

Déclaration de Madrid sur les substances alkylées poly-et Perfluorées (PFAS)

En tant que scientifiques et autres professionnels de diverses disciplines, nous sommes préoccupés par la production et la libération dans l'environnement d'un nombre croissant de substances alkylées poly- et Perfluorées (PFAS) pour les raisons suivantes :

1. Les PFAS, dont l'origine est anthropique, sont omniprésents. Les PFAS sont très persistants, car ils contiennent des chaînes perfluorées qui ne se dégradent que très lentement, voire pas du tout, dans des conditions environnementales. Il est établi que certaines substances chimiques polyfluorées se dégradent pour former des perfluorés ([D'Eon et Mabury, 2007](#)).
2. On trouve des PFAS dans l'environnement intérieur et extérieur, chez la faune sauvage et dans les tissus et les fluides corporels humains partout dans le monde. Ils sont émis par des procédés industriels ainsi que par des opérations militaires et de lutte contre les incendies ([Darwin 2011](#); [Fire Fighting Foam Coalition 2014](#)). Ils migrent depuis les produits de consommation dans l'air ([Shoeib et al. 2011](#)), la poussière domestique ([Björklund et al. 2009](#)), la nourriture ([Begley et al. 2008](#); [Tittlemier et al. 2007](#); [Trier et al. 2011](#)), les sols ([Sepulvado et al. 2011](#); [Strynar et al. 2012](#)), les eaux souterraines et de surface, et font leur chemin jusque dans l'eau potable ([Eschauzier et al. 2012](#); [Rahman et al. 2014](#)).
3. Dans les études animales, il a été constaté que certains PFAS à longue chaîne provoquent une toxicité hépatique, une perturbation du métabolisme des lipides et des systèmes immunitaire et endocrinien, des troubles neuro-comportementaux, une toxicité et une mortalité néonatales, ainsi que des tumeurs dans de multiples systèmes organiques ([Lau et al. 2007](#); [Post et al. 2012](#)). L'ensemble des preuves épidémiologiques, toujours plus nombreuses, montre qu'il existe des associations significatives ou suggestives entre des PFAS à longue chaîne spécifiques et des effets néfastes, y compris des associations avec le cancer du testicule et des reins ([Barry et al. 2013](#); [Benbrahim-Tallaa et al. 2014](#)), des dysfonctionnements du foie ([Gallo et al. 2012](#)), l'hypothyroïdie ([Lopez-Espinosa et al. 2012](#)), un cholestérol élevé ([Fitz-Simon et al. 2013](#); [Nelson et al. 2009](#)), la colite ulcéreuse ([Steenland et al. 2013](#)), un faible poids de naissance et une petite taille ([Fei et al. 2007](#)), l'obésité ([Halldorsson et al. 2012](#)), une diminution de la réponse immunitaire aux vaccins ([Grandjean et al. 2012](#)), une baisse des niveaux hormonaux et un retard de la puberté ([Lopez-Espinosa et al. 2011](#)).
4. En raison de leur persistance élevée, de leur distribution mondiale, de leur potentiel de bioaccumulation et de leur toxicité, certains PFAS figurent dans la liste de la Convention de Stockholm (Programme des Nations Unies 2009) comme polluants organiques persistants (POP).
5. Comme indiqué dans la déclaration Helsingør ([Scheringer et al. 2014](#)),
 - a. Bien que certains des PFAS à longue chaîne soient réglementés ou éliminés progressivement, les substituts les plus courants sont des PFAS à chaîne courte avec des structures similaires, ou des composés avec des segments fluorés reliés par des liaisons éther.
 - b. Alors que certaines alternatives fluorées à chaîne plus courte semblent être moins bioaccumulables, elles n'en demeurent pas moins aussi persistantes dans l'environnement que les substances à longue chaîne, ou ont des produits de dégradation persistants. Par conséquent, changer pour des substances à chaîne

courte et autres alternatives fluorées peut ne pas réduire les quantités de PFAS dans l'environnement. En outre, parce que certains PFAS à chaîne plus courte sont moins efficaces, il se peut que de plus grandes quantités soient nécessaires pour fournir les mêmes résultats.

- c. Alors que de nombreuses alternatives fluorées sont commercialisées, peu d'informations sont accessibles au public concernant leurs structures chimiques, leurs propriétés, leurs utilisations et leurs profils toxicologiques.
 - d. L'utilisation accrue d'alternatives fluorées conduira à une augmentation des niveaux de produits de dégradation perfluorés stables dans l'environnement, et peut-être aussi dans le biote et chez l'humain. Cela augmenterait les risques d'effets néfastes pour la santé humaine et pour l'environnement.
6. Les efforts initiaux pour estimer les émissions globales de PFAS dans l'environnement sont limités en raison des incertitudes liées à la formulation des produits, aux quantités de production, aux sites de production, à l'efficacité du contrôle des émissions et aux tendances à long terme dans l'histoire de la production ([Wang et al. 2014](#)).
 7. La capacité technique de détruire les PFAS est actuellement insuffisante dans de nombreuses parties du monde.

L'action mondiale via le Protocole de Montréal ([United Nations Environment Programme 2012](#)) a réussi à réduire l'utilisation des chlorofluorocarbures (CFC), des gaz très persistants qui appauvrissent l'ozone, permettant ainsi la reconstitution de la couche d'ozone. Toutefois, bon nombre des substituts organofluorés aux CFC sont toujours une source de préoccupation en raison de leur potentiel de réchauffement global élevé. Il est essentiel d'apprendre de ces efforts passés et de prendre des mesures au niveau international pour réduire l'utilisation de PFAS dans les produits. Il faut aussi empêcher leur remplacement par des alternatives fluorées afin d'éviter des dommages à long terme pour la santé humaine et l'environnement.

Pour ces raisons, nous demandons à la communauté internationale de coopérer pour limiter la production et l'utilisation des PFAS et développer des solutions alternatives non fluorées plus sûres. Nous exhortons donc les scientifiques, les gouvernements, les fabricants de substances chimiques et de produits, les organisations d'achat, les revendeurs et les consommateurs à prendre les mesures suivantes :

Les scientifiques :

1. Dresser un inventaire global, en collaboration avec l'industrie et les gouvernements, de tous les PFAS utilisés ou présents dans l'environnement, y compris leurs précurseurs et leurs produits de dégradation, ainsi que leur fonctionnalité, leurs propriétés et leur toxicologie.
2. Développer des méthodes analytiques pour identifier et quantifier des familles additionnelles de PFAS, y compris les alternatives fluorées.
3. Poursuivre la surveillance des anciens PFAS dans différentes matrices ainsi que des réservoirs environnementaux de PFAS.
4. Continuer l'étude des mécanismes de la toxicité et de l'exposition (par exemple les sources, le devenir, le transport et la bioaccumulation des PFAS), et améliorer les méthodes pour tester l'innocuité des substituts.

5. Porter les résultats de la recherche à l'attention des décideurs, de l'industrie, des médias et du public.

Les Gouvernements :

1. Adopter une loi pour exiger que les PFAS ne soient utilisés que lorsque c'est indispensable et renforcer l'étiquetage pour indiquer les utilisations.
2. Exiger que les fabricants de PFAS :
 - a. effectuent des tests toxicologiques plus poussés,
 - b. rendent les structures chimiques publiques,
 - c. fournissent des méthodes analytiques validées pour la détection de PFAS,
 - d. assument une responsabilité élargie des producteurs et mettent en œuvre l'élimination en toute sécurité des produits et des stocks contenant des PFAS.
3. Travailler avec l'industrie pour développer des registres publics de produits contenant des PFAS.
4. Publier des données statistiques annuelles sur la production, les importations et les exportations de PFAS.
5. Autant que possible, éviter les produits qui contiennent des PFAS ou dont la fabrication utilise des PFAS, sur les marchés publics.
6. En collaboration avec l'industrie, veiller à ce que l'infrastructure soit en place pour transporter, éliminer et détruire les PFAS et les produits contenant des PFAS en toute sécurité, et faire appliquer ces mesures.

Les fabricants de substances chimiques :

1. Rendre les données relatives aux PFAS accessible au public, y compris les structures chimiques, les propriétés et la toxicologie.
2. Fournir des échantillons standards de PFAS aux scientifiques, y compris les précurseurs et les produits de dégradation pour permettre la surveillance des PFAS dans l'environnement.
3. Travailler avec les scientifiques et les gouvernements au développement de méthodes d'élimination des PFAS ne présentant pas de danger.
4. Fournir de la documentation sur le contenu des PFAS ainsi que des instructions pour éliminer les PFAS de manière sécuritaire à la chaîne d'approvisionnement.
5. Développer des alternatives non fluorées qui ne sont ni persistantes ni toxiques.

Les fabricants de produits :

1. Arrêtez d'utiliser des PFAS là où ils ne sont pas indispensables ou lorsque des alternatives plus sûres existent.
2. Développer des méthodes de quantification des PFAS peu coûteuses et sensibles pour des tests de conformité.
3. Etiqueter les produits contenant des PFAS en indiquant leur identité chimique, ainsi que les protocoles pour les éliminer sans danger.
4. Investir dans le développement et l'utilisation d'alternatives non fluorées.

Les groupes d'achat, les détaillants et les consommateurs individuels :

1. Dans la mesure du possible, éviter les produits qui contiennent des PFAS, ou qui sont fabriqués en utilisant des PFAS. Ceux-ci incluent de nombreux produits résistants aux taches, imperméables à l'eau, ou antiadhésifs.
2. Contester l'utilisation de ces substances chimiques fluorées « haute performance » ajoutées aux produits de consommation.

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