

## Result 1 (Protocol number M120132)

**Sample material:** 2x seeds (rape and flex)

**Material attributes:** rape seed sample

**Utilized FRITSCH product:**

Variable-Speed Rotor Mill PULVERISETTE 14

speed: 20.000 rpm

impact rotor with 12 ribs

+ sieve ring 0,75 mm trapezoidal perforation

**Feed quantity:** 16 g

**Feed size:** 2 mm

**Grinding time:** 25 s

**Result:** sieve openings are blocked with sample

**Comments:** With the used 0,75mm sieve ring, the openings use to become closed with sample during grinding. Probably the rape seed sample use to contain too much oil which will be pressed out by the impact rotor during grinding. Eventually, the additional impact bar might improve the output (see result 2).

**Pictures:**



Oily sample uses to block the openings of the used 0,75mm sieve ring rapidly. A grinding of higher amounts is not possible.

## Result 2 (Protocol number M120132)

**Sample material:** 2x seeds (rape and flex)

**Material attributes:** rape seed sample

**Utilized FRITSCH product:**

Variable-Speed Rotor Mill PULVERISETTE 14

speed: 20.000 rpm

impact rotor with 12 ribs

+ impact bar with sieve ring 0,75 mm trapezoidal perforation

**Feed quantity:** 17 g

**Feed size:** 2 mm

**Grinding time:** 25 s

**Result:** sieve openings are blocked with sample

**Comments:** Also with the additional impact bar, particles use to stick to the bar and the sieve ring behind. The grinding has been aborted after 25s.

Probably with lower speed and a 1mm sieve ring, the sample can be ground properly (see result 3).

**Pictures:**



Also by using the impact bar (for temperature sensitive samples), the openings started to become closed with sample.

### Result 3 (Protocol number M120132)

**Sample material:** 2x seeds (rape and flex)

**Material attributes:** rape seed sample

**Utilized FRITSCH product:**

Variable-Speed Rotor Mill PULVERISETTE 14

speed: 16.000 rpm

impact rotor with 12 ribs

+ sieve ring 1,0 mm trapezoidal perforation

**Feed quantity:** 30 g

**Feed size:** 2 mm

**Grinding time:** 60 s

**Result:** < 1 mm (majority use to be finer)

**Comments:**

With a lower speed setting (16,000 rpms), probably less oil will become pressed out of the sample. Less sticking might be expected.

With the used 1mm sieve ring, almost all openings use to stay free after grinding of 30g of sample. A grinding of higher amounts is still possible.

For a grinding of 100-150g of sample, eventually a batch wise grinding might be required. Also the accessories for grinding large quantities can be used for a direct grinding of 150g of sample. Unfortunately, not enough sample has been send for testing this.

Not further mentioned will be trials with previous embrittlement in liquid nitrogen with sieve rings of 0,5mm and 0,75mm trapezoidal perforation with different grinding speeds. None of them have been successful.

**Pictures:**



By using the 1,0mm sieve ring, all fed sample has been ground successfully. Higher amounts can be ground without problems.

**Result 4 (Protocol number M120132)**

**Sample material:** 2x seeds (rape and flex)

**Material attributes:** rape seeds

**Utilized FRITSCH product:**

Planetary Mono Mill PULVERISETTE 6 classic line

main disk speed: 650 rpm

80 ml grinding bowl made of zirconium oxide (ZrO<sub>2</sub>)  
+ 5x 20 mm Ø ZrO<sub>2</sub> balls

**Feed quantity:** 15 g (rest of sample)

**Feed size:** 2 mm

**Grinding time:** 60 s

**Result:** mashed sample

**Comments:** By grinding with our Planetary Mono Mill PULVERISETTE 6 classic line, sample will become meshed up. It should be possible receiving a homogeneous ground pulp / suspension by adding liquids (e.g. water, isopropyl alcohol or other organic solvents). Also higher amounts can be ground with e.g. 250ml bowls (useful volume of up to 125ml).

**Pictures:**



By using a ball mill, the sample will become pressed to mush within one minute. For a further grinding, it should be possible adding some solvents and receiving a homogeneous slurry / suspension.