



MAY 2026

RESEARCH

RESOURCE

Research Recap

Understanding the Impact of Food Residue on Paper Packaging Recyclability



The SPC would like to extend a special thanks to SPC member organizations and partners who provided funding to Clemson University. Without their generous support, this research project would not have been possible.

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EXECUTIVE SUMMARY

The Sustainable Packaging Coalition, in collaboration with program members and industry partners, spearheaded a multi-faceted research project aimed at better understanding the impact food residue has on the recyclability of paper packaging. We explored whether the How2Recycle label influences the actions consumers take to prepare paper packaging for recycling and how paper recyclers view food residue entering their systems. In our research, we learned that on-pack labeling and supporting education play a critical role in reducing the amount of food contamination entering the recycling stream,

both for existing packaging and for new formats that could be added to the system. Further, the research indicated that food contamination may present a less significant issue to paper recyclers than often perceived, but the packaging industry should not see allowance of higher levels of food contamination by recyclers as a viable path forward for recycling more packaging. Instead, increasing the amount of food packaging accepted for recycling, and correctly recycled by consumers, will require collaboration among stakeholders across the paper packaging and recycling value chains.

This research points to the need for paper packaging industry, in partnership with paper recyclers, to align on:

Acceptable levels of food residue on paper packaging that is recycled.

Consistent on-pack language that communicates acceptable levels of food residue to consumers.



RESEARCH METHODOLOGY

Consumer Behavior Study

Conducted by Clemson University, study participants, divided into three groups, were provided with 19 packaging formats to assess how the How2Recycle label impacted their preparation of the packages for recycling. Participants were surveyed after the activity.

Paper Recycler Outreach and Surveys

Consultants from the firm Insight + Action conducted outreach to stakeholders in the paper packaging recycling chain to better understand how food residue from residential sources impacts recycling from an operational and business perspective.

CALL TO ACTION

Findings from the combined consumer behavior research and paper recycler outreach underscore the opportunity for the paper industry to increase the amount of paper food packaging that is recycled.

The SPC recommends the following as next steps for the industry:



Focus on the Right Formats First

Include appropriate How2Recycle labeling on paper formats found to have low amounts of food residue surveyed after the activity.



Build an Industry Standard Residue Threshold

Agree on acceptable levels of food residue and associated on-pack language through a cross-industry working group.



Support On and Off-pack Education

Build education on cleaning food residue off paper packaging into the planned How2Recycle Forward campaign.



Expand System-wide Partnerships

Identify ways the SPC and its members can partner with MRF operators to support education.

Research Overview

Takeaway 1

Takeaway 2

Takeaway 3

Takeaway 4

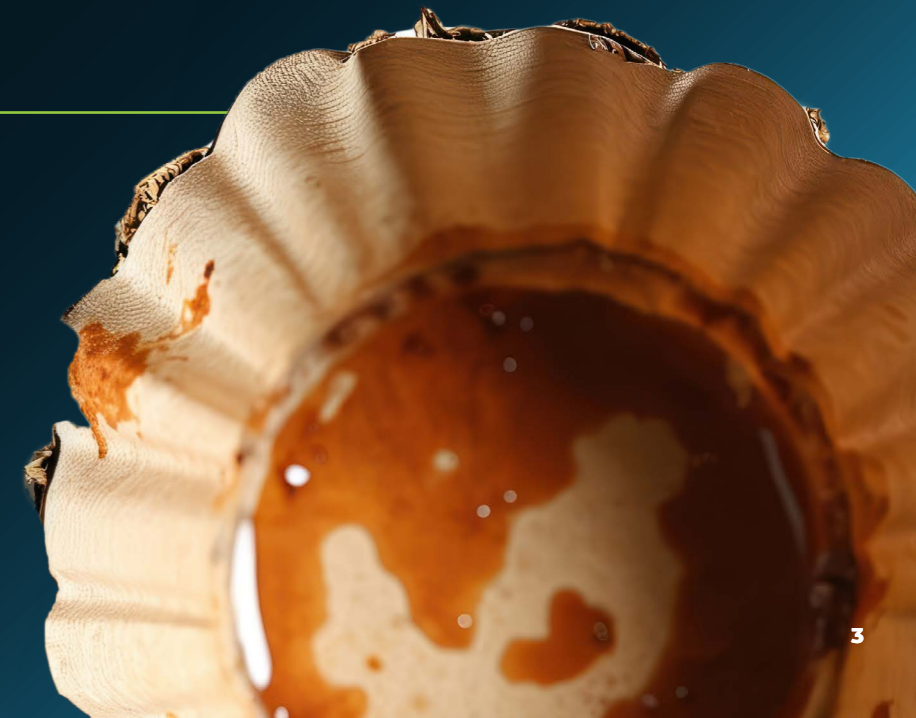
Takeaway 5

Call - to - Action



Clemson study participant on included packaging and labeling:

“There were some items today that I thought may have been recyclable and have pondered the same thing in my own home, but without clear markings have proceeded to throw away.”



RESEARCH OVERVIEW

In 2024, the Sustainable Packaging Coalition (SPC) first described a **key trend occurring in the paper packaging industry: Paperization**. Since then, we've seen a wellspring of innovative paper formats taking on new frontiers. Paper packaging has expanded into applications historically reserved for other packaging materials, including food packaging.

In the context of food packaging, the paperization of these formats invokes new questions, like: Consumers have developed habits around recycling their food packaging materials, like cleaning plastic, glass, and metal formats – how will those habits change with paper packaging? What impact does residual food have on the recyclability of paper packaging?

SPC, in collaboration with SPC members and industry partners, spearheaded a multi-faceted research project aimed at better understanding the impact food residue has on the recyclability of paper packaging. We also explored whether the How2Recycle label influences the actions consumers take to prepare paper packaging for recycling. In our research, we discovered that consumers know to clean their paper packaging for recycling and that food residue, at its current level, may present a less significant issue to paper recyclers than often perceived.

METHODOLOGY

This research was conducted in two parts: consumer behavior research and industry outreach. The consumer behavior research was conducted by Clemson University, and outreach to material recovery facilities (MRFs), paper recyclers, and export brokers (intermediaries who trade paper, pulp, and recycled materials) was conducted by the consulting firm Insight + Action.

The consumer behavior research conducted by Clemson University aimed to quantify consumer's reduction of food residue prior to recycling across a selected array of food packaging, and to examine if How2Recycle labels influence how consumers clean and sort food packaging. Study participants, divided into three groups, were provided with 19 packaging formats, including both paper and plastic formats, from various product categories to assess their preparation of paper packaging for recycling. Participants were surveyed after the activity.

Additionally, consultants from the firm Insight + Action conducted outreach to stakeholders in the paper packaging recycling chain. In our outreach, we sought to better understand how food residue on paper packaging from residential sources impacts recycling from an operational and business perspective. The outreach comprised qualitative interviews, asking recyclers how they measure food residue entering their systems, how they manage food residue, and how food residue compares to other forms of contamination.

Group N (control) 36 Participants	Received packages that did not include a How2Recycle label
Group Y 34 Participants	Received packages with a How2Recycle label applied
Group E 35 Participants	Received packages with a How2Recycle label applied and were shown a 90-second video about recycling and the How2Recycle label
Material Recovery Facility (MRF) Operators	37 companies operating over 400 individual MRFs interviewed
Recycled Fiber Mills Using Residential Mixed Paper as a Feedstock	12 mill companies operating 20 mills interviewed
Exporter Brokers (sellers of recycled fiber to international recycling markets)	6 businesses interviewed

This report includes the main takeaways from each phase of research on food residue as well as recommendations on how SPC member organizations and industry partners can support improved paper food packaging recyclability. SPC members can view full reports from each portion of research in the SPC member dashboard.



Takeaway One

Education and On-Pack Messaging are Key to Reducing the Amount of Food Residue that Enters the Recycling System

Findings from both the consumer behavior and recycler interviews underscore the critical role that education and on-pack messaging play in reducing the amount of on-pack food residue that enters the recycling system, both for packaging accepting in existing programs and for new package formats that could be added to the recycling system. Results from the consumer behavior portion specifically show that consumers will follow label instructions, particularly with education about the label itself, and labels can in turn lead to lower levels of food contamination remaining on pack.

RESEARCH METHODOLOGY

Here's how we tested this:

- Group E received packaging with How2Recycle label, and watched a short instructional video about recycling and the How2Recycle label
- Group Y received packaging with How2Recycle labels, but did not watch the short instructional video
- Control Group N was not shown the video about recycling or presented with packaging carrying the How2Recycle label
- For all included packages, some portion or portions of the package were considered Widely Recyclable, indicated on by How2Recycle labels provided to Groups Y and E.

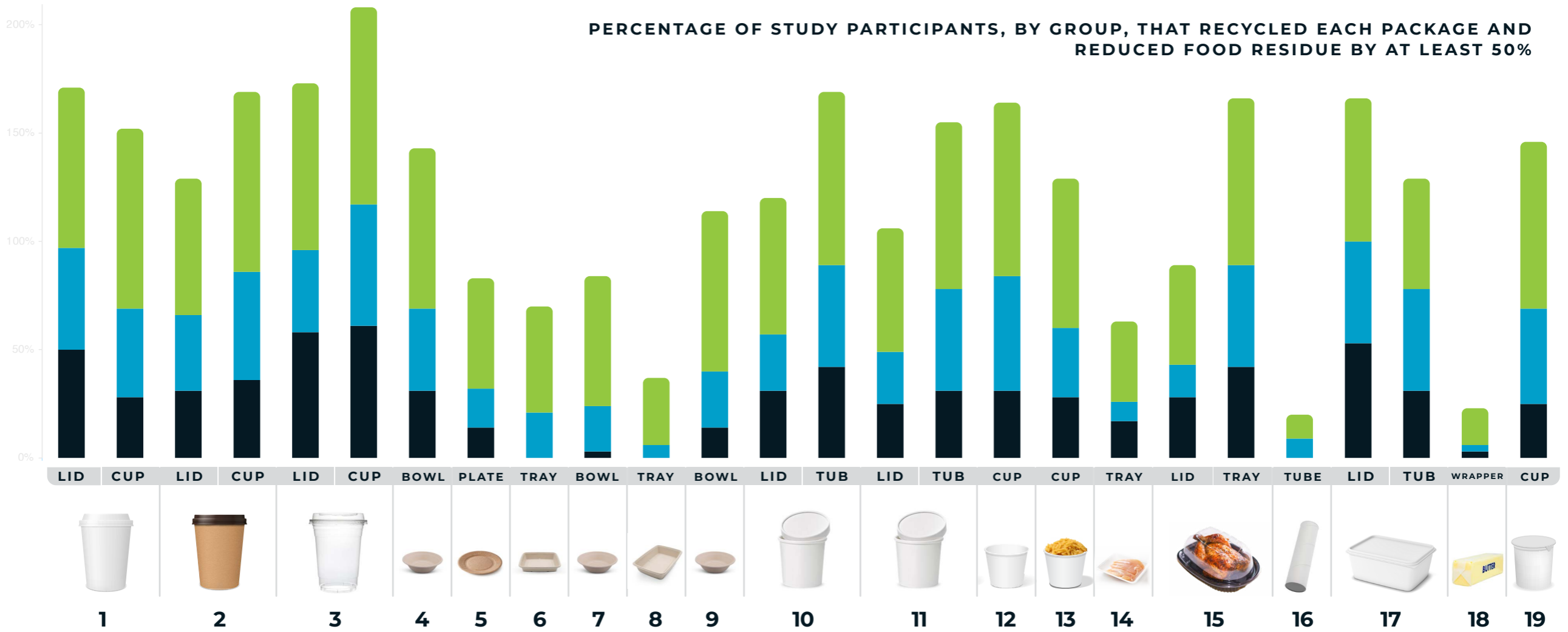
Here's what we found:

- 65% of study participants in Group E put the correct packaging items into the recycling bin
- 46% of participants in Group Y put the correct packaging items into the recycling bin
- And just 40% of participants in the Control Group N put the correct packaging items into the recycling bin

	Group N (no H2R label)	Group Y (H2R label only)	Group E (Education + H2R Label)
% of participants who successfully recycled items that required cleaning AND cleaned off at least 50% of the original food residue	27%	32%	62%
% of participants who attempted to recycle items that required cleaning but did not clean the items	9%	9%	8%

Looking specifically at included packaging that required cleaning, the results are consistent. 62% of Group E participants both recycled packaging that required cleaning AND cleaned off at least 50% of the original food residue, a good indication the participant attempted to clean the package prior to recycling. This compared to 33% of Group Y participants and 27% of Group N participants who both recycled the packaging and removed at least 50% of the original food residue. While the group that received just the How2Recycle label correctly recycled packaging that required cleaning at a higher rate compared to Group N, the group receiving a small amount of education recycled packaging that required cleaning at a statistically significantly higher rate compared to both Group N and Group Y. On-pack labeling, paired with education, proved to be a difference maker.

PERCENTAGE OF STUDY PARTICIPANTS, BY GROUP, THAT RECYCLED EACH PACKAGE AND REDUCED FOOD RESIDUE BY AT LEAST 50%



Group N (no H2R label) **Group Y** (H2R label only) **Group E** (Education + H2R Label)

Post-behavior testing survey responses highlighted the importance of on-pack labels and associated messaging in ensuring consumer understanding of packaging recyclability and proper recycling behaviors. When asked, “What sources have been helpful for you to know if a package is recyclable?”, three of the four sources most frequently rated as “very helpful” related to on-pack messaging and package features. Among the top three sources, “printed recycling icons on packaging” and “words about recycling on packaging” received the highest and third-highest share of “very helpful to me” responses, respectively. While educational campaigns and public awareness initiatives ranked in the middle of the “very helpful to me category”, respondents ranked it as the highest source in the “somewhat helpful to me” category, indicating its likely usefulness when paired with other sources about recyclability.

Clemson study participant on recommendations to companies to help increase recycling of used food packaging:

“Clear, bold, conspicuous, consistent labeling.”

	Packaging Description
1	Coated paper cup + PP sipping lid
2	Paper cup + PP sipping lid
3	Plastic Coffee Cup
4	Paper Bowl
5	Paper Plate
6	Frozen Enchilada
7	Frozen Mac & Cheese
8	Frozen Pizza
9	Frozen Veggies & Sauce
10	Peanut Butter Ice Cream
11	Strawberry Cheesecake Ice Cream
12	Cheese Crackers
13	Quick Mac & Cheese
14	Raw Chicken
15	Rotisserie Chicken
16	Dough Tube
17	Spreadable Butter
18	Stick Butter
19	Yogurt



When asked, “if all packages were clearly labeled with easy-to-understand recycling instructions, how much would you recycle relative to how your currently recycle?” 91% of study participants responded that clear and easy-to-understand labeling would likely increase their frequency of recycling. If we compare this against the 80% of study participants that responded saying they would throw food packaging away in the trash if they were unsure whether it is recyclable or not, the case for clear messaging is further solidified.

Results indicating the importance of education are consistent with findings from the recycling facility outreach portion of the study as well. Specifically, feedback from MRFs highlighted the role education could play in better managing the amount of food residue entering their facilities. While many of the responding facilities mentioned processes they have in place to remove food residue should it enter their system, most responded that outreach to their customers is key to reducing food waste at the source. According to surveyed recyclers,

focusing resources on educating haulers and consumers on the front end could significantly reduce the operational cost of food residue on the back end.

Taken in tandem, findings from the consumer behavior research and facility outreach present an opportunity for SPC member organizations and partners to ensure consumers are aware of what is – and is not – recyclable, and how to properly prepare packaging for recycling through clear on-pack messaging and associated education.

Shown from Very Helpful highest to lowest	Very Helpful	Somewhat Helpful	Not Helpful
Printed recycling icons on packaging	76%	19%	5%
Visual posters/lists near recycling receptacles	61%	34%	5%
Words about recycling on the packaging	54%	35%	10%
What the package looks like (color, material, design)	45%	41%	14%
Information from my local recycling center or waste management authority via email, flyer, website, etc.	31%	29%	40%
Online research (Google, ChatGPT, sustainability blogs) other than social media.	26%	31%	43%
Friends, family, or colleagues	23%	46%	31%
Resin ID codes	23%	26%	51%
Educational campaigns or public awareness initiatives	22%	52%	26%
Guidance, signs, or websites from retailers/grocery stores or brands	22%	44%	34%
Advertisements/ ads about recycling	15%	41%	44%
Municipal waste or recycling companies	14%	41%	45%
Neighbors/ local acquaintances	14%	27%	59%
Social media	7%	31%	62%
Government websites or environmental agencies such as EPA	5%	28%	68%
Packaging manufacturer websites	2%	14%	84%



Takeaway Two

Residual Food is Not an Issue for Many Packages, But Challenges Exist for Some Product Categories

Many of the packaging formats included in the consumer behavior portion of the research were cleaned to the point where they had minimal food residue remaining once they were recycled. The study found that the application of the How2Recycle Label increased the likelihood of a low amount of remaining food residue. The likelihood of reduced food residue increased even more with a small amount of education on recycling and the How2Recycle label. These results suggest that study participants inherently understand that action should be taken to clean packaging formats, such as coffee cups with the lid removed, soup cups, ice cream containers, or cups containing dry, food prior to recycling.

AVERAGE PERCENT FOOD REMOVED BY STUDY GROUP (packages organized by similar products)

The consumer survey results also showed that, when consumers were faced with other packaging formats and product categories, they were less confident that the packages were recyclable. At times, consumers also found these formats inconvenient to clean for recycling. Study participants responded that package categories, such as frozen food trays and bowls or trays used for meat were generally viewed as the package categories most inconvenient to clean. Consistently, consumers found packaging formats used for products that adhere more strongly to the package, or products consumers are wary of physically touching, least convenient to clean. Interestingly, after the experiment, participants expressed willingness to recycle, if clean, many of the same packaging formats they had previously dismissed as likely non-recyclable or too inconvenient to clean.

Product	Component	Average Mass (g) Food Applied	Average % Food Removed (# of recyclers)		
			N (n=36)	Y (n=34)	E (n=35)
Frozen Meal - Mac & Cheese	Bowl	19.9g	34% (3)	64% (10)	79% (23)
Frozen Meal - Veggies & Sauce	Bowl	10.2g	39% (12)	54% (16)	77% (27)
Frozen Enchiladas	Bowl	36.8g	16% (3)	N/A (0)	89% (1)
Frozen Pizza*	Tray	3.8g	10% (6)	35% (9)	39% (15)
Ice Cream - Strawberry	Cup	18.5g	67% (14)	72% (18)	85% (29)
	Lid	2.5g	60% (14)	55% (13)	70% (24)
Ice Cream - Peanut Butter	Cup	17.2g	81% (17)	78% (19)	89% (30)
	Lid	2.2g	60% (14)	63% (12)	65% (24)
Paper Bowl		12.5g	85% (12)	84% (15)	94% (26)
Paper Plate		8.6g	47% (10)	58% (12)	75% (23)
Coffee Cup - Single Wall	Cup	7.6g	95% (9)	89% (15)	91% (23)
	Lid		80% (7)	78% (11)	82% (18)
	Cup + Lid		40% (6)	31% (4)	52% (8)
Coffee Cup - Double Wall	Cup	13.2g	97% (5)	95% (11)	96% (20)
	Lid		90% (13)	83% (14)	87% (18)
	Cup + Lid		64% (6)	33% (7)	76% (11)
Coffee Cup - Plastic	Cup	8.6g	99% (14)	97% (17)	97% (21)
	Lid		90% (14)	96% (11)	99% (16)
	Cup + Lid		62% (10)	48% (3)	81% (11)
Yogurt	Cup	9.1g	60% (15)	80% (17)	80% (31)
Dough tube	Tube	2.4g	3% (3)	12% (3)	8% (6)
Spreadable Butter	Tub	3.8g	45% (22)	73% (19)	63% (24)
Stick Butter	Wrapper	3.8g	31% (2)	89% (1)	69% (8)
Raw Chicken	Tray	42.8g	94% (6)	92% (3)	96% (13)
	Tray + Pad		48% (4)	26% (3)	N/A (0)
Rotisserie Chicken	Base	206.4g	93% (16)	89% (18)	100% (27)
	Lid	1.0g	51% (13)	32% (14)	56% (22)
Quick Mac & Cheese	Cup	6.1g	62% (16)	62% (15)	75% (32)
Cheese Crackers*	Cup	4.0g	71% (13)	78% (19)	86% (28)

*Minimal food residue prior to cleaning



AVERAGE PARTICIPANT VIEWS BETWEEN N, Y, AND E GROUPS ON INCLUDED PACKAGE FORMATS FROM CONSUMER BEHAVIOR TESTING
(packages organized by similar products)

The table shows the average percentage of respondents between the N, Y, and E Groups that responded to the questions:

Were there any packages you felt confused or unsure if it should be recycled or not?

Even if you thought a package was recyclable, did you not recycle the package because you thought it was too inconvenient or too much of a hassle to clean?

What packages or package components would you recycle if they were clean?

Consistently, participants in the Y and E Groups were less likely to be confused about the recyclability of a package compared to the N Group, but the trend was less pronounced when it came to finding a package too inconvenient to clean. In multiple instances, more Y Group respondents found packages too inconvenient to clean compared to the N Group, while the E Group was most often the group least likely to find cleaning a package for recycling too much of a hassle.

Results from consumer behavior testing show that the brands and the paper packaging industry will need to reconcile the gap between consumer willingness to recycle clean paper packaging with the unwillingness to clean the paper packaging in the first place. Again, results point to a small amount of education making a meaningful impact on closing the gap.

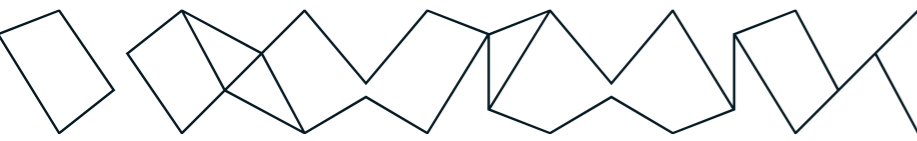
While the SPC encourages brands and package suppliers to design recyclable, if this gap in consumer behavior cannot be addressed for specific packaging formats, recycling may not be the best route of recovery. Instead, designing the packaging for recovery with the residual food through compost may be a more realistic approach for diverting the packaging from landfill. The [SPC's Guide to Understanding the Role of Compostable Packaging in North American](#) provides an in-depth look at the best application for compostable packaging.

Product	Component	Feel confused or unsure if the package is recyclable or not	Think the package is recyclable but considered too inconvenient to clean	Willing to recycle the package if it is already clean
Frozen Meal - Mac & Cheese	Bowl	31%	27%	64%
	Carton	2%	1%	68%
Frozen Meal - Veggies & Sauce	Bowl	28%	25%	68%
	Carton	2%	1%	68%
Frozen Enchiladas	Bowl	30%	28%	62%
	Carton	5%	1%	70%
Frozen Pizza	Tray	34%	26%	65%
	Carton	4%	1%	70%
Ice Cream - Strawberry	Cup	13%	14%	63%
	Lid	18%	11%	51%
Ice Cream - Peanut Butter	Cup	13%	15%	63%
	Lid	18%	11%	49%
Paper Bowl		19%	16%	57%
Paper Plate		22%	27%	61%
Coffee Cup - Single Wall	Cup	17%	11%	55%
	Lid	18%	4%	48%
Coffee Cup - Double Wall	Cup	17%	8%	56%
	Lid	18%	4%	46%
Coffee Cup - Plastic	Cup	12%	7%	60%
	Lid	18%	4%	48%
Yogurt	Bowl	10%	12%	61%
Dough tube	Tube + Metal Ends	43%	16%	37%
Spreadable Butter	Tub	13%	14%	64%
	Lid	16%	7%	55%
Stick Butter	Wrapper	28%	22%	25%
	Box	4%	5%	64%
Raw Chicken	Tray	26%	36%	61%
Rotisserie Chicken	Tray	25%	27%	68%
	Lid	18%	19%	60%
Quick Mac & Cheese	Cup	13%	14%	59%
Cheese Crackers	Cup	10%	7%	57%
	Lid	15%	3%	36%



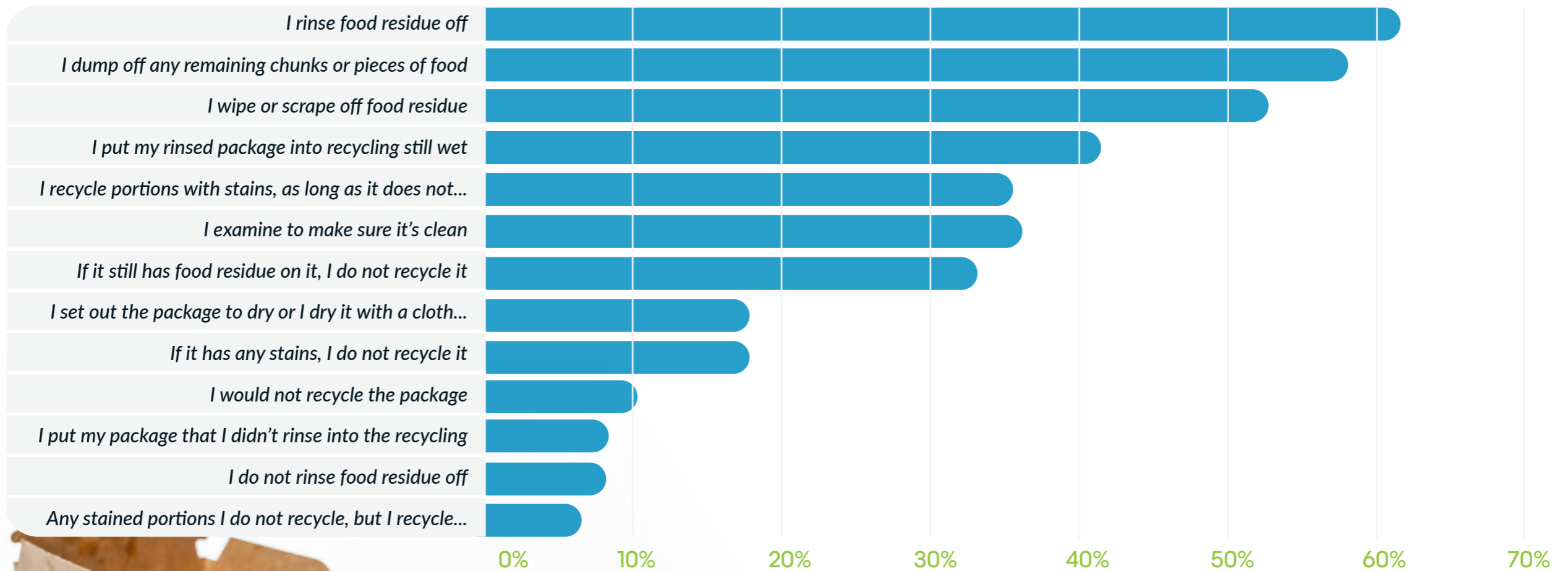
Takeaway Three

Most Consumers Know to Clean Food Residue Off Packaging for Recycling



Clemson study participants were asked: Imagine you have decided to recycle a used food package that has left over food pieces, some food residue, and food stains on it. You then see this label printed on the package - what actions would you realistically do prior to recycling?

Rinsing, dumping, and wiping off food were all found to be common methods to approach recycling food packaging that includes a How2Recycle label. With that said, only about 17% of respondents were willing to dry packaging prior to recycling.

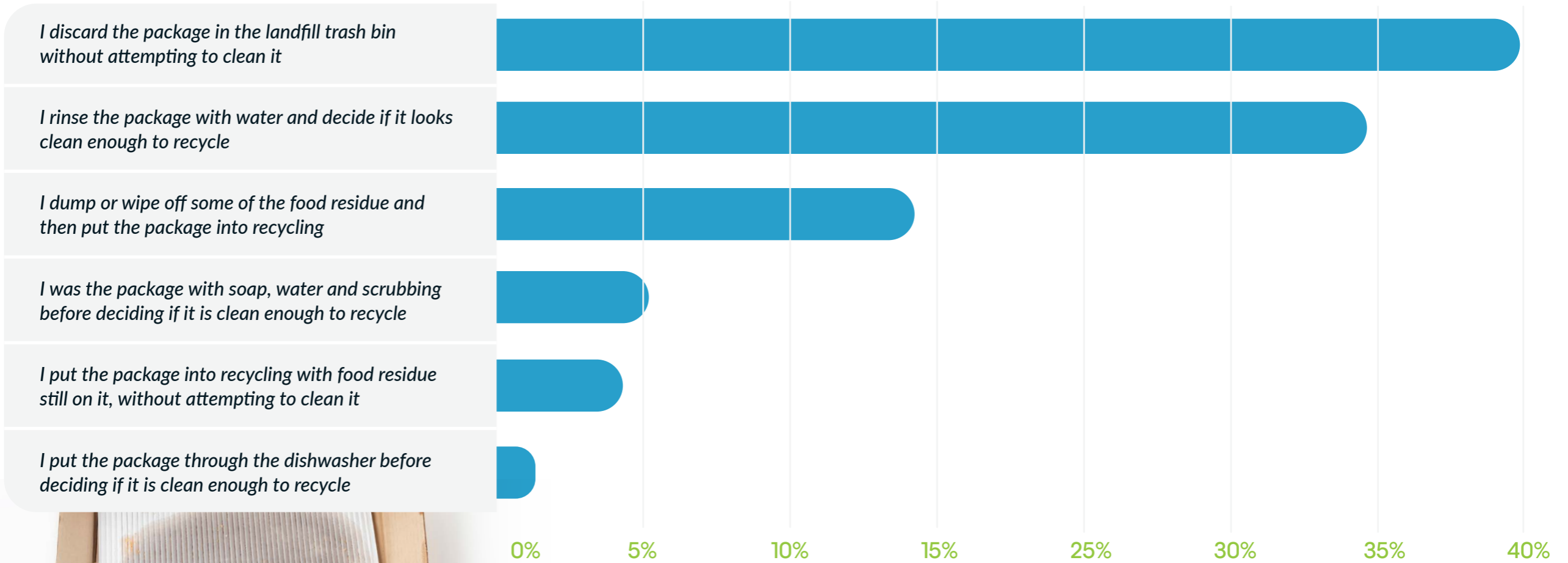


Most participants in the consumer behavior study knew to clean off food residue from packaging before placing it in a recycling bin, whether the package included explicit instruction to do so. If explicit instruction was included on-pack, nearly all study participants responded that they would take some form of action to clean the package for recycling,

such as rinsing food residue off, dumping off remaining chunks or pieces of food, or wiping or scraping food residue off the package. Even if explicit instruction to clean the package for recycling was not included on-pack, more than **80% of study participants knew to take some action to clean a package off before recycling.**



Study participants were also asked: When you encounter a used food package that you know is recyclable, but the package has food that is difficult to clean, how do you typically handle it? Participants were also shown images of soiled packaging for reference.



While study participants know to clean food residue off packaging for recycling, nearly 40% said that they would dispose of a recyclable food package if they found the residue too difficult to clean. Continued efforts between brands and paper packaging will need to focus on changing this behavior through education, on-pack messaging, or paper design choices that encourage consumers to clean the package for recycling.

Takeaway Four

Most Recycling Facilities Currently View Food Residue as a Minor Issue, but None are Open to Receiving More

Responses from interviewed MRFs, recycled fiber mills, and paper export brokers indicated that food residue is widely viewed as a minor issue through the recycling process, but no facilities operators or brokers expressed willingness to accept more food residue than they are currently receiving.

EXAMPLES OF FOOD SOILED PACKAGES SHOWN TO INTERVIEWED PAPER RECYCLERS AND BROKERS WITH THE QUESTION:



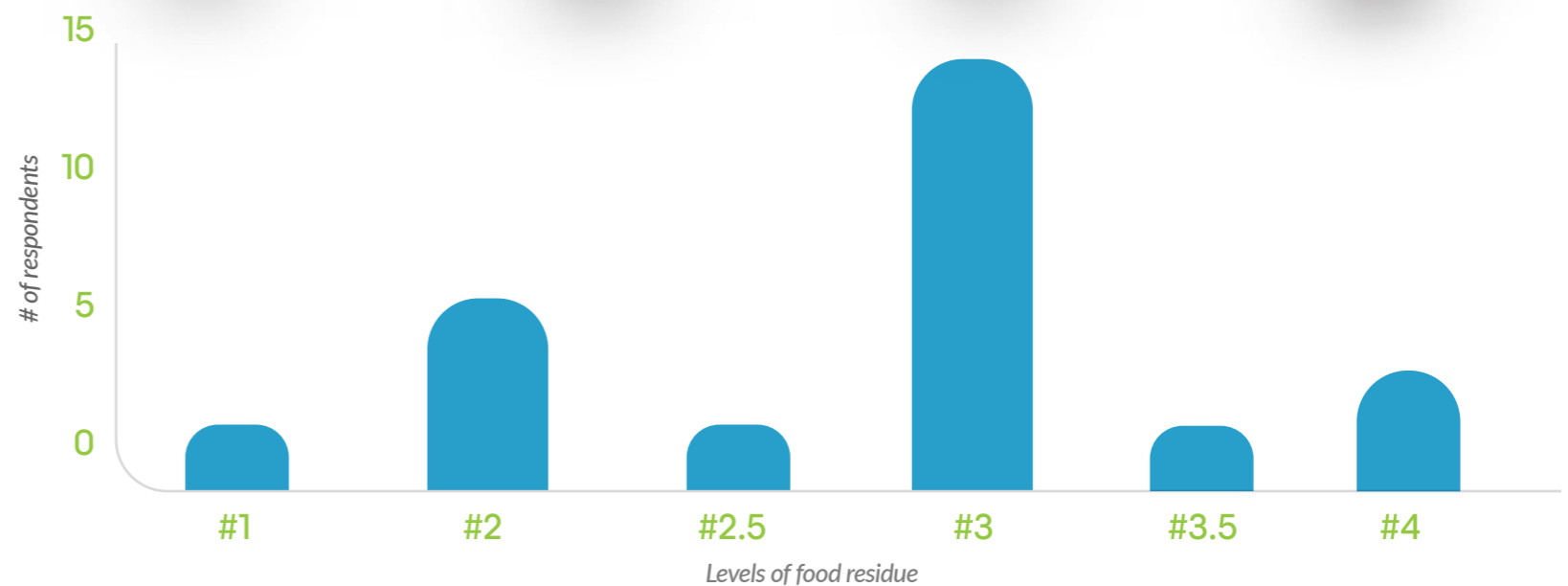
MEASURING FOOD RESIDUE

The amount of food residue present in any given recycling facility can be highly variable, and “measuring” the amount of incoming food residue can be both difficult and subjective. Estimating the amount of food residue that is entering a facility due to individual packaging is particularly difficult given the volume of materials that these facilities process. Instead, food residue entering facilities can generally be “measured” on a case-by-case basis through some combination of the following.

Olfactory or visual “data” such as odor, pests, or food residue that is visible on incoming material

The overall volume of food residue in an incoming load of material, which can range from “a whole lot” to “some random containers”

Food residue spotted on incoming food packaging that is removed from a MRF line



Due to the high level of subjectivity, defining an actual, qualitative threshold over which food residue becomes an issue is impractical. The qualitative saying “we know it when we see” likely best defines a threshold for MRFs and recycled fiber mills. For export brokers, who must comply with international regulations on traded recyclable commodities, there is zero tolerance for food residue.

As part of our research, interviewees were shown images of an example package with increasing levels of food residue and asked to indicate at which point the level of food residue would be unacceptable in their operations. Guided by a sentiment of “the less, the better,” the majority indicated that somewhere between the 2nd and 3rd level of food contamination – shown in the figure above – marked the

point at which the packaging would become unacceptable. These results indicate that mild residue would not cause an issue.



DEFINING FOOD RESIDUE

Clearly defining food residue was found to be a similarly difficult task for interviewed recyclers, again due to a high level of variability. Some responded that they associate food residue with specific paper packaging formats, such as pizza boxes or foodservice ware, but the response “we know it when we see” generally applies here, too.

We found that not all food residue is created equal. While few commented on the type of food residue seen on incoming packaging, those who did respond indicated that absorbed food residue or grease embedded in package fibers is generally not a problem, while physical food remnants in or on the package can create issues. Responses indicated physical food remnants take up space in the bale and cause issues commonly associated with food residue in recycling facilities, such as pests or odor. When food residue is “absorbed” into packaging fibers, all the fiber is still present. While too much absorbed food residue in fibers can still lead to odors or excessive moisture, interviewed recyclers indicated that the potential issues associated with absorbed material are less concerning than those associated with solid food residue.



CAN RECYCLING FACILITIES HANDLE MORE?

The paper recycling industry is currently at what might be considered a maximum threshold of allowable food residue. Domestic facilities and brokers have methods to manage the residue they are receiving at present, and the majority report that it is a minor issue overall. But no recyclers are open to receiving more food residue at risk of exacerbating the issues it can cause. For export brokers navigating international regulations on recycled materials, accepting more food residue is not an option.

Outreach to paper recyclers made one thing clear: brands and the paper packaging industry should not see acceptance of more food residue by recycling facilities as a viable approach to recycling more food packaging. Rather, the packaging industry should focus efforts on minimizing the amount of food residue that enters recycling facilities on-pack in the first place.

“We support getting more materials recycled, but it must be clean.”

- Interviewed MRFs on if they could handle more paper packaging with food residue



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Takeaway Five

The Paper Industry Needs New Language for Communicating Acceptable Food Residue



Label states "Recycle if Clean & Dry" Label DOES NOT state "Recycle if Clean & Dry"



Results from both portions of the food residue research highlight the important role communicating how to recycle a package can play in ensuring consumers recycle correctly. While "Clean and Dry" provides a concise, on-pack instruction for preparing packaging for recycling, the paper packaging industry may be better served in identifying new language that clearly communicates how clean a paper package should be before recycling. This requires industry-wide alignment on what level of on-pack food residue is acceptable for recycling.

Clemson study participants were asked the following on their beliefs about dryness and cleanliness, and how the presence or lack of specific language on package impacted those views:

Which statement best aligns with your belief about recycling a used food package that states "Recycle if Clean & Dry" like the label shown below?

Which statement best aligns with your belief about recycling a used food package that does not explicitly state "Recycle if Clean & Dry" like the label shown below?

Clemson study participants on included packaging and labeling

"Some instructed to rinse and dry while others didn't therefore, I wasn't sure if I should be drying all of them or just the ones with those specific instructions."



Results showed that study participants generally understand that packaging needs to be clean prior to placing it in a recycling bin. Without a label explicitly telling them what to do, more than 80% of participants still indicated that packaging should either be fully clean or only have a small amount of residual food on it prior to recycling. Consumers were less confident about the level of packaging dryness required for recycling, regardless of explicit instructions on-pack, with statement "I don't believe (dryness) affects recyclability" receiving 41% of responses when the label did not provide clear instruction.

Belief About Package Dryness		
The package should be fully dry before placing it in the recycling bin	26%	10%
The package should be mostly dry before placing it in the recycling bin	30%	22%
The package will dry in a recycling bin before being recycled	29%	27%
I don't think it affects recycling if the package is wet or dry	13%	41%
Belief About Package Cleanliness		
The package should be fully clean with no food before placing it in the recycling bin	65%	50%
The package can have just a bit of food on it going into the recycling bin	31%	33%
I don't think it affects recycling if the package is clean or has food on it	3%	15%

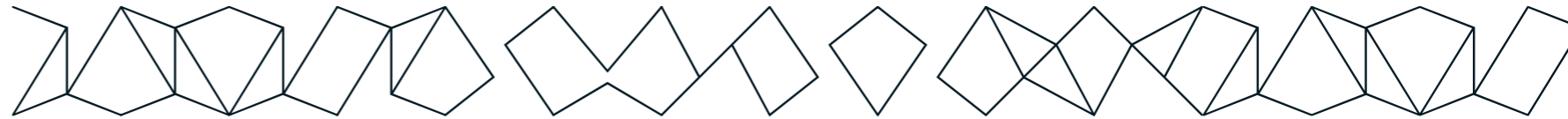


Clemson study participants on included packaging and labeling:

“Rinse is ambiguous – I didn’t know if I was supposed to just wash with water, or use the soap provided.”

When we pair these insights with our findings from paper recyclers – that embedded food residue is generally acceptable and challenges with liquid is generally coming from other sources – these results highlight the opportunity for industry-wide agreement around on-pack guidance specifically developed for paper packaging. Specifically, the industry should align on on-pack language that defines both how much food residue must be removed before recycling, and what level of residue can remain when a package is placed in the recycling bin. This may be as simple as eliminating the word “Dry” and shortening the current language to “Recycle if Clean”, but it warrants additional investigation of what language would be most effective. 85% of consumer behavior research participants responded that clear, concise language paired with symbols can dramatically increase confidence about whether a package can or cannot be recycled.

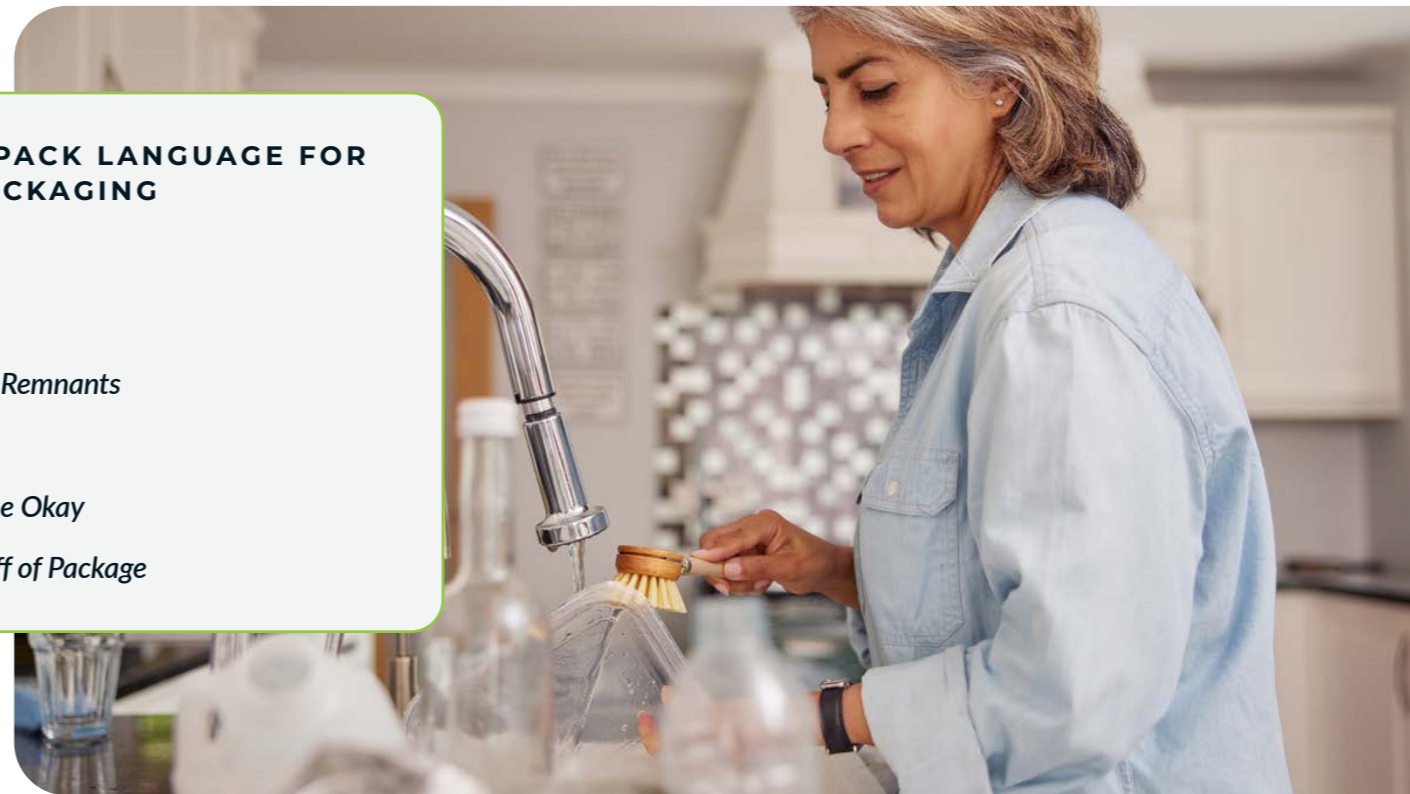
Development of on-pack recycling instruction specific to paper food packaging can support the paper industry in collecting more paper food packaging for recycling. It can also ensure that collected materials are not causing issues in the paper recycling chain. These enhancements can even help to address consumer skepticism that paper packaging is either not recyclable, or too inconvenient to clean. If a consumer has a clear understanding of what level a package needs to be cleaned to, they may be more likely to take the action required to get the package to that level of cleanliness. The current lack of clarity may be a cause for inaction and exacerbate the likelihood that recyclable food packaging ends up in the landfill.



Over time, consistent use of agreed-upon language could help normalize the idea that paper packaging can be cleaned and recycled, closing the recycling knowledge gap between paper and other food packaging materials.

POTENTIAL ON-PACK LANGUAGE FOR PAPER FOOD PACKAGING

- Recycle if Clean*
- Clean and Empty*
- Remove Food Pieces / Remnants*
- Grease Okay*
- Soaked in Food Residue Okay*
- Scrap Food Residue Off of Package*



Clemson study participant on what would make it easier to recycle food packaging that has residue on it:

“Clear instruction on how clean the package needs to be before placing into the recycling bin. I want to know if residue or staining is allowed.”



Continue to see what SPC recommends for next steps in our Call - to - Action!



Findings from the combined consumer behavior and recycler outreach underscore the opportunity for the paper industry to increase the amount of paper food packaging that is recycled.

Many of the packaging formats included in the consumer behavior study were found to have minimal remaining food after consumers recycled the formats. Plus, food residue, at its current level, may present a less significant issue to the stakeholders in the paper recycling chain than often perceived.

Still, challenges remain for advancing circularity for fiber-based food packaging. Consumer reluctance to clean certain packaging formats, combined with recyclers' intolerance of additional food residue, rules out increased residue acceptance as a strategy for expanding paper food packaging recycling.

Increasing the amount of paper food packaging that is accepted for recycling, and correctly recycled by consumers, will require collaboration among stakeholders across the paper packaging and recycling value chains. Results from this work highlight the critical role of consumer education and on-packaging messaging in ensuring food residue is eliminated at the source. It also shows that the organizations and industry groups in the paper packaging industry must align on:

What is an acceptable amount of food residue on paper packaging that is recycled?

Consistent on-pack language that communicates this level of acceptable residue to consumers.

It's important to note that food residue is only one element that impacts the recyclability of packaging. The package must also be accepted within community recycling programs, be sorted to the correct stream of material in a MRF, be reprocessed into new material, and ultimately have an end market where the recycled material is used to create a new product. A finding that food residue is not an issue for a specific packaging format does not mean the package will be recycled. Rather, these findings can act as supportive of a larger case demonstrating packaging recyclability, and acceptance through the recycling value chain.

Call - to - Action



GreenBlue, through its SPC and How2Recycle programs, encourages the paper industry and recyclers to provide clear and public support for the inclusion of light food-soiled paper packaging in the paper recovery stream. Industry endorsement of these findings, paired with previously conducted and ongoing research on food residue, will help to confirm that these paper formats provide value to the fiber recycling system. This support can serve as meaningful substantiation that these formats are desirable to recyclers, and may qualify for recyclability labeling, consistent with applicable program criteria.

SPC RECOMMENDS THE FOLLOWING AS NEXT STEPS FOR THE PAPER INDUSTRY TO BUILD ON THIS RESEARCH:



1 Focus on the Right Formats First

Results from the consumer behavior portion of the research provide supportive evidence that consumers will clean packaging formats generally assumed to have low amounts of residual food residue, such as cups with lids removed or dry food packaging. It's recommended the How2Recycle program take these findings into considerations for label assessments moving forward.



2 Build an Industry Standard Residue Threshold

Organize a cross-industry working group with the goal of agreeing on acceptable levels of food residue on recyclable paper packaging and developing on-pack language that can be built into How2Recycle labels for paper packaging. This will help to enforce acceptable and unacceptable levels of food residue. SPC recommends that this group include a diverse set of voices, including SPC members that produce paper packaging, brands and retailers, paper recyclers, as well as other paper industry.



3 Support On - and Off - Pack Education

Build education on cleaning food packaging for recycling into the planned How2Recycle Forward campaign, a national effort on educating consumers about the How2Recycle label.



4 Expand System - Wide Partnerships

Identify ways that SPC and its members can partner with MRF operators and municipalities to support education on cleaning paper and plastic food packaging in preparation for recycling, such as an education toolkit MRF operators could use to work with haulers and municipalities.



To get involved in the SPC's ongoing food residue work, SPC members can join our [Paper Packaging Recyclability Collaborative](#) today.

