



Food Solutions

Solutions Designed for Meat Products



Dow Food Solutions offers a broad range of ingredients for the meat market. Our ingredients help improve the texture, bite and succulence of meat products while also facilitating the development of healthier options.

Whether your product is consumed hot or cold, we have solutions to help you:

- **Develop lower fat or lower meat sausages, allowing for cost effective recipes**
- **Safeguard shape and binding in reformed and emulsified meat products**
- **Improve water retention, consistency and sliceability** – while enhancing texture and mouthfeel

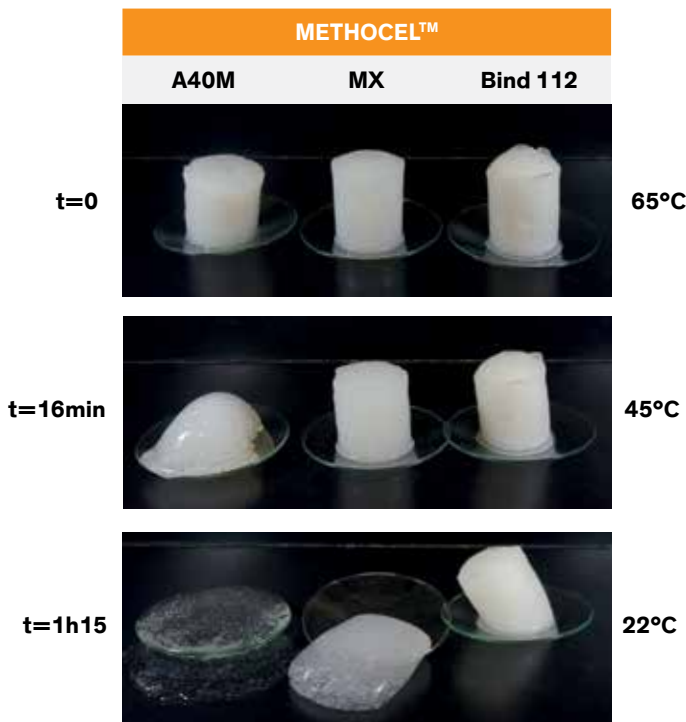
METHOCEL™ in Meat Products

METHOCEL™ MX and METHOCEL™ Bind 1 12 are high viscosity methylcellulose with excellent emulsifying properties and forming strong gels at hot temperature.

Properties	Benefits
<ul style="list-style-type: none"> • Thermal gelling: METHOCEL™ solutions will gel at hot temperatures. This gel is reversible, meaning that when it cools down, it returns to a viscous solution 	<ul style="list-style-type: none"> • Excellent hot structure for great bite as well as stability • During thermal gelling some water is released, carrying flavors and leading to a juicy bite, succulent mouthfeel at high temperatures • Allow development of lower cost products
<ul style="list-style-type: none"> • Methylcellulose has both hydrophobic and hydrophilic areas along its cellulose backbone which acts as an emulsifier • Emulsions made with METHOCEL™ MX and METHOCEL™ Bind 1 12 are very thick and have excellent stability • Emulsions will generally contain between 2-6% of METHOCEL™ and can comprise up to 60% fat • Emulsions can be obtained with different fats: animal fat (fat, skin), vegetable oil, etc • Good water retention capacity 	<ul style="list-style-type: none"> • Emulsions can be obtained with different fats: animal fat (fat, skin), vegetable oil or butter • Freeze/thaw stability + heat stability + time stability during storage • Easy to incorporate into meat preparations • Ability to reduce fat content by up to 50% and to replace unhealthy fat with healthier options (vegetable and omega oils)

Improved structure and binding at cold and ambient temperatures

METHOCEL™ Bind 112 differentiates from METHOCEL™ MX and other methylcellulose due to its **lower melt back property** that results in **long lasting gelling** behavior. This product is the preferred option for applications that require both hot and cold bite.



The lower melt back temperature of METHOCEL™ Bind 112 ensures the **cold bite** benefit

2% solutions of METHOCEL™ were heated up to 65°C (until achieving gelled state) and then allowed to stand and cool down to room temperature. The illustration shows the comparative melt back behaviour between METHOCEL™ MX and METHOCEL™ Bind 112 – both supergelling methylcellulose products patented by Dow – and METHOCEL™ A40M, a standard methylcellulose.

This lower melt back property contributes to improved structure and texture at cold and ambient temperatures resulting in increased stability, bite, cohesiveness and firmness.

Differences in sausages texture at ambient temperature

Sausages were prepared with METHOCEL™ MX and METHOCEL™ Bind 112. The sausage with METHOCEL™ Bind 112 presented a firmer texture and excellent bite when eaten at cold temperature.

Gel strength at 20°C of meat mix after simulation of steaming process (30 min, 80°C)



Differences between METHOCEL™ MX and METHOCEL™ Bind 112

Properties	METHOCEL™ Bind 112	METHOCEL™ MX
Hydration temperature	< 2° C	< 10° C
Gelation temperature	30° C	40° C
Melt back temperature	10° C	20° C
Strong hot gel	Yes	Yes
Cold bite & texture	Yes	No

METHOCEL™ MX and METHOCEL™ Bind emulsifying properties

Making METHOCEL™ MX and METHOCEL™ Bind emulsions

The properties of this fat replacement system can be tailored to meet a creamy or firm desired finished texture:

Ingredients	%
METHOCEL™ MX or METHOCEL™ Bind 112	2 - 6
Fat or oil	10 - 60
Ice water	To 100

Texture depends of the concentration of METHOCEL™ (viscosity) and ratio of water/oil (±aerated, ±firm and brittle)



Cool the bowl chopper (~ 0 °C) and add pork fat (S IX)



Add METHOCEL™ MX or METHOCEL™ Bind 112



Add cold water or crushed ice (<2°C)



A viscous and homogeneous emulsion is obtained after 5 minutes mixing (1°C)



METHOCEL™ MX emulsion



METHOCEL™ Bind 112 emulsion

Application example: lower fat sausages

Tests were performed using a Frankfurter sausage type formulation, in which either the METHOCEL™ MX or METHOCEL™ Bind 112 emulsion was used to replace pork fat. METHOCEL™ Bind 112 was applied at same dosage as METHOCEL™ MX and also at a lower dosage (-25%).

Low fat sausage formulation (16% fat)

Emulsion composition:
 20% pork fat (S IX)
 • Sample 1: 3% METHOCEL™ MX (=0,9% in the final sausage)
 • Sample 2: 3% METHOCEL™ Bind 112 (= 0,9% in the final sausage)
 • Sample 3: 2.25% METHOCEL™ Bind 112 (=0,68% in the final sausage)
 Ice water to 100%

Ingredients	Kg	%
Lean pork meat (S III)	8.0	38.6
Pork chin (S VI)	4.0	19.3
METHOCEL™ emulsion	6.0	29.0
Cold water/ice	2.0	9.7
TOTAL	20.0	100

+ Dry ingredients (curing salt, flavors...)

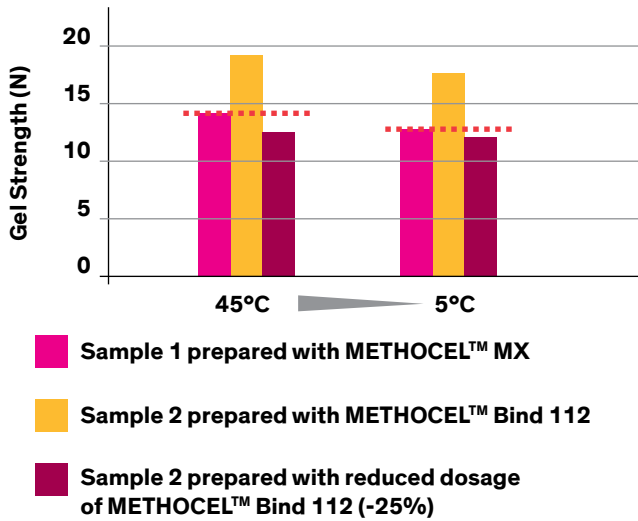
Low fat sausage preparation using METHOCEL™ MX or METHOCEL™ Bind 112 emulsions



The use of METHOCEL™ Bind via powder addition is also possible.

Texture evaluation

The texture of the low fat sausage was measured with a texture analyzer*.



* Sausage meat was prepared in a cutter and filled into a special set up. The system was heated for 30 min at 80°C; cooled down to 45°C and 5°C and compression was measured at each temperature.

At same dosage METHOCEL™ Bind 112 provided a stronger texture at hot and cold temperatures than METHOCEL™ MX

At a 25% lower dosage: compared to METHOCEL™ MX, METHOCEL™ Bind 112 offered a similar texture performance

Sensory evaluation

A consumer panel with 16 people participated in a triangular test to compare sample 1 (0.9% METHOCEL™ MX) and 3 (0.68% METHOCEL™ Bind 112): the panel had to choose the sample they identified as different and comment on what the difference was.

Fridge temperature (5-7°C)	Hot temperature (45°C)
Consumers were able to differentiate between the two samples, with comments indicating that those prepared with METHOCEL™ Bind 112 had a stronger bite, despite the lower dosage.	Consumers perceived the bite of both samples of sausages to be similar.
Conclusion: METHOCEL™ Bind 112 offers enhanced bite and texture at low temperatures, even when used at lower usage levels than METHOCEL™ MX.	Conclusion: METHOCEL™ Bind 112 offers equivalent hot bite characteristics compared to METHOCEL™ MX even at lower usage levels.

Both texture and sensory evaluations confirmed the improved cold bite and structure of sausages with METHOCEL™ Bind 112 and also indicated the possibility of 25% dosage reduction over METHOCEL™ MX.

WALOCEL™ in Meat Products

WALOCEL™ CRT 45000 W PA is a high viscosity cellulose gum with the ability to improve the texture of meat products (e.g. scalded sausages and reformed meat) delivering the following benefits:

- Improved water absorption and reduced syneresis
- Cost reduction due to increased yield
- Juicy texture
- Improved form stability during frying step
- Enhanced consistency, sliceability and peelability

Dow has a complete range of cellulose gums in order to offer the right texturizer for different meat applications.

Conclusions

Dow offers various solutions to address texture enhancement, cost efficiency and healthier alternatives to meat products. The table below shows the recommended options according to the end application and expected benefits:

METHOCEL™ food ingredient portfolio consists of cellulose based gums, namely hydroxypropyl methylcellulose (E464) and methyl cellulose (E461). WALOCEL™ portfolio consists of a range of cellulose gum (also known as sodium carboxy methylcellulose and E466).

Recommended product	Target applications	Benefits	Hydration temperature
METHOCEL™ MX	Products eaten hot	<ul style="list-style-type: none"> • Provides a good juicy bite at hot temperatures • Enhanced binding and stability in hot temperatures 	~ 7-10° C
METHOCEL™ Bind 112	Products eaten hot and cold	<ul style="list-style-type: none"> • Improves structure, bite and texture at hot and cold temperatures • Provides stability and binding when product is cold or has cooled down after cooking (not eaten immediately) – easier to manipulate • Gives good juicy bite in hot temperatures 	~ 2° C
WALOCEL™ CRT 45000 W PA	Scalded sausages and reformed meat products	<ul style="list-style-type: none"> • Reduces syneresis • Allows cost reduction due to increased yield • Improves form stability during frying • Enhanced consistency, sliceability and peelability 	Any temperature

North America	+1 800 258 2436
Europe, Middle East, Africa	+31 11 567 2626
Pacific	+60 3 7965 5392
Latin America	+55 11 5188 9000

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