

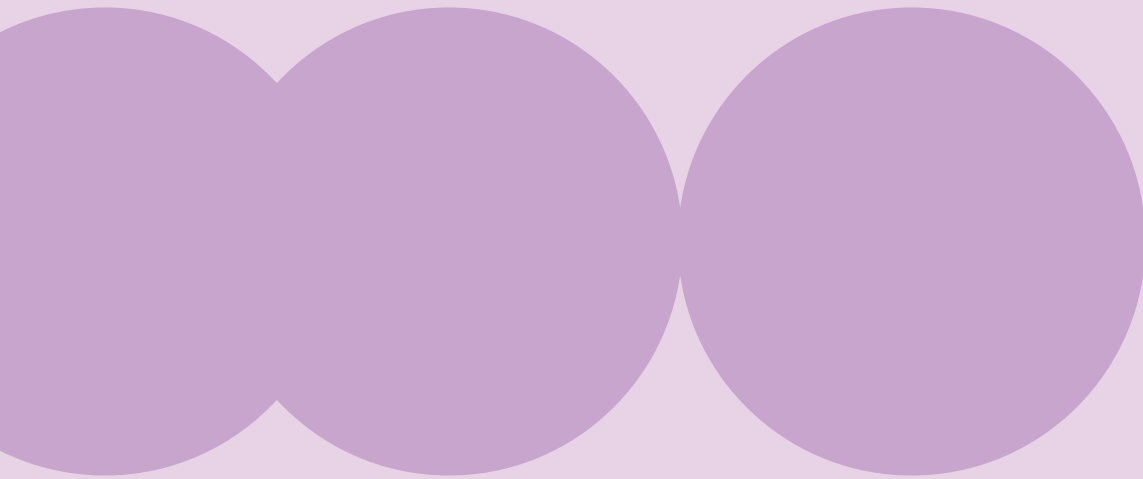
A close-up photograph of a bowl filled with macaroni and cheese. The pasta is a shell-like shape, coated in a thick, creamy yellow cheese sauce. A small sprig of fresh green basil leaves is placed on top of the pasta as a garnish. The bowl is white with a red, textured exterior. The background is a soft-focus pinkish-red fabric.

Mac & Cheese

Decoding Delicious

Crack the Code of Cheesy Cravings
with **dsm-firmenich Dairy Excellence**

dsm-firmenich 



- ④ Comfort, elevated.
- ④ Indulgence you can justify.
- ④ Flavors without borders.

We didn't just study Mac & Cheese...

We decoded it.

Our mac & cheese solutions deliver nostalgic comfort with rich flavor, creamy Indulgence, and homemade appeal.

Using our proprietary sensory and consumer insights capabilities, we identified four key pillar shaping consumer expectations across QSR and retail.

Decoding Delicious

Desirable Attributes of Mac & Cheese



Best-in-Class Taste

Elevate accessible
comfort food with
best-in-class taste



Cost-Efficient without Compromise

Consumers desire
quality and value without
compromising on taste

Powered by:

Authentic cheese and
dairy profiles tailored to
create the memorable taste
your consumers crave

Reduced cost and decreased
reliance on volatile commodities,
with consistently delicious
flavor delivery



Familiar Comfort Reimagined

Nostalgic comfort
enhanced by bold
flavor twists

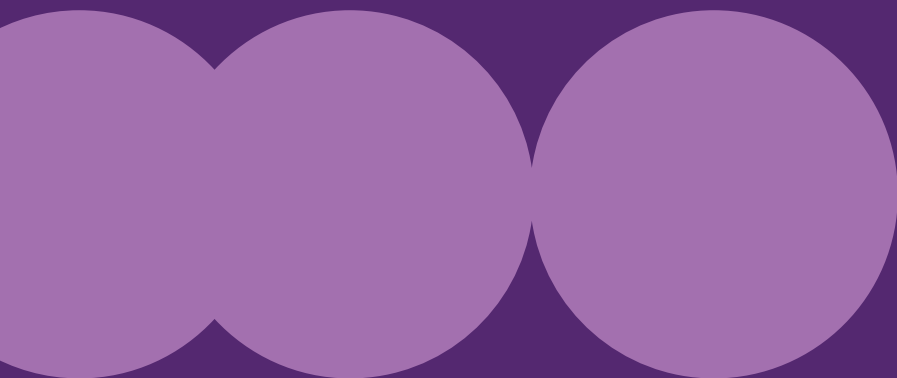


Permissible Indulgence

Consumers want
indulgence with
better-for-you cues

Deep consumer insights
and customizable flavor systems
built to energize LTO menus
and repeat purchase

Sensory-validated sodium
reduction, fat reduction, and
clean-label umami that
maintain delicious taste



Foodservice & Retail

Market Trends



Global flavors are fueling
Mac & Cheese growth, with
Mexican leading at 11% share (+6% YoY),
followed by Italian at 6% (+0.9%).

+108%
YoY Growth
in “rich”
mac & cheese



American Gen Zers are
66% more inclined to buy items
advertised as “spicy” and 44%
would pay more for them.



Smoky
is **9x** more
strongly associated
with mac & cheese
than in previous
years.



Comfort meets **bold**,
it never gets old.



Menu Offerings
706,998



Posts
29,592



Menu YoY
+9.7%

Shelf-stable boxed mac & cheese
is the *most preferred* retail format



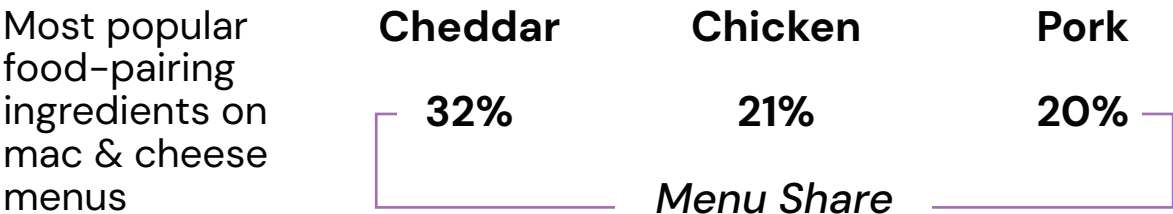
41%
adults



44%
kids

Mac & cheese remains a foodservice staple, with broad menu penetration and continued year-over-year growth.

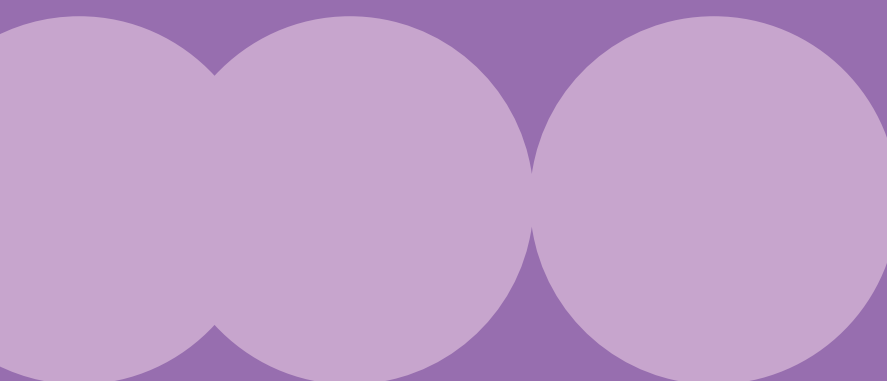
Familiar proteins still anchor the category



Flavor-forward additions drive momentum



The enduring appeal of mac & cheese creates a strong foundation for more distinctive, premium flavor experiences.



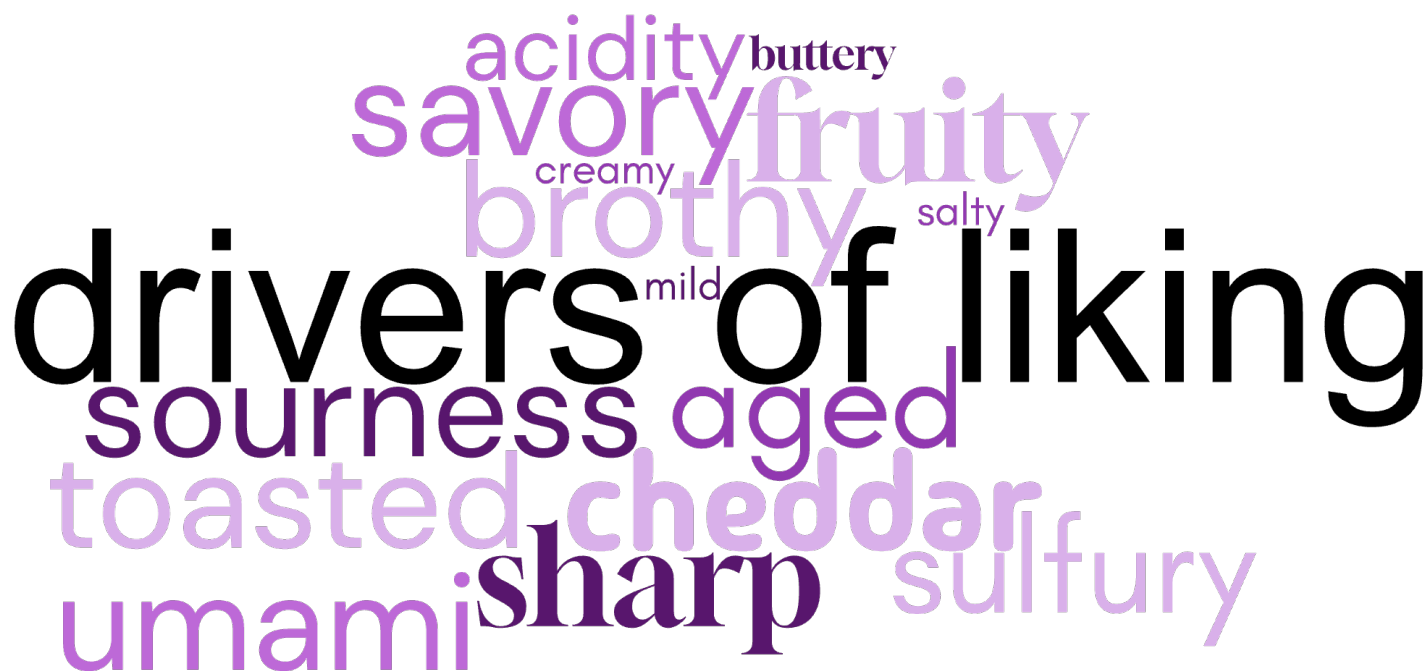
Consumer Insights

How We Decoded Delicious



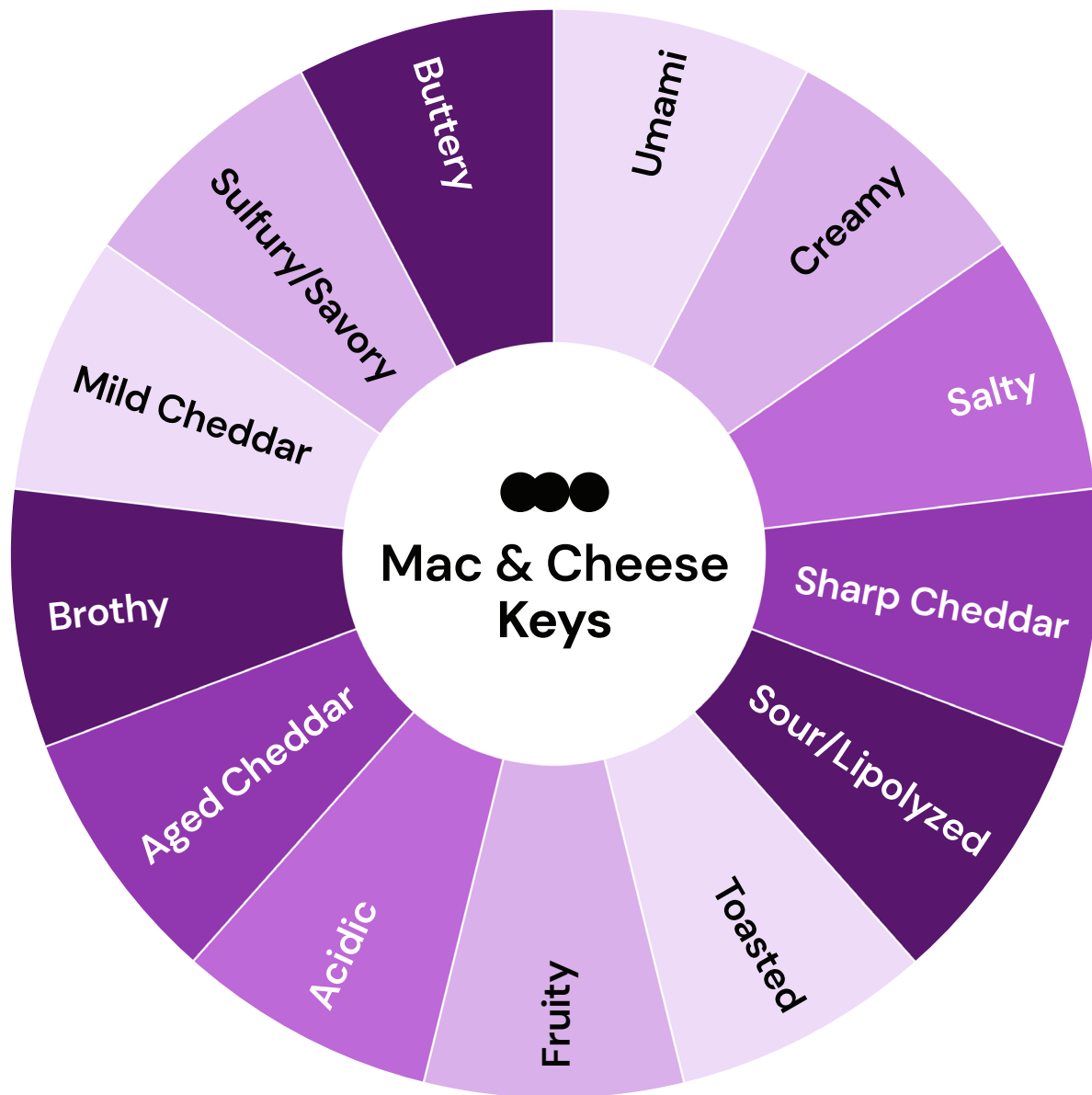


The Perfect Mac & Cheese



CLT Source: n=100–n=105, Date: 8/11/2025–8/14/2025,
mix of dsm–firmenich employees and friends & neighbors database
QDA Source, products seen in triplicate
Dates: 5/27/25, 5/28/25, 5/30/25 and 6/10/25., trained QDA panel

Your *Signature* Flavor Wheel

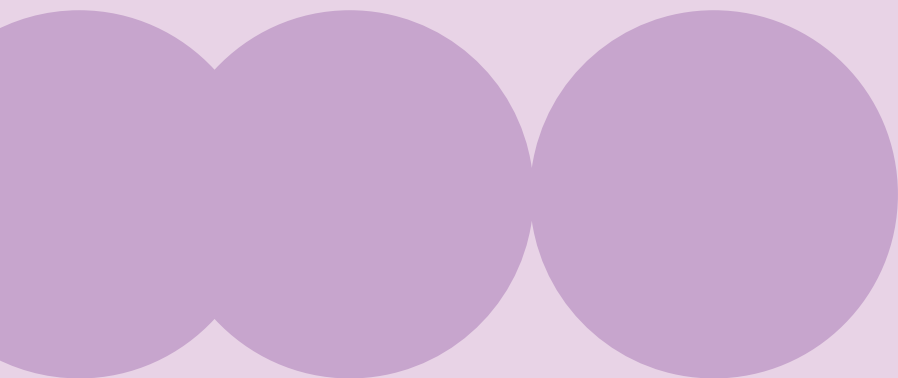


Mac & Cheese Keys



FLAVOR	DESCRIPTOR	USE-LEVEL
CHEDDAR CONCENTRATE 050027 F23145	aged cheddar	0.50 – 2.00%
LIPOLYZED CREAM FLAVOR 050027 F40056	fatty, creamy	0.30 – 0.75%
CONCENTRATED BUTTER 5X 050027 F11004	creamy, fatty, rich butter	0.50 – 5.00%
SAVORY CHEDDAR CHEESE FLAVOR 050027 F23177	savory, umami	0.50 – 1.00%
CHEDDAR FLAVOR 050027 F23214	brothy, meaty	0.50 – 1.50%
NATURAL CHEESE FLAVOR 050027 F33093	pungent, sulfury	0.25 – 0.75%
TOASTED PARMESAN CONCENTRATE 050027 F26168	medium aged parmesan, nutty, umami	0.50 – 2.00%
NATURAL FLAVOR (CHEESY SAVORY TYPE) 050023 218CB	brothy, acidic, umami	0.40 – 0.90%
CHEESE TYPE CONCENTRATE 050027 F33088	sweet ripe fruit notes	0.25 – 0.75%
CHEDDAR CHEESE CONCENTRATE 050027 F23342	buttery cheddar	0.40 – 1.50%
NATURAL CHEDDAR CHEESE FLAVOR 050027 F23003	medium cheddar	0.50 – 1.25%
NATURAL CHEESE FLAVOR 50027 F33025	sharp cheddar	0.40 – 1.80%
TOASTED CHEDDAR FLAVOR 50027 F23048	toasted cheddar	0.40 – 1.25%





Let's Taste

Authentic Cheese



Classic Mac & Cheese

FLAVORS & TECHNOLOGIES	USE LEVELS
CLUB CHEESE CONCENTRATE	1.25-1.5%
CHEDDAR CONCENTRATE	0.40-0.50%
LIPOLYZED CREAM FLAVOR	0.25-0.50%
NAT FLAVOR (CHEESY SAVORY TYPE)	0.05-0.10%



Toasted Mac & Cheese

FLAVORS & TECHNOLOGIES	USE LEVELS
TOASTED PARMESAN CONCENTRATE	0.50%-1.50%
NATURAL AGED PARMESAN CHEESE FLAVOR	0.50%-1.50%
NATURAL FLAVOR (BREAD CRUST TYPE)	0.05%-0.50%

A close-up photograph of a bowl of mac and cheese. The bowl is divided vertically by a diagonal white line. The left half of the bowl contains macaroni topped with a thick layer of melted cheese and a golden-brown breadcrumb topping. The right half contains macaroni in a smooth, creamy cheese sauce. The bowl is a reddish-brown color with a textured, dimpled exterior. It sits on a light-colored surface with a brown cloth napkin and a gold fork nearby.

●●● Toasted Mac & Cheese

●●● Classic Mac & Cheese

In Step with the Best



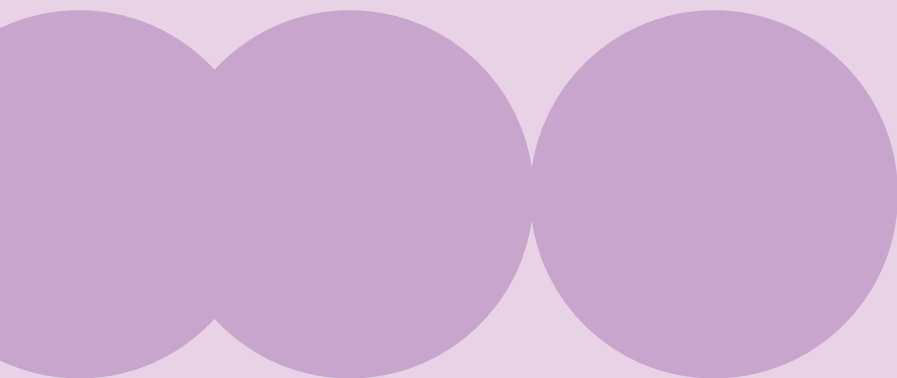
CLT Results

Consumer testing confirmed

●●● Classic Mac & Cheese and Toasted Mac & Cheese sensory performance at parity with two leading QSR benchmarks.



Attribute	QSR Benchmark A	QSR Benchmark B
Overall Liking	✓	✓
Overall Flavor	✓	✓
Cheese Flavor Overall (Mild, Sharp, Baked & Buttery)	✓	✓



Our dsm-firmenich
Classic Mac & Cheese brings

**Cost
Reduction**



40%
commodity
dairy reduction

+

3%
addition of
dsm-firmenich ●●●
flavors & technologies

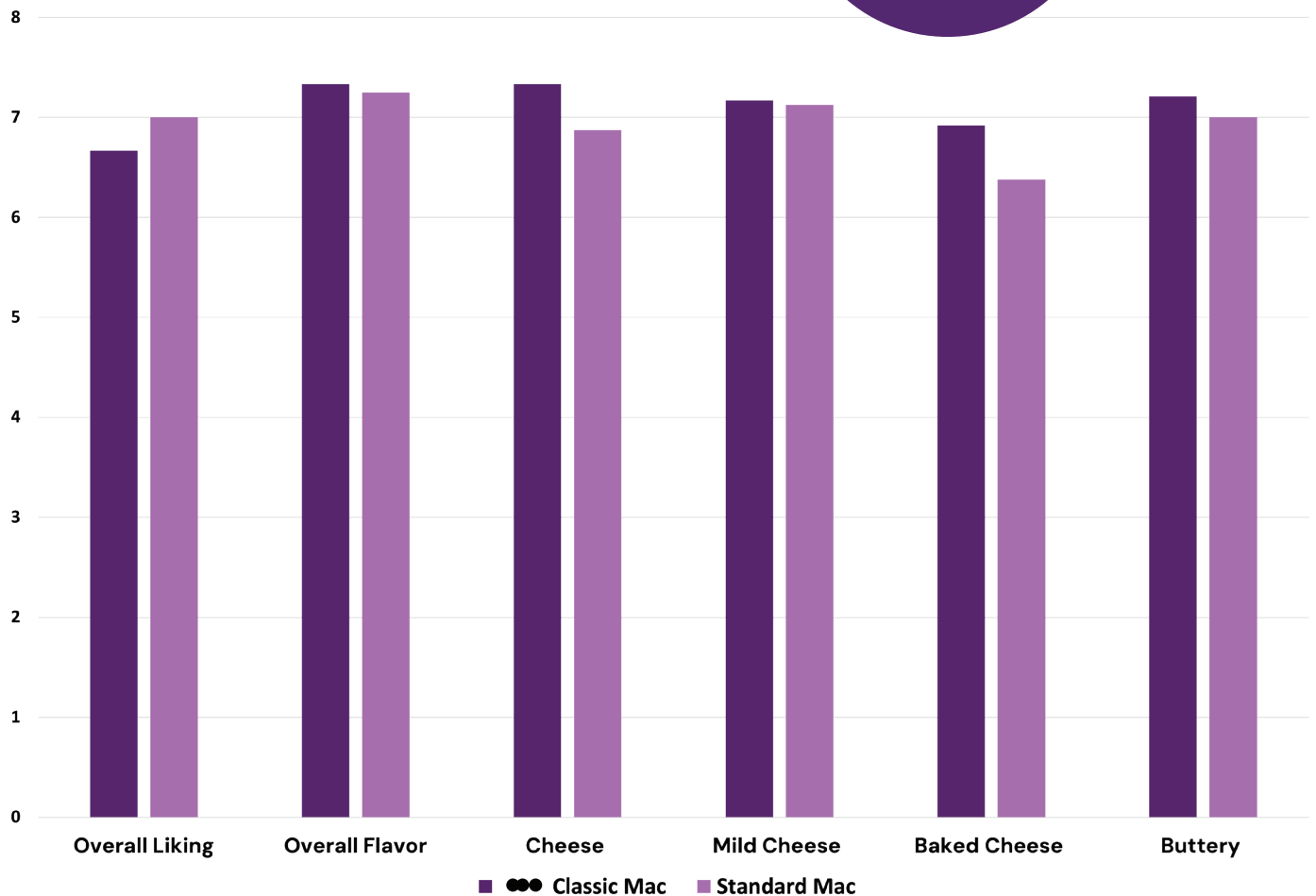
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20%
cost savings

Standard Mac & Cheese	Use Level	dsm-firmenich ●●● Classic Mac & Cheese	Use Level
Cheddar Cheese	20.00%	Cheddar Cheese	12.76%
Parmesan Cheese	5.00%	Parmesan Cheese	1.96%
Heavy Cream	7.00%	Heavy Cream	2.70%
 Classic maximizes value through lower cost solutions		Club Cheese Concentrate	1.30%
		Cheddar Concentrate	0.45%
		Cream	0.29%
		Nat Flavor (Cheesy Savory Type) 050023 218CB	0.07%

Cost Reduction Overall Liking

CLT
Results:
Parity in
all liking
metrics

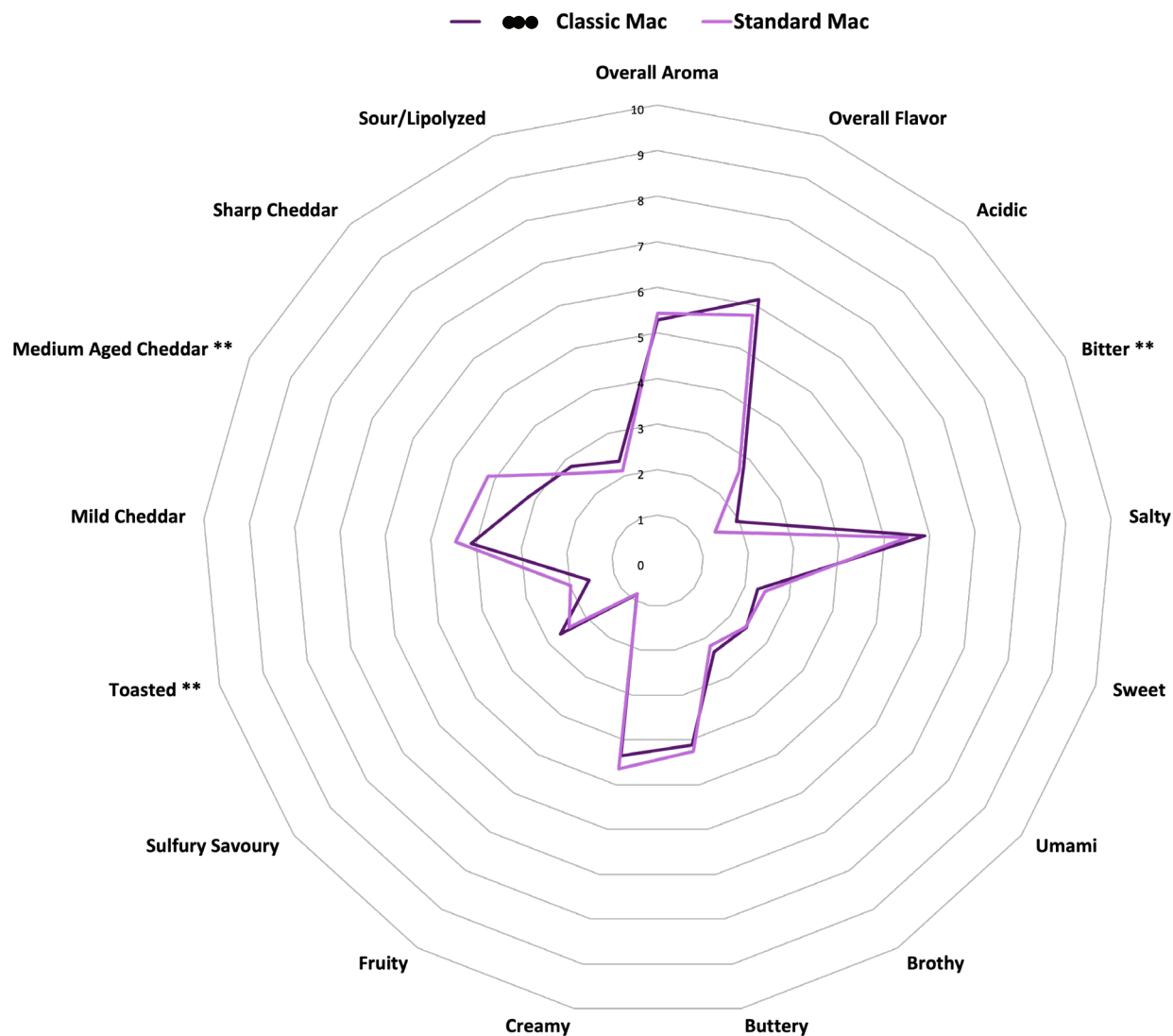


Source: n=40, Date: 7/7/26

Liking Scale: 1=Dislike Extremely - 9= Like Extremely

Q. How much do you LIKE or DISLIKE the ___ of this sample?

QDA Results



Descriptive Analysis Panel held on 7/2/26. N= 11 highly trained dsm-firmenich panelists
Scales: Attribute intensities rated on an 11-pt scale: 0 = Imperceptible | 10= Extremely Pronounced
Statistical Analysis: ANOVA with Post Hoc Duncan's Test at 90% Confidence Level

Create your

**BOLD &
EXCITING**

Mac & Cheese
Flavor

**Herbs &
Spices**

**Smoke
& Grill**

**Honey
& Sweet
Brown**

**Global
Bold**

Dairy

Alcohol

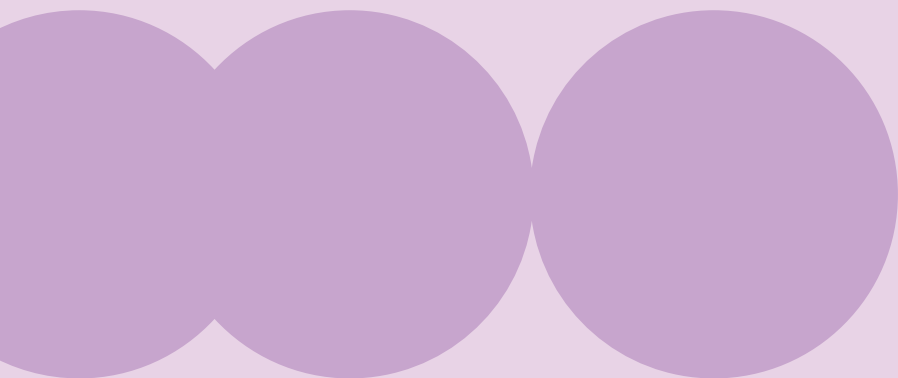
Vegetables


**Savory
Flavor
Excellence**

Fruit

**Meat &
Seafood**

**Salt
& Umami**



Let's Taste

**Bold &
Exciting
Flavors**



Supreme Pizza Mac

FLAVORS & TECHNOLOGIES	USE LEVELS
NATURAL FLAVOR (PIZZA SAUCE TYPE)	0.10–0.20%
NATURAL FLAVOR (ITALIAN SAUSAGE TYPE)	0.05–0.10%
NATURAL FLAVOR (SAVORY TYPE)	0.30–0.50%
NATURAL FLAVOR (CRISPY TYPE)	0.30–0.50%



Italian Three Cheese Mac

FLAVORS & TECHNOLOGIES	USE LEVELS
NATURAL AGED PARMESAN CHEESE FLAVOR	0.30–0.50%
ASIAGO CHEESE CONCENTRATE	0.30–0.50%
NATURAL ROMANO CHEESE FLAVOR	0.30–0.50%
NATURAL PARMESAN CHEESE FLAVOR	0.10–0.20%
NATURAL FLAVOR (ITALIAN CHEESE TYPE)	0.04–0.06%



BBQ Mac

FLAVORS & TECHNOLOGIES	USE LEVELS
NATURAL FLAVOR (BBQ TYPE)	2.50–3.50%
NATURAL FLAVOR (CAROLINA BBQ TYPE)	0.30–0.50%
NATURAL FLAVOR (WOODFIRE GRILL)	0.10–0.20%



Smoky Bacon & Cheddar Mac

FLAVORS & TECHNOLOGIES	USE LEVELS
NATURAL SMOKE HICKORY WONF	0.03–0.05%
NATURAL FLAVOR (BACON TYPE)	0.30–0.50%
NATURAL FLAVOR (CRISPY TYPE)	0.02–0.03%



Tuscan Mac

FLAVORS & TECHNOLOGIES	USE LEVELS
NATURAL FLAVOR (SUNDRIED TOMATO TYPE)	0.25–0.40%
NATURAL BASIL FLAVOR WONF	0.03–0.05%
NATURAL GARLIC WONF (ROASTED GARLIC TYPE)	0.02–0.05%



Chile Verde Mac

FLAVORS & TECHNOLOGIES	USE LEVELS
NAT FLAVOR (CHILI VERDE TYPE)	0.15–0.20%
NATURAL PEPPER FLAVOR WONF (POBLANO TYPE)	0.05–0.10%
NATURAL LIME JUICE POWDER	0.10–1.00%

Take greater control of your *Signature* cheese experience

FCI Tools



Create Distinction

Own your signature profile



Reduce Dairy Dependency

Improve cost and supply resilience



Deliver the Taste Experience

Maintain sensory performance
through processing

Use EMC and EMDI to reduce reliance on commodity dairy ingredients while delivering the flavor, richness and consistency consumers expect.

- Build a distinctive cheese profile
 - Create new flavor combinations
 - Maintain a recognizable signature across products and market
-
- Significant cost savings by reduction or replacement of dairy components
 - Reduce exposure to dairy price and supply volatility
 - Simplify transportation and inventory
-
- Enhance and intensify dairy flavor
 - Supplement flavor lost during processing
 - Add richness, mouthfeel and lingering impact
 - Mask unwanted notes
 - Deliver consistent flavor from batch to batch



**More Flavor.
More
Possibilities.**

**Create your *Signature*
mac & cheese**

Explore complementary
profiles designed to make your
mac & cheese uniquely yours.

Dairy



FLAVOR	DESCRIPTORS	USE LEVEL
GOUDA CHEESE CONCENTRATE 050027 F29019	cheesy, creamy	0.50 – 2.00%
NAT FLV COOKED MILK TYPE 050027 F44027	creamy, cooked notes	0.50 – 1.50%
NAT CHEESE FLAVOR COTIJA TYPE 050027 F33065	acidic, cheesy	0.50 – 2.00%
BUTTER CONCENTRATE 050027 F10093	fatty, buttery	0.75 – 2.00%
ASIAGO CHEESE CONCENTRATE 050027 F34017	aged, sharp	0.50 – 2.00%
ENZYME MODIFIED MONTEREY JACK CHEESE 050027 F35004	creamy, mild cheese	0.50 – 2.00%
ENZYME MODIFIED FETA CHEESE 050027 F28020	creamy, tangy	0.50 – 2.00%
NATURAL SWISS CHEESE FLAVOR 050027 F31009	medium aged cheese, fruity	0.50 – 2.00%
NATURAL BLUE CHEESE FLAVOR 050027 F21012	sl. musty, tangy	0.50 – 2.00%
NAT BUTTERMILK FLAVOR WONF 050027 F18010	cultured dairy, acidic	0.50 – 1.50%
NATURAL CREAM CHEESE FLAVOR 050027 F41004	creamy, tart	0.50 – 2.00%
BROWN BUTTER 050027 F11098	caramelized, buttery	1.00 – 4.00%
VERMONT CHEDDAR CHEESE CONCENTRATE 050027 F23300	sharp, aged, vermont cheddar	0.50 – 2.00%
MOZZARELLA CHEESE CONCENTRATE 050027 F30024	creamy, mild cheese	0.50 – 2.00%
NATURAL CHEDDAR CHEESE FLAVOR 050027 F23003	medium aged cheddar	0.50 – 2.00%
NATURAL SHARP CHEDDAR FLAVOR 050027 F22015	sharp cheddar	0.50 – 2.00%
GRUYERE TYPE CHEESE FLAVOR 050027 F33037	young fruity cheese, sour	0.50 – 2.00%
NATURAL CHEESE FLAVOR 050027 F33043	mild cheddar, buttery	0.50 – 2.00%

Herbs & Spices



FLAVOR	DESCRIPTORS	USE LEVEL
NATURAL FLAVOR (SOUTHWEST CHIPOTLE TYPE) 864348 CB	tomato, cumin, garlic, spicy, smoky	0.25 – 0.50%
NATURAL CILANTRO WONF 540661 TP0504	fatty, green, aldehydic	0.05 – 0.25%
NATURAL BASIL FLAVOR WONF 868668 CB	basil, fresh	0.10 – 0.30%
NATURAL BLACKPEPPER 598788 TPC0699	peppery	0.05 – 0.20%
NATURAL FLAVOR(SRIRACHA TYPE) 553275 T	hot, spicy	0.10 – 0.20%
NATURAL FLAVOR (HOT SAUCE TYPE) 534649 TP0404	vinegary, smoky, rounded, spicy	0.10 – 0.20%
NATURAL ROSEMARY WONF 533208 SN	piney, camphor, herbaceous	0.05 – 0.20%
NATURAL FLAVOR (BLASTED RANCH TYPE) 864177 CB	alliaceous, savoury, dairy	0.05 – 0.20%
NATURAL FLAVOR (SAMBAL TYPE) 050023 0413CB	hot, spicy, seafood	0.40 – 0.60%
NATURAL FLAVOR (CAJUN TYPE) 050023 46CB	spicy, herbaceous	0.60 – 0.80%
NATURAL SAGE EXTRACT ORG 050012 117341ORG	herbal, green	0.10 – 0.30 %



Peppers & Vegetables



FLAVOR	DESCRIPTORS	USE LEVEL
NATURAL PEPPER FLAVOR WONF (POBLANO TYPE) 517953 TH	green, spicy, roasted, fresh	0.05–0.10%
NATURAL PEPPER FLAVOR WONF (GUAJILLO TYPE) 515807 TH	smoky, dried fruit, spicy	0.20 – 0.50%
NATURAL JALAPENO WONF POWDER 862072 2TPO359	fresh, green, hot	0.10 – 0.40%
NATURAL SERRANO PEPPER FLAVOR WONF 517952 TH	green, hot, fresh, spicy	0.05 – 0.25%
NATURAL GARLIC FLAVOR WONF (FRESH TYPE) 539746 SN	fresh, raw, alliaceous	0.05 – 0.25%
NATURAL FLAVOR (VINE RIPENED TOMATO TYPE) 557208 SN	tomato, green, fresh, ripe	0.10 – 0.50%
NATURAL FLAVOR (FRIED CORN TYPE) 516046 T	corn, oily, fried	0.05 – 0.15%
NATURAL MUSHROOM WONF FLAVOR 869374 CB	fresh, earthy	0.10 – 0.25%
NATURAL ONION FLAVOR WONF (ROASTED TYPE) 513339 5CB	roasted, alliaceous, vegetable, fried	0.10 – 0.40%
NATURAL FLAVOR (ROASTED RED PEPPER TYPE) 868620 CB	vegetable, roasted	0.70 – 1.00%
NATURAL GARLIC WONF (ROASTED TYPE) 864487 CB	roasted, alliaceous	0.50 – 0.80%
NATURAL FLAVOR (MIREPOIX TYPE) 868831 CB	onion, carrot, celery, vegetable	0.70 – 1.00%



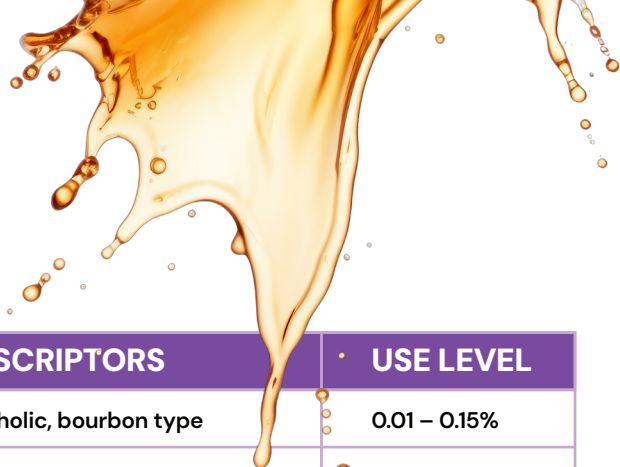
Proteins



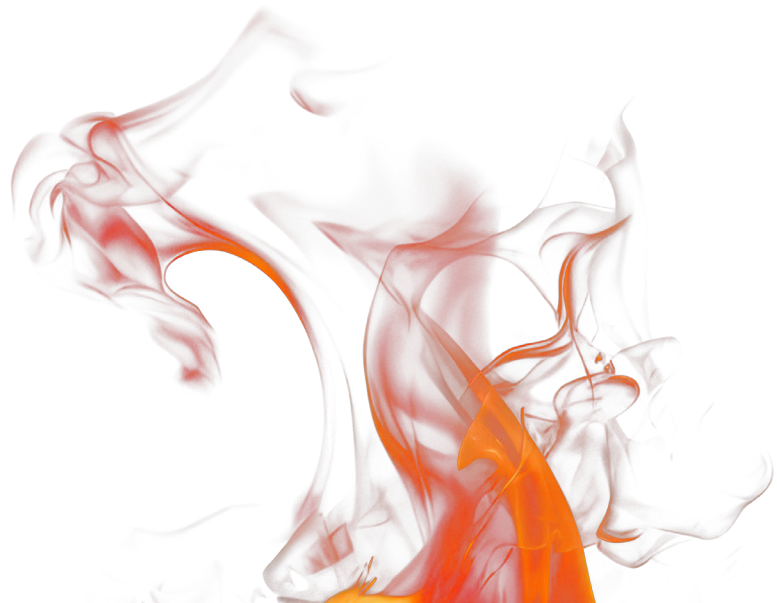
FLAVOR	DESCRIPTORS	USE LEVEL
NATURAL CHICKEN FLAVOR WONF (FAJITA TYPE) 050023	meaty, lime, broth	0.20-0.50%
NATURAL FLAVOR(CRUSTY FRIED PO TYPE) 050006 2633CB	fried, roasted, crusty, sulfury	0.10 – 0.50 %
NATURAL FLAVOR (CRISPY BACON TYPE) 597892 4SH	crispy, savory, fatty, smoky	0.05 – 0.20 %
NATURAL FLAVOR (FATTY JUICY BEEF TYPE) 864014 CB	meaty, fatty, juicy	0.10 – 0.30 %
CHICKEN FLAVOR WONF(ROTISSERIE TYPE) 864691 CBUM	roasted, herbal, brothy, fatty	0.40 – 0.80 %
NATURAL FLAVOR (LOBSTER TYPE) 539488 SII	green, meaty	0.10 – 0.30 %
NATURAL FLAVOR (CRAB TYPE) 500185 TH	fishy, meaty, fresh	0.10 – 0.30 %
NATURAL FLAVOR (SEAFOOD TYPE) 500186 TH	fishy, meaty, fresh	0.10 – 0.30 %



Complementary Flavors



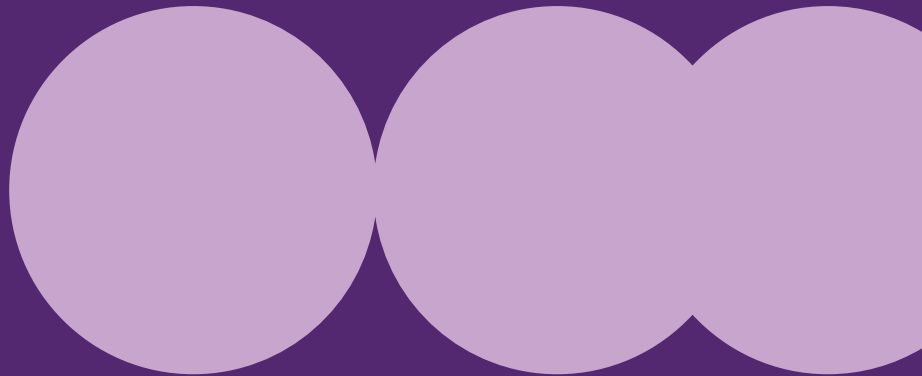
FLAVOR	DESCRIPTORS	USE LEVEL
NATURAL WHISKEY WONF (BOURBON TYPE) 540777 3TP2554	alcoholic, bourbon type	0.01 – 0.15%
NATURAL WHITE WINE POWDER 862259 TP0287	astringent, woody, dried	0.80 – 1.00%
NATURAL BEER WONF (PORTER TYPE) 580274 11T	alcoholic, malty	0.05 – 0.20%
NATURAL BEER WONF (STOUT TYPE) 514098 TP0904	dark, malty, alcoholic	0.10 – 0.25%
NATURAL SMOKE HICKORY WONF 540732 P	smoky, hickory	0.01 – 0.15%
NATURAL FLAVOR (WOODFIRE GRILL TYPE) 500790 T	grilled, woody	0.10 – 0.30%
NATURAL FLAVOR (TERIYAKI TYPE) 050023 0729CB	brown, ginger, soy sauce, sweet	0.25 – 0.50%
NATURAL SALT ENHANCER 868868 CB	salty, savory	0.20 – 0.60%
NATURAL UMAMI FLAVOR 864055 CB	umami, brothy	0.20 – 0.40%
NATURAL HONEY POWDER 862255 TP0299	sweet, honey	0.10 – 0.80%





From classic to completely yours, take mac & cheese further.

Connect with our team to explore
Decoding Delicious, request samples, and
create what's next in mac & cheese.



We bring progress to life

dsm-firmenich 

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