



# TOXIC HAZARDS IN MICROWAVE POPCORN

PFAS IN POPCORN EXPORTED FROM THE U.S. TO INDONESIA  
POSES HEALTH THREATS TO CONSUMERS

March 2023



for a toxics-free future







## MICROWAVE POPCORN: A SOURCE OF PFAS EXPOSURE

Microwave popcorn has been [identified](#) as a source of exposure to PFAS chemicals, substances that [persist](#) in the environment and pose potential [threats](#) to our health. To assess potential exposures to PFAS by consumers in Indonesia and the US, [IPEN](#), a global network of public interest groups and the [Nexus3 Foundation](#), an Indonesian public interest organization, investigated the PFAS content of popular microwave popcorn brands manufactured in the US to determine if the products exported to Indonesia contain PFAS. We also assess whether the lack of federal PFAS regulations in the US has the potential to impact residents in other countries.

Together the groups purchased 29 microwave popcorn samples produced by four US food companies. Products were purchased in Indonesia and the US and the bags were analyzed for PFAS content. **All 29 samples tested positive for one or more PFAS chemicals.** The groups also surveyed the four popcorn companies for their policies on PFAS. Only Conagra responded, replying that **they are eliminating PFAS from their Act II popcorn bags.**

In 2019, a Jolly Time FAQ stated that their microwave popcorn products were PFAS-free. However, the IPEN-Nexus3 data from Jolly Time products purchased at about the time of the testing found that the products contained PFAS. This misleading claim is no longer included in their current [FAQ](#).



# HEALTH THREATS FROM PFAS

Per- and polyfluoroalkyl substances (PFAS), known as “Forever Chemicals,” are an environmental and health concern because they can **persist** in the environment and harm **human health**. PFAS are a family of **thousands** of related chemicals, many of which are widely used as water- and grease-resistant **additives** in many products, including in microwave popcorn bags. People are continuously **exposed** to PFAS in their diet, drinking water, and personal care and consumer products.

PFAS are **used** in paper food packaging because they create a chemical barrier on the surface of the wrapping material, which repels grease coming from the food. Microwave popcorn bags containing PFAS have been shown to be a source of PFAS in the body. PFAS in microwave popcorn bags **migrate** into the oil, so people may ingest the chemicals when they eat popcorn. A 2019 **study** of human exposure found that microwave popcorn consumption was associated with significantly higher levels of PFAS in blood.

PFAS persist in the body, where they are mainly **detected** in blood, liver, breastmilk, and kidneys. Animal **studies** have found that certain PFAS can cause reproductive and developmental disruption, liver, kidney, and immunological health effects, effects on birth weight, growth, learning, behavior, pregnancy, the endocrine system, increased cholesterol, and impacts on thyroid function. Safer **alternatives** to PFAS are available for paper packaging. For example, wax-coated or high-density paper can **substitute** for PFAS and prevent transmission of oils.



## ALL TESTED PRODUCTS CONTAINED PFAS

For this study, IPEN and Nexus3 purchased microwave popcorn from Indonesia and the US. Eighteen samples from Indonesia were purchased from local markets and online retailers. Eleven samples from the US were purchased online and from markets in Indiana and California. The samples were produced by four US food companies. The Indonesian popcorn samples were all products imported from these US producers.

The four popcorn brands tested are Jolly Time (made by the American Popcorn Company), Act II (made by Conagra), Cousin Willie's (made by Ramsey Popcorn), and Preferred Popcorn.

All the samples were sent to an independent laboratory at the University of Chemistry and Technology in Prague, Czechia and tested for PFAS chemicals. All 29 popcorn bag samples tested positive for one or more PFAS (see Table 1 below). A Preferred Popcorn "Kettle Korn" brand bag purchased in Indonesia tested with the highest concentration of PFAS. Among the US samples, an American Popcorn "Jolly Time Blast O Butter" brand tested with the highest PFAS concentrations. Half of the products contained more than one PFAS, with some containing between five to nine PFAS chemicals, increasing potential risks to consumers.

## CONAGRA COMMITS TO ELIMINATING PFAS

In January 2023, IPEN and the [Toxics-Free Future](#) campaign surveyed the four popcorn companies regarding their policies on PFAS in their microwave popcorn brands. American Popcorn, Ramsey Popcorn and Preferred Popcorn did not respond.

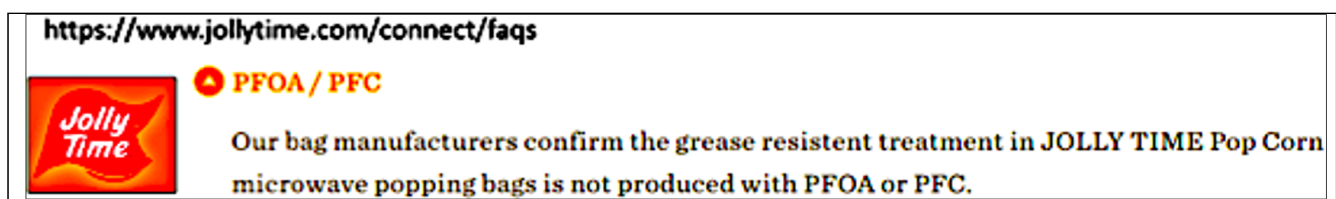
**Conagra replied that it is eliminating PFAS from its Act II popcorn bags.** A February 10, 2023 email from Conagra Corporate Communications to IPEN noted that

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**"WE REMOVED PFAS LAST YEAR FROM THE PACKAGING USED FOR OUR ACT II MICROWAVE POPCORN PRODUCTS IN THE U.S., AND AS OF MARCH 2023 WE WILL NO LONGER USE PFAS IN THE PACKAGING FOR OUR MICROWAVE POPCORN PRODUCTS SOLD INTERNATIONALLY UNDER OUR ACT II BRAND."**

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In 2019, at around the time that IPEN and Nexus3 were purchasing their products, a Jolly Time FAQs stated that



*"Our bag manufacturers confirm the grease resistant treatment in JOLLY TIME Popcorn microwave popping bags is not produced with PFOA or PFC."*

This statement misled consumers, as the testing for this study confirmed PFAS were present in Jolly Time products at that time. This Jolly Time claim is no longer included in their [FAQ](#). In addition, while food contact uses of [PFOA are prohibited](#) by the Stockholm Convention, the IPEN-Nexus3 testing found this banned PFAS chemical in a Jolly Time product on the Indonesian market.

## WEAK REGULATIONS LEAVE CONSUMERS AT RISK

Three PFAS chemicals -- PFOS, PFOA and PFHxS -- are [listed](#) in the Stockholm Convention for global restriction and elimination. The Convention's Scientific Committee is currently [evaluating](#) more PFAS substances classified as long-chain perfluorocarboxylic acids (LC-PFCAs) for addition to the Convention.

In the EU, several PFAS have been [identified](#) as substances of very high concern (SVHCs) under the REACH chemicals legislation and others have been proposed for restriction or were recently restricted. In February 2023, the EU Chemicals Authority (ECHA) released a [proposal](#) broadly defining PFAS as a class and calling for a ban on about 10,000 PFAS to prevent *“negative effects on people’s health and the environment.”* The proposal notes that non-essential PFAS, including those used for food packaging, could be phased out first, as they *“are more likely to be non-essential (e.g., clothing, cosmetics, toys and food contact materials).”*

While Indonesia is a Party to the Stockholm Convention, no domestic regulation limits PFAS in food packaging. According to the [Indonesian Statistics Bureau](#), in 2021, Indonesia imported US\$3 million worth of microwave popcorn from the U.S. (HS code 10059010). One [research firm](#) estimates that the global popcorn market will reach more than US\$18 billion by 2031, and that Asia-Pacific will be the fastest growing market from 2022 to 2031. Thus, exposure of the Indonesian population to PFAS chemicals from microwave popcorn will likely increase if restrictions are not applied.

In the US, there has been no comprehensive federal regulatory strategy limiting PFAS, and the US is not a Party to the Stockholm Convention. In 2021, the US EPA [developed](#) a PFAS Strategic Roadmap, which has resulted in a variety of [actions](#) to address these substances. However, federal regulation of PFAS in the US is extremely weak to non-existent. In 2021, legislation was [introduced](#) in Congress to ban PFAS nationwide, however, the proposal [failed](#) due to corporate lobbying and lack of support by the Republican Party.

In the absence of federal action, some states are considering or have adopted PFAS [restrictions](#). Eleven U.S. states, including Washington, New York, and California, passed laws banning PFAS in food packaging. Dozens of states regulate PFAS in drinking water or in some products (see the [Safer States PFAS bill tracker](#)). Also, [numerous major US food retailers](#), including Ahold Delhaize, Starbucks, McDonald's, Burger King (RBI), and others have announced commitments to eliminate PFAS from their food packaging.

## EXPORTING TOXIC HAZARDS

The IPEN-Nexus3 study shows that PFAS are widely used in popular microwave popcorn products in the US and that these same PFAS-containing products are exported to Indonesia. Consumers in both countries can be exposed to PFAS when they eat popcorn from PFAS-treated microwave popcorn bags, leading to increased PFAS levels in the body and potential health risks.

The results of this study illustrate how the lack of federal PFAS regulations in the US along with corporate indifference can result in spreading toxic PFAS in food products to other countries such as Indonesia. The lack of PFAS regulations in Indonesia compounds the problem, leaving its residents vulnerable to PFAS-containing products. The data highlight the importance of urgent action to globally prohibit the production, sale, and use of PFAS as a [class](#), particularly for all non-essential uses.



Regarding PFAS in microwave popcorn bags, we urge the following:

## FOR FOOD COMPANIES:

- Popcorn makers should commit to eliminating PFAS from their products, and to using a tool such as GreenScreen to evaluate the hazards of alternatives, with clear phase-in timelines for safer substitutes.
- Until PFAS are phased out, companies should publicly disclose the PFAS content in existing products with clear warning labels on their products.
- Companies that have shifted to safer alternatives should have their products certified through independent, third-party verification procedures to increase their customers' ability to choose products without PFAS.

## FOR GOVERNMENTS:

- Work for a class-based approach of listing all PFAS for global elimination under the Stockholm Convention.
- Prohibit the sale and importation of PFAS-treated food packaging and food contact materials, including microwaveable popcorn bags.
- Promote the replacement of PFAS with safe alternatives.



**Table 1** PFAS levels in microwave popcorn products purchased in the US and Indonesia

Note: Jolly Time is made by the American Popcorn Company; Act II is made by Conagra; and Cousin Willie's is made by Ramsey Popcorn.

SAMPLE CODE	BRAND	COUNTRY OF PURCHASE	DATE PURCHASED	PFAS CHEMICALS DETECTED
IDN-PA-03	Jolly Time	Indonesia	Jan-19	PFBA. PFPeA. PFHxA. PFHpA. PFOA
IDN-PA-06	Jolly Time	Indonesia	Feb-20	FHET (6:2 FTOH)
IDN-PA-07	Jolly Time	Indonesia	Feb-20	FHET (6:2 FTOH)
IDN-PA-08	Jolly Time	Indonesia	Feb-20	FHET (6:2 FTOH)
IDN-PA-09	Jolly Time	Indonesia	Feb-20	FHET (6:2 FTOH)
IDN-PA-10	Jolly Time	Indonesia	Feb-20	FHET (6:2 FTOH)
IDN-PA-11	Jolly Time	Indonesia	Feb-20	PFBA. PFPeA. PFHxA. FHET (6:2 FTOH)
IDN-PA-12	Preferred popcorn	Indonesia	Feb-20	PFHxA. FHET (6:2 FTOH)
IDN-PA-13	Preferred popcorn	Indonesia	Feb-20	PFHxA. FHET (6:2 FTOH)
IDN-PA-14	Preferred popcorn	Indonesia	Feb-20	PFHxA. FHET (6:2 FTOH)
IDN-PA-15	Preferred popcorn	Indonesia	Feb-20	PFHxA. 6:2 FTOH. 6:2 diPAP. 6:2 8:2 diPAP
IDN-PA-17	Jolly Time	Indonesia	Mar-22	PFBA. PFHxA. FHET. 6:2 FTS. 6:2 monoPAP. 8:2 monoPAP. 6:2 diPAP. 6:2 8:2 diPAP. 8:2 diPAP
IDN-PA-18	Jolly Time	Indonesia	Mar-22	PFBA. PFHxA. FHET. 6:2 monoPAP. 8:2 monoPAP. 6:2 diPAP. 6:2 8:2 diPAP. 8:2 diPAP
IDN-PA-19	Jolly Time	Indonesia	Mar-22	PFBA. PFHxA. PFHpA. FHET. 6:2 monoPAP. 8:2 monoPAP. 6:2 diPAP. 6:2 8:2 diPAP. 8:2 diPAP

**Table 1 Continued** PFAS levels in microwave popcorn products purchased in the US and Indonesia

Note: Jolly Time is made by the American Popcorn Company; Act II is made by Conagra; and Cousin Willie's is made by Ramsey Popcorn.

SAMPLE CODE	BRAND	COUNTRY OF PURCHASE	DATE PURCHASED	PFAS CHEMICALS DETECTED
IDN-PA-20	Jolly Time	Indonesia	Mar-22	PFBA. PFHxA. FHET. 8:2 mono-PAP. 6:2 diPAP. 6:2 8:2 diPAP
IDN-PA-21	Jolly Time	Indonesia	Mar-22	PFBA. 6:2 diPAP
IDN-PA-22	Preferred popcorn	Indonesia	Mar-22	PFBA. PFHxA. PFHpA. FHET
IDN-PA-23	ACT II	Indonesia	Mar-22	PFBA. PFHxA. PFHpA. FHET. 6:2 diPAP
USA-PA-01	Jolly Time	USA	Feb-20	FHET (6:2 FTOH)
USA-PA-02	Jolly Time	USA	Feb-20	PFBA. PFHxA. FHET (6:2 FTOH)
USA-PA-03	Jolly Time	USA	Feb-20	FHET (6:2 FTOH)
USA-PA-04	Jolly Time	USA	Feb-20	FHET (6:2 FTOH)
USA-PA-05	Preferred popcorn	USA	Feb-20	FHET (6:2 FTOH)
USA-PA-06	Cousin Willie's	USA	Feb-20	FHET (6:2 FTOH)
USA-PA-07	Cousin Willie's	USA	Feb-20	FHET (6:2 FTOH)
USA-PA-08	Cousin Willie's	USA	Feb-20	FHET (6:2 FTOH)
USA-PA-09	Cousin Willie's	USA	Feb-20	FHET (6:2 FTOH)
USA-PA-10	Cousin Willie's	USA	Feb-20	FHET (6:2 FTOH)
USA-PA-11	Jolly Time	USA	Mar-22	PFBA. PFHxA. FHET





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