HARKE
Pharma

Tabletting

HarkePlus Tab®

The Powder Blend That Solves Your Tableting Problems

YOUR DOSAGE FORM EXPERTS

HARKE Pharma
Your Dosage Form Experts

HARKEPLUS TAB®

HARKE Pharma is an international distributor specialized in supplying high-quality excipients to the pharmaceutical industry, having more than half a century of experience in that particular field.

Throughout the decades we have learnt and experienced firsthand, one of the many challenges drug developers face are complex powder formulations, which are virtually not compactible into cost effective tablets, leaving the developer no choice but to go down the capsule path.

HARKE Pharma saw the opportunity to provide a possible solution to that problem by releasing HarkePlus Tab®, a tailored powder blend, made up of well-established excipients, which combines the functionality of a filler, binder, and disintegrant. HarkePlus Tab® provides the necessary flow and compaction properties, which allows it to be used for compacting the most challenging powders into the most cost effective dosage form to date, tablets.

Composition and Regulatory Information

HarkePlus Tab® is made up of Microcrystalline Cellulose (Ph. Eur./USP-NF/JP), Low-Substituted Hydroxypropyl Cellulose (Ph. Eur./USP-NF/JP) and Dicalcium Phosphate (Ph. Eur./USP-NF/JP).

The individual components of HarkePlus Tab® comply with pharmacopoeial requirements, necessary for its use as pharma excipient. However, use in nutraceutical applications is covered through the regulatory status of the individual components: Microcrystalline Cellulose (E 460 i), Low-Substituted Hydroxy-propyl Cellulose (E 463a) and Dicalcium Phosphate (E 341 ii).

Labelling Information

HarkePlus Tab® addresses the needs of conscious consumers and developers, allowing by its use the following label claim: vegan, GMO-free, lactose-free, gluten-free.

HARKEPLUS TAB®

Functional Related Characteristics (FRC)

Particle Size Distribution: HarkePlus Tab® particle size distribution is comparably narrow, essential to powder blend homogeneity. Its mean particle size is above 100µm, which translates into free powder flow characteristic. Further, the absence of large amount of fines caters to developers, who demand dust-free environment or helps to alleviate problems associated with dust, very well known in development and production.

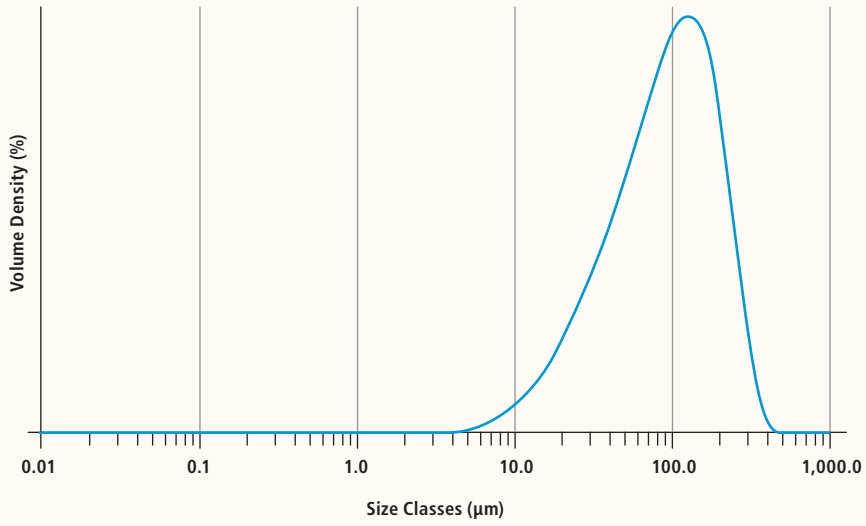

Figure 1 *Typical particle size distribution of HarkePlus Tab® measured by laser diffraction*

Particle Size Distribution	
Sieve size (µm)	**Weight fraction (%)**
< 45	10.45
< 90	39.35
< 125	52.52
< 250	99.82
< 355	100.00
< 500	100.00

Table 1 *Typical particle size distribution of HarkePlus Tab® measured by mechanical sieving*

Density and Powder Flow		
Bulk density (g/ml)	**Tapped density (g/ml)**	**Angle of repose (°)**
0.33	0.43	40.1

Table 2 *Typical density and angle of repose values for HarkePlus Tab®*

Compactibility

HarkePlus Tab® yields excellent results concerning tablet's tensile strength. Even at comparably low compaction pressure (as low as 60MPa) a tensile strength of 2MPa is easily achieved. Further, with increasing compaction pressure linear increase of tensile strength is observed, rendering HarkePlus Tab® a highly predictable excipient, concerning its tableting behavior (Figure 2).

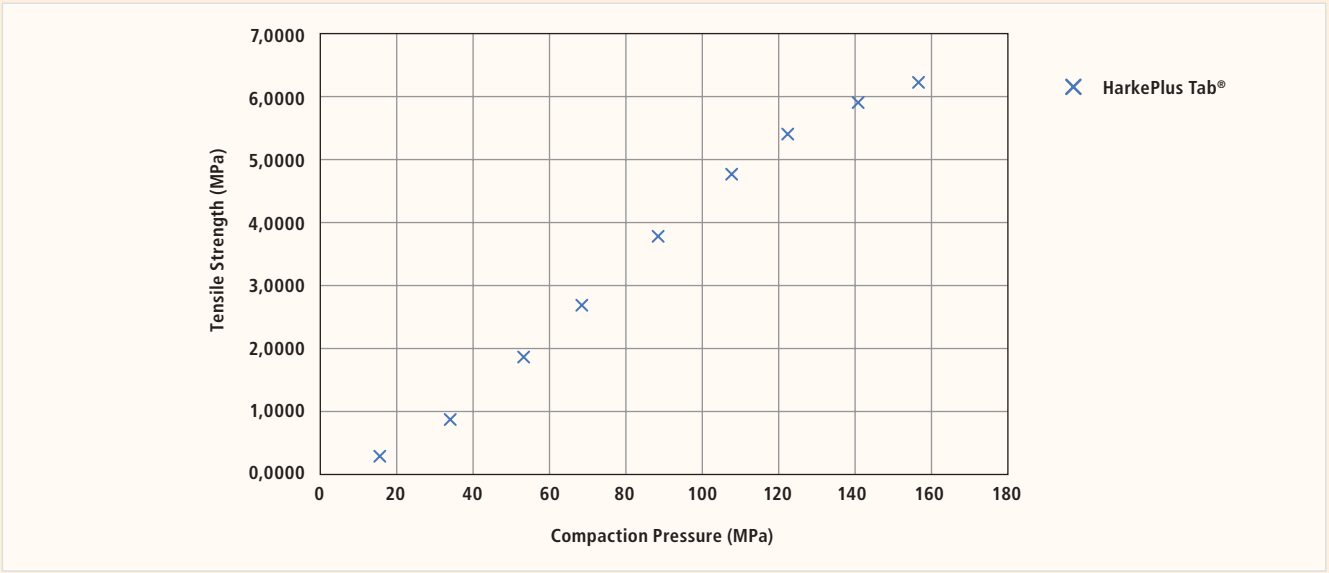

Figure 2 *Typical compaction profile of HarkePlus Tab® (500mg flat faced tablet, 12mm diameter)*

Case Studies

1. Supplements and Herbals

HarkePlus Tab® aims at pharmaceutical and nutraceutical applications alike. In fact, herbal preparations are among the most difficult to compress materials, which is why HarkePlus Tab® has become very popular amongst developers facing these challenges.

Table 3 summarizes the formulations' composition, which were put to the test to illustrate HarkePlus Tab® capabilities. Figure 3 shows final tablet hardness of the tested formulations. Up to 67% drug load has been achieved.

Individual Tablet Composition		
Supplements and Herbals	**HarkePlus Tab® (%)**	**Additional Excipients Required**
Perna canaliculus 25%	75	No
Egg lecithin 67%	33	No
Ginkgo extract 67%	33	No
Ginkgo leaves 20%	79.7	Colloidal silica 0.3%
Green tea extract 67%	31.3	Magnesium stearate 1.7%

Table 3 *Individual tablet composition*

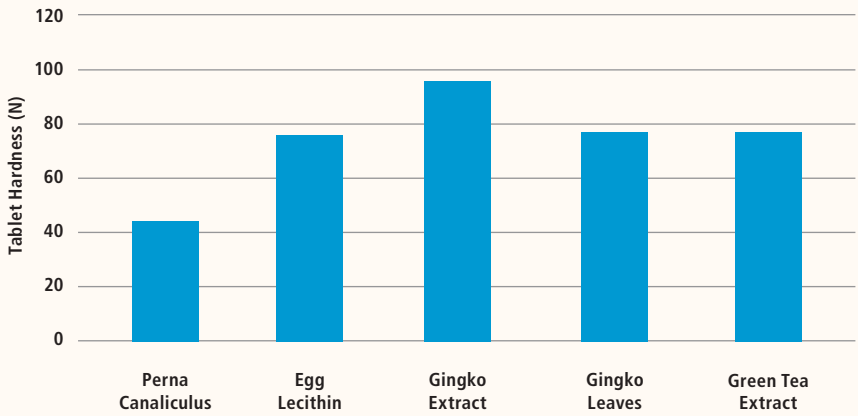

Figure 3 *Tablet hardness as a function of used supplements or herbal preparation*

Case Studies

2. Active Pharmaceutical Ingredients (APIs)

In order to verify HarkePlus Tab® capability as tablet-enabling excipient by direct compression, two different APIs (Ibuprofen, and Paracetamol) were selected and individually compressed with HarkePlus Tab® into tablets. 30% drug load and a target tablet hardness 100 N were selected. In addition, ejection force while tableting was recorded.

Compacting HarkePlus Tab® into a tablet required comparable low compaction force (Figure 4 left bar). The addition of API required additional force in order to maintain 100 N tablet hardness. However, necessary compaction force did not exceed 10 kN for any of the formulations. Recorded ejection force did not exceed 300 N, indicating sufficient material's processability.

Powder Flow of HarkePlus Tab®:

	HarkePlus Tab®	HarkePlus Tab® + 30% Paracetamol	HarkePlus Tab® + 30% Ibuprofen
Carr Index	24.08	22.33	20.93
Hausner Ratio	1.32	1.29	1.27

Table 4 *Power flow of HarkePlus Tab® and in combination with various APIs characterized by Carr's Index and Hausner Ratio; all formulations contained 0.5% SiO_2 and 1% magnesium stearate*

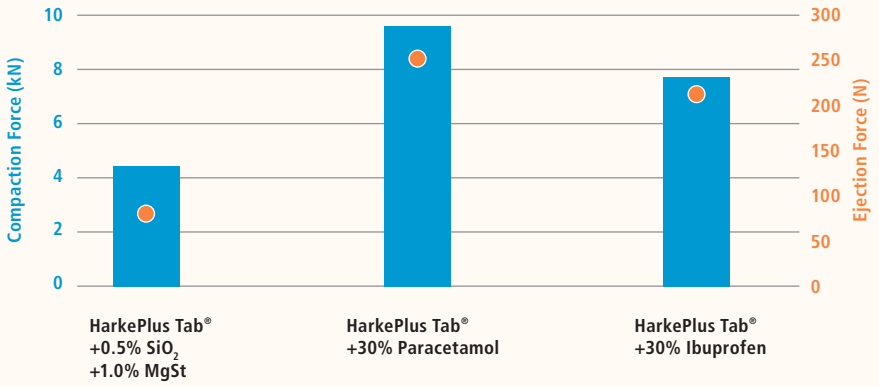

Figure 4 *Compaction force (blue bars) required to achieve 100 N tablet hardness (lower bars mean better); ejection force (orange dots) recorded while tableting*

Packaging and Retest

HarkePlus Tab® is shipped in a 12.5kg plastic bucket with double PE-Inline. The retest period is two years.

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