Rapid Substance Detection in Inspection and Supply Chain

Non-Confidential Needs Brief

BACKGROUND

Procter & Gamble is a global leader in innovation, products and services for consumer goods in categories like Beauty (Hair and Skin Care), Fabric & Home Care, Baby Care, Oral Care, Health Care, Family Care, and Feminine Care. We focus on designing and manufacturing superior products, packages and experiences that are safe to consumers, the environment and supply chain partners. P&G undertakes significant efforts to analyze compositions of raw materials and finished products and packages from development to manufacturing through the supply chain.

NEED DESCRIPTION

For most substances we lack rapid, easy-to-use yet precise detection devices/ methods for inspections at P&G operations (e.g. material income, manufacturing control, cleaning of equipment) and at our supply chain partners that can be used by workers and do not require laboratory environment/ standards.

WHAT WE ARE LOOKING FOR

- *We are looking for precise, rapid, robust and simple-to-use measurement devices/ tools for substance detection, designed to be used in industrial and supply chain environment by workers for frequent inspections.*
- *List of samples and substances:*
    - ***Volatiles in Finished Products** – We produce adsorbent hygiene products (diapers and fem care pads, as examples) that should not contain a meaningful presence of VOCs that are not intentionally added (i.e., through the adsorption of environmental background, the deviation of normal production processes, or the contamination of raw material supply streams). As a prototype marker, we propose real time evaluation of formaldehyde, at a limit level of 10 ppm or less.*
    - ***Heavy Metals in Mined Raw Materials / Botanicals --** As we introduce more naturally-occurring feedstocks across our supply chain, we need to accommodate a wider potential variance of trace contaminates across raw materials. Scope here would include trace metal profiles. Titanium Dioxide and Calcium Carbonate represent two such raw materials, and Lead, Arsenic, and Antimony would be potential specific naturally-occurring trace contaminates. Target would be to detect these metals at 1 ppm or less.*
    - ***Pesticides in the Manufacturing Environment:** We want to ensure that our products are not contaminated by sporadic environmental events (i.e. seasonal use of pesticides close to manufacturing and/or warehousing sites). A target analyte would be glyphosate and/or or chlorinated pesticides, measured in the air (or some suitable proxy), at or about the 1 ppm level or less.*
- *The tools/ detectors should ideally not require any training, other than an intuitive use instruction, and should show results as either present/not present or in a simple-to-interpret display with a scale/ value.*
- *Ideally a solution that can be piloted within 6 months in P&G labs and our supply chain.*

WHAT WE ARE NOT LOOKING FOR

- *Sophisticated analytical equipment that would require a lab assistant education/ training and dedicated lab settings*
- *A long-term fundamental research and development activity.*

THE ASK

If you have a solution and proposal to partner with us, or a serious interest in developing a solution in partnership with us, please submit a summary of your solution, approach and/or technologies, incl. your current level of detection/ limit of quantification. Please indicate how you would propose pilot testing your solution. We look forward to partnering with you. All ideas and submissions will be fully reviewed.

Please note that only **non-confidential** information describing the method, current use and IP can be accepted for review.

Appendix – Table of Substances and Requirements – ideal limit of quantification by substance

Substance	Required limit of quantitation	Comment
Glyphosate	0.5 µg/g	
Formaldehyde	10 µg/g	
Lead	0.05 µg/g	
Arsenic	0.1 µg/g	
Antimony	0.1 µg/g	
Cadmium	0.1 µg/g	
Mercury	0.05 µg/g	
Cobalt	1 µg/g	
Nickel	0.5 µg/g	
Vanadium	1 µg/g	
PAHs	0.2 µg/g each congener	At a minimum, can measure the following PAHs: Naphthalene Phenanthrene Anthracene Fluoranthene Pyrene Benzo(a)anthracene Chrysene Benzo(b)fluoranthene Benzo[j]fluoranthene Benzo(k)fluoranthene Benzo(e)pyrene Benzo(a)pyrene dibenzo(a,h)anthracene Benzo[g,h,i]perylene Indeno[1,2,3-cd]pyrene

Phthalates	10.0 µg/g each congener	Ideally, can measure the following phthalates: Dimethyl phthalate Diethyl phthalate Dipropyl phthalate Dibutyl phthalate Diisobutyl phthalate Benzyl butyl phthalate Dipentyl phthalate Diisopentyl phthalate Dicyclohexyl phthalate Dihexyl phthalate Diisoheptyl phthalate Bis(2-ethylhexyl) phthalate Di-n-octyl phthalate Diisononyl phthalate Diisodecyl phthalate Di-2-propylheptyl phthalate Bis(methyl-glycol) phthalate Di-2-ethoxyethyl phthalate Di-2-butoxyethyl phthalate Bis(4-methyl-pentyl) phthalate Bis(4-methyl-2-pentyl) phthalate Hexyl-2-ethylhexyl phthalate Diphenyl phthalate Diphenyl Isophthalate
Dioxins/Furans/DL-PCBs	See comment and individual congener LOQs below.	With LOQ sufficient to determine sum TEQ > 2 ng/kg. Listing of individual congener LOQs is based on their respective TEF values and 10x buffer relative to the sum TEQ parameter.
2,3,7,8-TCDD	2.00E-07 µg/g	
1,2,3,7,8-PeCDD	2.00E-07 µg/g	
1,2,3,4,7,8-HxCDD	2.00E-06 µg/g	
1,2,3,6,7,8-HxCDD	2.00E-06 µg/g	
1,2,3,7,8,9-HxCDD	2.00E-06 µg/g	
1,2,3,4,6,7,8-HpCDD	2.00E-05 µg/g	
OCDD	6.67E-04 µg/g	
2,3,7,8-TCDF	2.00E-06 µg/g	
1,2,3,7,8-PeCDF	6.67E-06 µg/g	
2,3,4,7,8-PeCDF	6.67E-07 µg/g	
1,2,3,4,7,8-HxCDF	2.00E-06 µg/g	
1,2,3,6,7,8-HxCDF	2.00E-06 µg/g	

1,2,3,7,8,9-HxCDF	2.00E-06 µg/g	
2,3,4,6,7,8-HxCDF	2.00E-06 µg/g	
1,2,3,4,6,7,8-HpCDF	2.00E-05 µg/g	
1,2,3,4,7,8,9-HpCDF	2.00E-05 µg/g	
OCDF	6.67E-04 µg/g	
PCB77	2.00E-03 µg/g	
PCB81	6.67E-04 µg/g	
PCB126	2.00E-06 µg/g	
PCB169	6.67E-06 µg/g	
PCB105	6.67E-03 µg/g	
PCB114	6.67E-03 µg/g	
PCB118	6.67E-03 µg/g	
PCB123	6.67E-03 µg/g	
PCB156	6.67E-03 µg/g	
PCB157	6.67E-03 µg/g	
PCB167	6.67E-03 µg/g	
PCB189	6.67E-03 µg/g	