

Perfect grip decides victory or defeat Comminution of colophony

A very special task

Our accounting manager and track and field athlete Fabian Mayer, asked our laboratory manager to produce an "adhesive" for him, with which the discus would have the perfect grip in his hand. He planned on taking part in the German Senior Winter Throw Athletics Championships in discus throwing. The commercial products are often very expensive, do not provide a very good grip and are often made of chemical materials. Therefore, the most important aspect was that the powder produced later should consist of natural materials and be skin-friendly.



A good grip is essential

Research on the ingredients

Our lab manager researched the ingredients of commercial products and their skin compatibility. He came across rosin also called colophony, the "violin resin" already used in sports. There are references in the literature to health concerns, but only if the resin is burned or vaporized and then inhaled. The resin itself even has a healing effect, for example on abscesses. Other substances from the category are frankincense and myrrh, known from ancient times.

Properties of colophony

The colophony was supplied in larger crystals with an edge length around 10 mm. To approach the comminution process correctly, it was first necessary to understand how the adhesive character of a fine rosin powder is created. The powder is strongly hygroscopic and attracts any moisture from the environment. In addition, any heat generated during the grinding process can directly cause strong sticking and prevent the formation of fine powder.



Colophony sample

Task

After the suitable ingredients, colophony and magnesium oxide, were selected, they should be processed in our Knife Mill PULVERISETTE 11 with the adapter for single-use grinding vessels to a homogeneous mixture. This sample would only be compressed in our planetary mill by the grinding balls, therefore we decided to use our Knife Mill PULVERISETTE 11.



Knife Mill PULVERISETTE 11

First test milling

We used our Knife Mill PULVERISETTE 11 with the adapter for single-use grinding bowls. By using the Single-Use grinding bowls, the complicated cleaning process could be avoided. We programmed a SOP with short grinding times of 3s and 1s pause time. After 5 repetitions of these grinding steps, the entire 40 ml of rosin crystals had been ground into very fine powder.

Next, we added magnesium oxide and briefly ground the two powders to a homogeneous mixture. Our accounting manager tested it. He gave our lab manager the change that it needed to stick even more.



Sample in 40 ml single-use grinding vessel in our Knife Mill PULVERISETTE 11

Conducting further grinding tests

Our accounting manager tested it in training and he thought that it should stick even more. Therefore, several grinding tests were carried out by changing the ratio of rosin to magnesium oxide, thus obtaining several powders. We found that a short grinding time and maximum speed were much more effective than a long grinding time and small speed. These powders were also tested in discus training and the required adjustments were reported to our laboratory manager.



Colophony after a comminution of 15 seconds

Last test

For our last comminution, our accounting manager selected his favorite blend. To prepare a larger quantity of 400 ml, we used a 100 ml single-use container. We programmed an SOP with three seconds of grinding time each at maximum speed (14,000 rpm) and one second of pause time. We filled the container a total of 5 times. Here the sticking was minimal and the sample could be completely brushed out.



100 ml vessel with approx. 40 g sample mixture



In conclusion

We recommend our Knife Mill PULVERISETTE 11 for grinding for the lowest possible cleaning effort.

The result

The mixture caused the perfect grip in the hand. At the German Senior Winter Throwing Championships, the powder was then used and our colleague won his first German championship title.

Author: Leos Benes, B.Sc.Pharm. Technology • Global Laboratory Manager,
E-Mail: benes@fritsch.de