke, part of the Greater Toronto Area; the sample site was located in a large asphalt parking lot surrounded by office buildings, directly adjacent to Highway 401 (to the north) which has an annual average daily traffic volume of 416,400 vehicles day -1; a parkland and a golf course were located to the south; (iii) the urban - agricultural transition site (EGB) was located in Egbert (+/- 80 km north of Toronto) at Environment Canada's (EC	

							<p>‘Centre for Atmospheric Research Experiments’. The sampler site was located on the roof-top deck of the clean air building facility, surrounded by unenclosed grass fields in an agricultural and forested area.</p> <p>The rural background site (DOR) was located at the Dorset Environmental Science Centre. The sampler site was located within a large gated sampling area in an open field surrounded by dense woodland.</p>
(Zhuo et al. 2018) [28]	<ul style="list-style-type: none"> ▪ Develop a large number of agricultural nonpoint source emission scenarios of various sources based on fixed position experiments or surveys to characterize the diversity of agricultural and environmental conditions of China’s arable. systems. ▪ Analyze the status and spatial variation of agricultural nonpoint source pollution loads of nutrient, pesticide, plastic film residue, and crop straw in situ burning. ▪ Analyze the spatial correlation between different agricultural nonpoint source pollution loads using data of land units. 	Nutrient loss to water; Pesticide; Agricultural film residual; Straw in situ burning	2007-2008	-		China	n.a.

Table S2. Summary of the instruments and analyses adopted in the different studies considered in this review. S/M: Sampling/Monitoring; E: Environmental; P: Personal; M: Models. AES: Atomic Emission Spectrometry; FESEM-EDX: Field Emission Scanning Electron Microscopy with Energy Dispersive X-Ray Spectroscopy; HPLC: High Performance Liquid Chromatography; ICP: Inductively Coupled Plasma; ICP-MS: Mass Spectrometry; ICP-OES: Plasma Emission Spectroscopy; SEM-EDS: Scanning Electron Microscopy; XRD: X-Ray Diffraction.

Reference	N	Pollutant	Type of S/M	Instruments	Sampling substrate	Collection time	Analyses
(Maesano et al. 2019) [40]	109 French farmers.	UFP	E	TSI P-track sensor	-	2 min	-
(Maesano et al. 2019) [40]	109 French farmers.	PM ₁	E	AEROCET 531S	-	2 min	-
(Swanepoel et al. 2011) [26]	298 respirable dust and respirable quartz measurements.	Respirable dust	P	Higgins–Dewell cyclone	25 mm polyvinyl chloride filters	8 h	Gravimetric analyses.
(Ali-Sak et al. 2021) [45]	266 volunteers recruited from 4 different villages; the measurements were repeated for 72 of 266 children after pesticide application.		E	pDR-1500 cyclones (Personal DataRAM Pdr, Thermo Scientific, USA)	-	-	-
				TEOM monitors (Series 1400a, Thermo Electron Co)	37-mm Teflon filters (Harvard Impactor)		
		PM _{2.5}		Light scattering nephelometer (M903, Radiance Research, Seattle, WA)	Quartz filter (Harvard Impactor)		
(Jimenez et al. 2006) [38]	1872 observations (TEOM-PM _{2.5}); 2788 observations (Neph-PM _{2.5})		E	Harvard Impactors (Air Diagnostics Inc., Naples, ME)		30 min; 10 min; 12 h	The PM collected on the Teflon media was analyzed gravimetrically (Mettler-Toledo UMT2 microbalance)
				DataRAM (Thermo- Andersen, Smyrna, GA)			
(Loftus et al. 2016) [31]	-		E	Nephelometer	-	24 h	-

(Maesano et al. 2019) [40]	109 French farmers.	E	AEROCET 531S	-	2 min	-
(Pavilonis et al. 2013) [29]	197 rural households.	E	Personal Environmental Monitors (SKC, Eighty Four, PA)	37 mm polytetrafluoroethylene filters with a 0.8-mm pore size (Pall Corporation, Ann Arbor, MI)	30 min	-
(Ryu et al. 2007) [39]	26 samples.	E	URG Versatile Air Pollutant Sampler (VAPS, URG-3000K) with a PM ₁₀ cyclone inlet and a Dichotomous PM ₁₀ sampler (ASI/GMW series 241)	Pre-baked quartz fiber filters (for carbonaceous species) Teflon filters (for mass, ionic and elemental species analyses)	12 h	Gravimetric method using an electronic microbalance HPLC and IC ICP – AES ICP-MS Analysis of: morphology, size of particles, and elemental compositions of individual particles using high-resolution field emission scanning electron microscopy coupled with FESEM-EDX (Quanta FEG 650, Oxford Instrument, Abingdon, UK) ICP-OES identifies the concentration of trace elements in the fine particle samples
(Ramli et al. 2021) [44]	2 sites.	E	E-BAM (Met One Instrument Inc., Grants Pass, OR, USA)	Glass-fiber filter tape with a pore size of 2 µm	12 h	
(Wei et al. 2019) [42]	-	E	Aerosol sampler (TH-150C-III, Wuhan Tianhong Instrument Co., Ltd., China)	0.45 µm pore size Teflon filters (PALL Life Sciences)	23 h	-

				PM _{2.5} monitor (SHARP 5030, Thermo Fisher Scientific, Massachusetts, USA)				
(Xing et al. 2020) [43]	11, 13, and 14 samples were collected from the 3 sites.		E	TH-150C intelligent medium flow air total suspended particle sampler (Tianhong Co. Ltd, China)	Quartz fiber filter membrane	23 h		Samples were weighed by a microbalance
(Sevimoglu and Rogge 2016) [35]	55 samples from Belle Gladeand; 61 samples from Delray Beach.	PM ₃	E	Samples were collected using a Graseby high volume sampler (Graseby Andersen, Atlanta, USA) with a PM ₁₀ selective inlet (G1200). The high volume cascade impactor (Graseby/GWM, series 235 with five impactor stages plus a backup stage) was added to the sampler	Slotted quartz fiber filters (SAC230QF) and backup quartz fiber filter (2500QAO-UP) were used for size-segregated particle sampling for the analysis of the organic compounds, including PAHs	23 h		-
(Reinhardt et al. 2011) [34]	-	PM _{3.5}	P	Nylon Dorr-Oliver cyclone (3.5-µm cut-point)	2.0-µm pore size 37-mm diameter Teflon (DuPont) filter	-		-
(Ali-Sak et al. 2021) [45]	266 volunteers recruited from 4 different villages; the measurements were repeated for 72 of 266 children after pesticide application.		E	pDR-1500 cyclones (Personal DataRAM Pdr, Thermo Scientific, USA)	-	-		-
(Campos-ramos and Arago 2009) [25]	96 daily samples; 30 samples were randomly selected according to the distribution of PM ₁₀ ; 3600 particles were analyzed by SEM-EDS.	PM ₁₀	E	PM ₁₀ high volume Andersen	Quartz fiber filters	24 h		SEM Phillips XL30 model coupled with EDS microanalysis EDAX DX4 XRD (Rigaku D model MAX-2200 diffractometer)
(Jimenez et al. 2006) [38]	2684 observations (TEOM-PM ₁₀)		E	TEOM monitors (Series 1400a, Thermo Electron Co) Light scattering nephelometer (M903, Radiance Research, Seattle, WA)	-	30 min; 10 min; 12 h		-

(Le Blond et al. 2017) [27]	-	E + P	DustTrak™ aerosol monitor (Model 8520, TSI Inc.) Sioutas cascade impactor	Polycarbonate impaction filters (Millipore Isopore™ polycarbonate filters, 25 mm diameter, 0.4 mm pore size)	1 min	The elemental composition and morphology of the airborne PM were investigated in a LEO VP1455 SEM with X-ray elemental analysis (Oxford INCA system), in high vacuum mode and backscattered electron (BSE) mode. Images were taken on a Philips FEG SEM in secondary electron mode (WD ¼ 8 mm, EHT 10 kV)
(Maesano et al. 2019) [40]	109 French farmers.	E	AEROCET 531S	-	2 min	-
(Pavilonis et al. 2013) [29]	197 rural households.	E	Personal Environmental Monitors (SKC, Eighty Four, PA)	37 mm polytetrafluoroethylene filters with a 0.8-mm pore size (Pall Corporation, Ann Arbor, MI)	30 min	-
(Ryu et al. 2007) [39]	26 samples.	E	URG Versatile Air Pollutant Sampler (VAPS, URG-3000K) with a PM ₁₀ cyclone inlet and a Dichotomous PM ₁₀ sampler (ASI/GMW series 241)	Pre-baked quartz fiber filters (for carbonaceous species) and on Teflon filters (for mass, ionic and elemental species analyses)	12 h	Gravimetric method using an electronic microbalance HPLC and IC ICP – AES ICP-MS
(Sevimoglu and Rogge 2016) [35]	55 samples from Belle Gladeand; 61 samples from Delray Beach.	E	Samples were collected using a Graseby high volume sampler (Graseby Andersen, Atlanta, USA) with a PM ₁₀ selective inlet (G1200). The high volume cascade impactor (Graseby/GWM, series 235 with five impactor stages plus a backup stage) was added to the sampler	Slotted glass fiber filters (SAC 230GF) and backup glass fiber filter (Graseby GMW P/N-810) were used for the size-segregated particle sampling. Slotted quartz fiber filters (SAC230QF) and backup quartz fiber filter (2500QAO-UP)	23 h	-

						<p>were used for size-segregated particle sampling for the analysis of the organic compounds, including PAHs</p>	
						<p>SEM and STEM to calculate the particles' aspect ratio and to characterize the particles into groups based upon their major elemental components and net fractional X-ray intensities</p>	
						<p>Analysis of bulk dusts (in terms of fibres) by STEM, for the identification of their fibrous morphology and aspect ratios) in combination with energy dispersive X-ray analysis</p>	
(Green et al. 1990) [33]	6 farm sites in the cereal-grain district; 6 farm sites in the forage-crop district.	TSP	E	<p>Bulk samples from tractor air filters were resuspended in an aerosol chamber and analyzed for particle size-distribution using a 6-stage cascade impactor (Sierra Source Cascade Impactor, Model 226)</p>	-	-	<p>Qualitative and semi-quantitative mineralogical analysis using XRD</p> <p>Quantitative analysis of quartz by infrared absorption spectrophotometry after ashing in a plasma furnace</p> <p>Combustible mass fraction and water soluble fraction of bulk dusts determined using high temperature</p>

							plasma ashing and water suspension filtration respectively
(Maesano et al. 2019) [40]	109 French farmers.		E	AEROCET 531S	-	2 min	-
(Barnig et al. 2012) [46]	100 dwellings and 50 farmhouses (50 rural nonfarming references).	Dust	E + P	IOM cassette (M 00003700, Millipore, St Quentin, France) associated with a portable Gilair pump (Sensidyne®, Clearwater, FL, USA)	Glass fibre filter (AP 4003705, Millipore)	8 h	Endotoxins extraction from 100 mg dust in 2 ml of PBS-LAL (Biomerieux, Craponne, France)
(Buczaj et al. 2014) [32]	3 farms; 3 samples on each were simultaneously collected at 3 measuring sites; 216 samples were collected during the monitoring period.	Asbestos fibres	E	Stationary aspiratoris (JHS 16,000)	Cellulose ester membrane filter of 25mm diameter with pores of 0,8um size	60-80 min	Optical phase contrast microscope with a green filter
(Swanepoel et al. 2011) [26]	298 respirable dust and respirable quartz measurements.	Quartz	P	-	-	8 h	X-ray diffraction (XRD) as specified in the HSE MDHS 101 method (HSE, 2005)
(Wei et al. 2019) [42]	-	CO	E	CO analyzer (Thermo Scientific, model 48C)	-	23 h	-
(Reinhardt et al. 2011) [34]	-		E	Inert gas sampling bag	-	-	-
(Jimenez et al. 2006) [38]	2842 observations	CO ₂	E	CO ₂ analyzer (Telaire 1050 Engelhard, Goleta, CA)	-	10 min	-
(Maw et al. 2002) [36]	4 farms + 1 background.	NO	E	Chemiluminescence analysis (Advanced Pollution Instruments, U.S.A.)	-	-	-
(Maw et al. 2002) [36]	4 farms + 1 background.	NO ₂	E	Chemiluminescence analysis (Advanced Pollution Instruments, U.S.A.)	-	-	-
(Zbieranowski and Aherne 2012) [41]	-		E	Willems badge passive sampler	-	-	UVeVIS Spectrometer (Perkin Elmer Lambda XLS) at a wavelength of 540 nm
(Jimenez et al. 2006) [38]	2857 observations	NO _x	E	NO _x analyzer (model 42 Thermal Environmental Instruments, Inc.)	-	10 min	-
(Wei et al. 2019) [42]	-		E		-	23 h	-

(Wei et al. 2019) [42]	-	O ₃	E	O ₃ analyzer (Thermo Scientific, model 49C)	-	23 h	-
(Wei et al. 2019) [42]	-	SO ₂	E	SO ₂ analyzer (Thermo Scientific, model 43C)	-	23 h	-
(Reinhardt et al. 2011) [34]	-	HCHO	P	Chemically treated Sep-Pak sorbent tube	-	-	-
(Zbieranowski and Aherne 2012) [41]	-	HNO ₃	E	Willems badge passive sampler	-	-	Dionex ICS-1100 Ion Chromatograph in a carbonate eluent through an IonPac AS22 analytical column
(Zbieranowski and Aherne 2012) [41]	-		E	Willems badge passive sampler	-	-	UVeVIS Spectrometer (PerkinElmer Lambda XLS) at a wavelength of 655 nm
(Blanes-vidal et al. 2012) [47]	5 regions; 470 household. 180 subjects agreed to participate.	NH ₃	E + M	Semiautomatic filter pack samplers to measure NH ₃ concentrations	-	-	Ammonia absorbed on the oxalic acid filter was analyzed as NH ₄ ⁺ according to the continuous flow analysis method described in DS/EN ISO 11732
(Wei et al. 2019) [42]	-	The inorganic aerosols (NH ₄ ⁺ , NO ₃ ⁻ , SO ₄ ²⁻ , Cl ⁻ , and mineral cations Na ⁺ , K ⁺ , Ca ²⁺ , Mg ²⁺)	E	ADI 2080 online analyzer for Monitoring for Aerosols and Gases (MARGA, Applikon Analytical B.V., the Netherlands)	-	23 h	-
(de Assuncao et al. 2014) [30]	3 sites (one in the city center and two in rural localities).	PAHs	E	PS1 polyurethane foam (PUF) sampler (Andersen Instruments Inc.; Smyrna, GA, USA), in accordance with EPA method TO-13A (EPA, 1999)	10.16 cm-diameter quartz microfiber filters (Whatman Inc.; Clifton, NJ, USA), followed by a 6 cm diameter and 7.62 cm length PUF sampler (Tisch Environmental, Inc.; Cleveland, OH, USA)	24 h	The chemical analyses were performed by gas chromatography-mass spectrometry (GC/MS) for the 16 most toxic PAHs

(Sevimoglu and Rogge 2016) [35]	55 samples from Belle Gladeand; 61 samples from Delray Beach.		E	Samples were collected using a Graseby high volume sampler (Graseby Andersen, Atlanta, USA) with a PM ₁₀ selective inlet (G1200). The high volume cascade impactor (Graseby/GWM, series 235 with five impactor stages plus a backup stage) was added to the sampler	Slotted glass fiber filters (SAC 230GF) and backup glass fiber filter (Graseby GMW P/N-810) were used for the size-segregated particle sampling. Slotted quartz fiber filters (SAC230QF) and backup quartz fiber filter (2500QAO-UP) were used for size-segregated particle sampling for the analysis of the organic compounds, including PAHs	23 h	-
(Xing et al. 2020) [43]	11, 13, and 14 samples were collected from the 3 sites.		E	-	-	23 h	The priority list of 16 PAHs recommended by the United States Environmental Protection Agency (US EPA) are detected by gas chromatography-mass by using a spectrometric capillary column
(You et al. 2008) [37]	11,399 air samples (13% of them were replicates); 145 - 1031 samples per month.	VOC	E	Teflon membrane impregnated with charcoal	-	-	VOC were extracted from the sampling media using a carbon disulfide solution spiked with deuterated standards. The extracts were then injected into a gas chromatograph equipped with a mass spectrometer operated in selected ion-monitoring mode that detected three ions per compound.

(Maesano et al. 2019) [40]	109 French farmers.		E	Radiello 165 cartridge absorbent with 2,4-dinitrophenylhydrazine (2,4-DNPH) coated Florisil® was used to assess aldehydes	-	2 min	BTEX and VOCs were extracted through thermodesorption and analyzed by gas phase chromatography equipped with flame ionization detection and/or mass spectrometry
(Reinhardt et al. 2011) [34]	-	Benzene	P	Charcoal sorbent tube	-	-	-
(Reinhardt et al. 2011) [34]	-	Acrolein	P	Chemically treated Sep-Pak sorbent tube	-	-	-
(Jimenez et al. 2006) [38]	-	EC	E	-	-	-	Sections of the quartz filters were analyzed via Thermal Optical Transmittance (Sunset Laboratory, Inc. Tigard, OR) using a modified version of the NIOSH 5040 method
(Jimenez et al. 2006) [38]	-	OC	E	-	-	-	Sections of the quartz filters were analyzed via Thermal Optical Transmittance (Sunset Laboratory, Inc. Tigard, OR) using a modified version of the NIOSH 5040 method
(Barnig et al. 2012) [46]	100 dwellings and 50 farmhouses (50 rural nonfarming references).		E + P	-	-	8 h	Endotoxins extraction from 100 mg dust in 2 ml of PBS-LAL (Biomerieux, Craaponne, France).
		Endotoxin					Endotoxin extracted from the filters was evaluated using the kinetic chromogenic Limulus Amebocyte Lysate assay
(Pavilonis et al. 2013) [29]	197 rural households.		E	-	-	30 min	

Table S3. Summary of the additional information acquired by the authors (cultivation type; activity performed; presence and type of farms; use of pesticides and fertilizers).

Reference	Cultivation type	Activity	Farm	Use of pesticides and fertilizers
(Ali-Sak et al. 2021) [45]	Cotton	Application of pesticides	-	Yes
(Barnig et al. 2012) [46]	-	-	Swineries	-
(Blanes-vidal et al. 2012) [47]	-	-	Swine; Cattle	-
(Buczaj et al. 2014) [32]	-	-	-	-
(Campos-ramos and Arago 2009) [25]	Sugarcane	-	-	-
(de Assuncao et al. 2014) [30]	Sugarcane	Agricultural burning	-	-
(Green et al. 1990) [33]	Barley; Wheat; Oats; Forage (alfalfa); Potatoes; Corn; Canola	Harvesting	-	Yes
(Jimenez et al. 2006) [38]	-	Agricultural burning	-	-
(Le Blond et al. 2017) [27]	Sugarcane	Harvesting	-	-
(Loftus et al. 2016) [31]	Tree fruit orchards	-	Cattle	-
(Maesano et al. 2019) [38]	-	-	-	-
(Maw et al. 2002) [36]	Grass; Maize	Silages	-	-
(Pavilonis et al. 2013) [29]	-	-	-	-
(Ramli et al. 2021) [44]	-	Agricultural burning	-	-
(Reinhardt et al. 2011) [34]	-	Agricultural burning	-	-
(Ryu et al. 2007) [39]	Barley	Agricultural burning	-	Yes
(Sevimoglu and Rogge 2016) [35]	Sugarcane	Agricultural burning	-	-
(Swanepoel et al. 2011) [26]	Maize; Sunflowers	Planting; Harvesting	-	-
(Wei et al. 2019) [42]	Wheat	Agricultural burning	-	-
(Xing et al. 2020) [43]	n.a.	-	-	-

(You et al. 2008) [37]	-	-	Cow	Yes
(Zbieranowski and Aherne 2012) [41]	-	-	-	-
(Zhuo et al. 2018) [28]	-	-	-	Yes

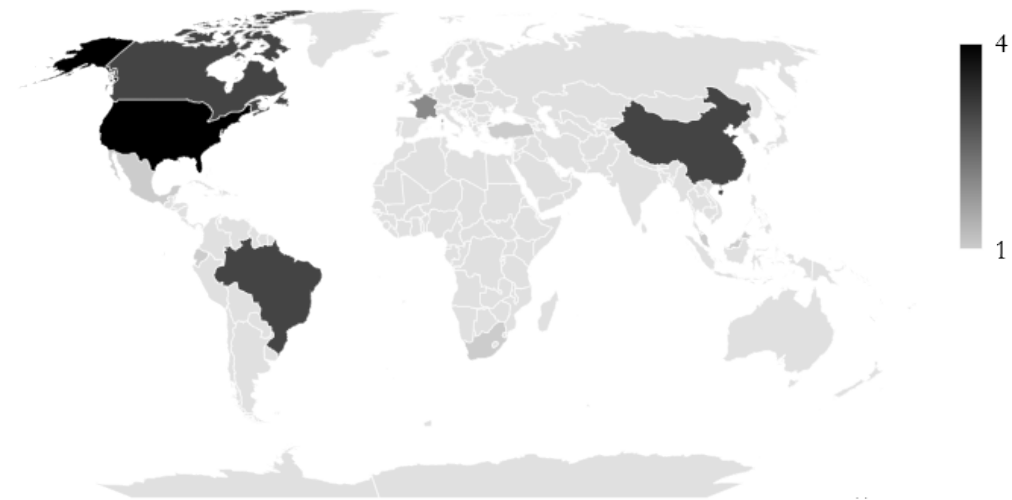


Figure S1. Spatial distribution of the evaluated papers. The number of studies is given by the grayscale.

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