

Ham Pumping/Tumbling

MTS-30

Benefits of Gelcarin® ME Carrageenan

- Increased process yields
- Formula cost effectiveness
- Improved texture and sliceability
- Retention of flavor with no foreign flavors
- Ease of processing using conventional injecting and tumbling equipment
- Improved purge control

Comments

Gelcarin® carrageenans bind free water to improve the process yield and reduce purge, especially in vacuum packaged, water added hams and ham and water product - X%...added ingredients classifications. Gelcarin® carrageenans help produce consistent textural characteristics and improved visual appeal. It also may be used to help maintain process consistency. Gelcarin® carrageenans can be used in virtually any typical ham production process including injection or vacuum tumbling.

FORMULATION:

80% Pump ® 90% Cook Yield ® 39% Added Ingredients

Ingredients	% in Brine	Lb. in Brine	% in Finished Product
Water	89.54	447.70	---
Salt	4.61	23.05	2.5000
Dextrose	3.03	15.15	1.5000
Gelcarin carrageenan*	1.22	6.10	0.6000
Sodium tripolyphosphate	1.01	5.05	0.5000
Cure salt	0.48	2.40	0.0156 (Nitrite)
Sodium erythorbate	<u>0.11</u>	<u>0.55</u>	0.0550
	100.00	500.00	

* FMC BioPolymer

80% Pump ® 90% Cook Yield ® 39% Added Ingredients

<u>Ingredients</u>	<u>% in Brine</u>	<u>Lb. in Brine</u>	<u>% in Finished Product</u>
Water	85.61	428.05	--
Salt	6.35	31.75	2.5**
Dextrose	4.19	20.95	1.5
Gelcarin® carrageenan*	1.67	8.35	0.6
Sodium tripolyphosphate	1.40	7.00	0.5
Cure salt	0.63	3.15	0.0156 (Nitrite)
Sodium erythorbate	<u>0.15</u>	<u>0.75</u>	0.0550
	100.000	500.00	

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** Some salt contributed by cure salt.

<u>Process</u>	<u>Injection</u>	<u>Tumble</u>	<u>Vacuum Mix</u>
Carrageenan	Gelcarin® ME 9111 carrageenan	Gelcarin® ME 8121 carrageenan	Gelcarin® ME 7228 carrageenan
Process Benefit	Reduced swelling in brine - lower viscosity	Some swelling to improve surface adhesion	Can increase batter viscosity for improved machinability

Procedure

- Mix phosphates in cold water until completely dissolved.
- Add salt prior to the addition of other ingredients.
- Add sugar/dextrose and Gelcarin® carrageenan and mix thoroughly.
- Add cure and cure accelerator (erythorbate).

Injection Tips

- Add carrageenan with agitation AFTER phosphate, salt etc. are dissolved.
- Keep brines cold (less than 5°C (40°F)) to prevent premature swelling.
- Multiple passes/multi-head injections at lower pressures results in a superior product.
- Minimize brine holding. Carrageenan may swell and settle if held without agitation.

Vacuum Tumbling Tips

- Carrageenan can be dispersed in a brine or added to the tumbler as dry powder.
- If dry powder is to be added to tumbler, mix with salt, dextrose, etc. to prevent clumping.
- If dispersed in brine, add carrageenan after phosphate, salt.

Vacuum Mix

- Simply add dry powder to mixer, followed by brine/water.

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REGULATORY STATUS:

Carrageenan "chondrus extract" is generally recognized as safe [GRAS] (see 21 CFR 182.7255) by experts in accordance with FDA food and drug regulations. Carrageenan is approved as a food additive under 21 CFR-172.620. Carrageenan is approved for use in certain cured pork products by 9 CFR parts 318.7 and 319.104. Carrageenan may be used in those cured pork products labeled as "Ham water added" and "Ham and water product - x% of weight is added ingredients."

All products manufactured by FMC BioPolymer meet all standards of quality as defined by:

- Food Chemicals Codex III
- J.E.C.F.A. Specifications issued by FAO/WHO
- European Economic Community Directives

PATENTS:

FMC Corporation does not warrant against infringement of patents of third parties by reason of any uses made of the product in combination with other material or in the operation of any process; purchasers assume all risks of patent infringement by reason of any such use, combination, or operation.

WARRANTY:

Because of the numerous factors affecting results, FMC BioPolymer ingredients are sold on the understanding that purchasers will make their own test to determine the suitability of these products for their particular purpose. The several uses suggested by FMC BioPolymer are presented only to assist our customers in exploring possible applications. All information and data presented are believed to be accurate and reliable, but are presented without the assumption of any liability by FMC BioPolymer.

TECHNICAL SERVICE:

The information contained in this bulletin is intended to be general in nature. Techniques and data pertaining to specific uses for FMC ingredients and new developments will be published periodically in the form of supplemental application bulletins.

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