



Increase Tableting Efficiency with PROSOLV® SMCC

What self-respecting plant manager wouldn't love to reduce tablet production costs while increasing output and improvement quality, without spending a penny? One nutraceutical company reaped this reward by switching to a high functionality tablet binder-diluent with far greater compatibility, low strain-rate sensitivity, better flow, less lubricant sensitivity and more densification and consolidation than conventional tableting ingredients.

"Some of the botanical materials that we try to compress are a challenge, especially since we prefer to use direct compression whenever possible," explains the Vice President of Research and Development. "The available standard excipients do not always meet up to the challenge posed by these new botanicals. Improved compression and higher throughput are always of paramount importance in an industry such as ours, and PROSOLV® SMCC was one of the newer tableting binders we examined. We were very surprised and pleased about how it resolved many of our previously insoluble problems."

PROSOLV® SMCC products are prepared by co-spray drying 2% by weight colloidal (fumed) silicon dioxide (CSD) with microcrystalline cellulose (MCC), which is prepared by the standard manufacturing process for premium grades of MCC. There are no other ingredients in

PROSOLV® SMCC products. Both CSD and MCC are generally recognized as safe by regulatory authorities worldwide.

The compactability of PROSOLV® SMCC direct compression formulations has been found to be two to four times greater than that of formulations of the same active ingredient(s) with MCC. One pharmaceutical prescription product could be manufactured to a hardness of 230 N with 12% PROSOLV® SMCC 90 compared to only 120 N with 25% MCC, a fourfold improvement in compatibility. The harder tablet was easier to coat, and the tablet size and weight were significantly reduced, providing a more appealing product for the patient.

The ingredient cost savings were very significant due to the fourfold-lower use level of compaction ingredients. There was less negative production-cost variance with the harder product, especially in the coating process. Further, tableting speed was doubled without losing hardness of the tablets due to the low strain-rate sensitivity, which led to another increment in production cost savings.

"The improvements we see include lower compression forces, higher throughput, and better yields," says the Vice President of R&D.

	MCC Formula	PROSOLV® HD 90	Change
MCC	285 mg	0	0
PROSOLV®	285 mg	74 mg	-211 mg
Dicalcium Phosphate	142 mg	0 mg	-142 mg
Tablet Weight	1094 mg	735 mg	-359 mg
Tablet Size	0.313" x 0.750" oblong	0.343" x 0.609" oval	Substantial
Compression Force	4 tn	<2 tn	To < half
Hardness	27 Kp	30 Kp	+3 Kp
Bottle Size (120 Count)	200 cm ³	120 cm ³	Substantial
Material Cost (Per 1000 Tabs)	---	---	-\$1.66
Production Cost Savings	# of tablets per batch = 1x	# of tablets per batch = 1.49x	Every 3rd batch is free



Technical Information

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“Another significant advantage is that PROSOLV® SMCC tends to absorb much of the oiliness that is characteristic of natural products, especially extracts.”

He typically uses PROSOLV® SMCC to replace other tableting aids. “Depending on what we are trying to improve, PROSOLV® SMCC has been used in place of several ingredients,” he says. “For example, we use it in place of silicon dioxide to absorb the active’s oiliness without losing compactibility. We use it in place of cellulose and starch derivatives when it is necessary to improve compactibility and increase compression speed.”

Consolidation and densification offer even greater production-cost improvements. JRS (Patterson, NY), the supplier of PROSOLV® SMCC 90, says one nutritional product realized a 13% increase in the density of the formulation: More tablets could be made from each production batch using the same equipment and avoiding additional capital expense. Together with an 11% reduction in binder use level, the product realized a 28% reduction in overall manufacturing costs.

The economic value in terms of production cost savings using a high-density form of the ingredient (PROSOLV® SMCC HD 90) was shown in the reformulation of a commercial mineral supplement product, according to JRS. Reducing the use level of compaction excipients and eliminating dicalcium phosphate entirely reduced production costs by \$1.66 per 1000 tablets. Meanwhile, the hardness of the tablets was improved 10% while using only half of the original compaction force. In addition, the tablet size and weight were reduced by about 33%.

The nutraceutical company continues to explore ways to use PROSOLV® SMCC, according to their VP of R&D. “When standard formulations don’t perform, we use PROSOLV® SMCC with great success,” he says, “and usually at a lower amount than what it is replacing, so we get a savings both from the raw materials side and from the higher throughput and better yield side.”

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PROSOLV® SMCC

Silicified Microcrystalline Cellulose
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Binders

VIVAPUR®, EMCOCEL®

Microcrystalline Cellulose

EMCOMPRESS®

Calcium Hydrogen Phosphate Dihydrate and Anhydrous
Dibasic Calcium Phosphate Dihydrate and Anhydrous

EMDEX®

Dextrates

COMPACTROL®

Calcium Sulfate Dihydrate

Superdisintegrants

VIVASTAR®, EXPLOTAB®

Sodium Starch Glycolate, Sodium Carboxymethyl Starch

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PRUV®

Sodium Stearyl Fumarate

LUBRITAB®

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Functional Fillers

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