



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 31604.39-2016

**National food safety standard - Food Contact Materials and
Articles - Determination of Polychlorobiphenyls (PCBs) in Food
Contact Paper**

食品安全国家标准 食品接触材料及制品 食品接触用纸中多氯联苯的测定
(English Translation)

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Foreword

This Standard replaces SN/T 2200-2008 Food Contact Materials - Pulp, Paper and Board - Determination of 7 Specified Polychlorinated Biphenyls (PCBs).

Compared with SN/T 2200-2008, this Standard has the major changes as follows.

--- Modify the standard name into "National Food Safety Standard - Food Contact Materials and Articles - Determination of Polychlorobiphenyls (PCBs) in Food Contact Paper".

--- Increase the determination types of polychlorobiphenyls (increase PCB 118).

--- Modify the pre-treatment procedures.

National Food Safety Standard - Food Contact Materials
and Articles - Determination of Polychlorobiphenyls
(PCBs) in Food Contact Paper

1 Scope

This Standard specifies using the gas chromatography and gas chromatography-mass spectrometry to determine the polychlorobiphenyls in food contact paper.

This Standard's first method is gas chromatography, the second method is gas chromatography-mass spectrometry; both of which are applicable to determine 8 polychlorobiphenyls in the various food contact papers.

The First Method of Gas Chromatography

2 Principle

Polychlorobiphenyls (PCBs) in monolayer food contact paper are extracted through water-bath shaking of n-hexane-dichloromethane mixed solution or extracted by accelerated solvent extractor; polychlorobiphenyls (PCBs) in composite food contact papers are extracted by accelerated solvent extractor. After the extracting solution is concentrated, through the concentrated sulfuric acid solution treatment, it shall be detected by the gas chromatograph equipped with electronic capture detector; use internal standard method to quantify.

3 Reagents and Materials

Unless otherwise is specified, the reagents used in this method are analytically pure; while the water is Class-I water stipulated in GB/T 6682.

3.2.1 N-hexane-dichloromethane mixed solution (1+1). weigh 100mL of n-hexane and 100mL of dichloromethane; mix evenly.

3.3 Standard substance

2, 2', 5-trichlorobiphenyl (PCB18); 2, 4, 4'- trichlorobiphenyl (PCB 28); 2, 2', 5, 5'-tetrachlorobiphenyl (PCB 52); 2, 2', 4, 5, 5'-pentachlorobiphenyl (PCB 101); 2, 3', 4, 4', 5- pentachlorobiphenyl (PCB 118); 2, 2', 3, 4, 4', 5'-hexachlorobiphenyl (PCB 138); 2, 2', 4, 4', 5, 5'- hexachlorobiphenyl (PCB 153); 2, 2', 3, 4, 4', 5, 5'-heptachlorobiphenyl (PCB 180); internal standard substance 2, 2', 3, 3', 4, 4', 5, 5', 6, 6'- decachlorobiphenyl

(PCB 209). purity of all standard substances is $\geq 98\%$; or the standard substances that are approved by the state or awarded standard substance certificate by the state.

Relevant information on the 8 polychlorobiphenyls (PCBs) and internal standard substance can refer to Table A.1.

3.4.1 PCBs and internal standard substance standard stock solution. accurately weigh appropriate amount of PCBs standard substances; use n-hexane to prepare into the solution with concentration of 200mg/L, respectively; seal and store at -18°C ; the shelf life is 12 months.

3.4.2 Mixed standard working solution. separately and accurately pipette 8 PCBs standard stock solutions; use n-hexane to gradually dilute into the 1.00mg/L mixed standard working solution; seal and store at -18°C ; the shelf life is 3 months.

3.4.3 Internal standard substance working solution. accurately pipette appropriate

amount of internal standard substance (PCB 209) standard stock solution; use n-hexane to prepare into the solution with concentration of 1.00mg/L; seal and store at -18°C ; the shelf life is 3 months.

3.4.4 Mixed standard series solution. pipette appropriate amount of mixed standard

working solution and internal standard substance working solution; use n-hexane to prepare into the mixed standard series solutions (the concentration of internal standard substance is 0.050mg/L) with concentration of 0.0050mg/L, 0.010mg/L, 0.025mg/L, 0.050mg/L, 0.100mg/L and 0.200mg/L. It shall be prepared for current use.

3.5.2 Diatomaceous earth carrier G. excellent grade; CAS No. of 68855-54-9; heat for 4h in the 400°C muffle furnace before use, then prepare for later-use.

The Second Method of Gas Chromatography - Mass Spectrometry

9 Principle

Polychlorobiphenyls (PCBs) in monolayer food contact paper are extracted through water-bath shaking by adopting the n-hexane-dichloromethane mixed solution or extracted by accelerated solvent extractor; polychlorobiphenyls (PCBs) in composite food contact papers are extracted by accelerated solvent extractor. After the extracting solution is concentrated, through the concentrated sulfuric acid solution treatment, it shall be detected by the gas chromatograph-mass spectrometry; use internal standard method to quantify.

10 Reagents and Materials

Unless otherwise is specified, the reagents used in this method shall be analytically pure; while the water is Class-I water stipulated in GB/T 6682.

10.1.3 Acetonitrile (C₆H₁₄) [here translator notes it shall be (CH₃CN)].

chromatographic pure.

10.2.1 N-hexane-dichloromethane mixed solution (1+1, volume ratio). weigh 100mL

of n-hexane and 100mL of dichloromethane, mix evenly.

10.3 Standard substance

2, 2', 5-trichlorobiphenyl (PCB 18); 2, 4, 4'-trichlorobiphenyl (PCB 28), 2, 2', 5, 5'-tetrachlorobiphenyl (PCB52); 2, 2', 4, 5, 5'-pentachlorobiphenyl (PCB 101); 2, 3', 4, 4', 5-pentachlorobiphenyl (PCB 118); 2, 2', 3, 4, 4', 5' -hexachlorobiphenyl (PCB 138); 2, 2', 4, 4', 5, 5'-hexachlorobiphenyl (PCB 153); 2, 2', 3, 4, 4', 5, 5'-heptachlorobiphenyl (PCB 180); internal standard substance (13C₁₂-PCB 209). the purity of all standard substances is ≥98%, or the standard substances approved by the state or awarded standard substance certificate by the state; relevant information on 8 PCBs and internal standard substance can refer to Table A.1.