

## Large-scale spore extraction unit (MycoHarvester Mk 3)

MycoHarvesters are a range of devices designed to harvest fungal spores safely and efficiently from solid substrates (e.g. grains such as rice, inoculated with beneficial microbial agents such as *Metarhizium* and *Trichoderma*). We have the capacity to install large (pilot plant / commercial) scale units (the MH 3), which consist of 2 sections:

- a. an agitator for the substrate: usually a rotating drum construction;
- b. the spore extractor unit: consisting 4 or more stainless steel "cyclones" linked to a compatible fan which draws air through the equipment and (usually) vents to the outside of the building via standard 100-110 mm pipes.

The **standard construction** consists of a 4 cyclone configuration. The Unit is best installed along an external wall and requires a "working space" depth of approximately 3 m. Substrate agitators used to date have occupied a space 3 m wide, coupled to the cyclones ( $\approx 1.5$  m) and an air extraction system taking up another 0.5 m. Allowing for working space, approximately 6 M of wall is usually sufficient.



**Process:** The substrate agitator is a continuous process. The advantage of having 4 (or more) cyclones is that they can be shut off individually for removal of conidia, without shutting down the rest of the process.

**Power requirements:** Units constructed to date have used 3 phase motors: one for the substrate agitator and one for the fan. The use of single-phase motors is possible but inefficient; alternatively, a belt drive system from a powered drive shaft is feasible.

**Processing:** A standard unit has been shown to be able to process conidiated grain substrate at least 1/2 tonne/day. Although not usually automated, the Mk 3 is easy to use: and as with the laboratory models (e.g. MH5), clients have been astonished by the improvement in comparison with conventional (sieving) methods.

MycoHarvesters aid the drying processes in that they concentrate the spore product, thus the bulky substrate need not be dried. In one tropical country installation, the

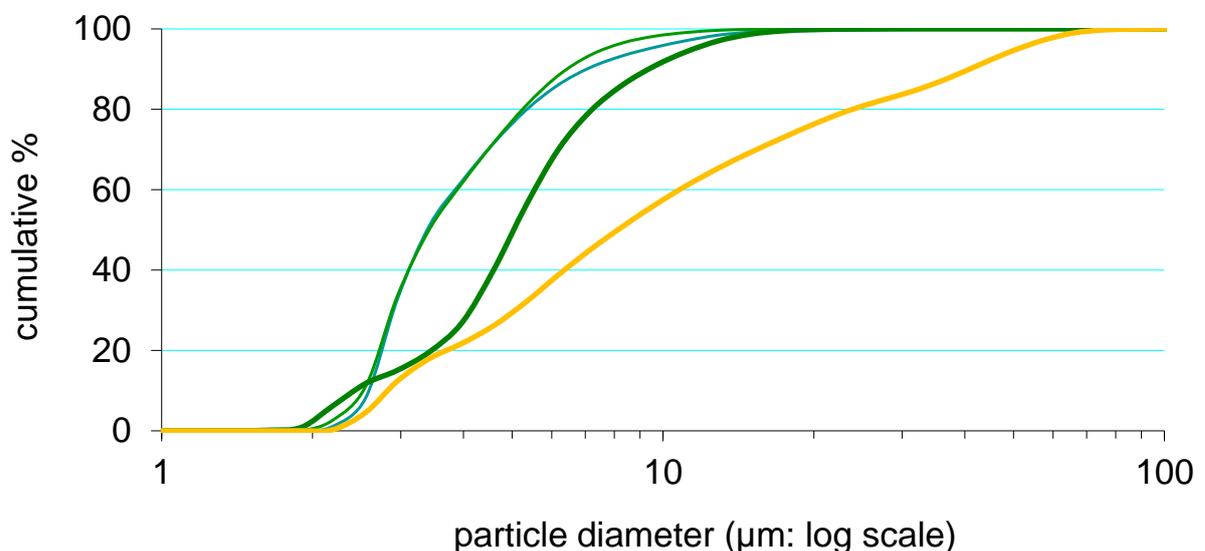
moisture content of the harvested conidia was 40%, but the process would benefit from drying the substrate surface down to <25%.

**Safety:** One of the major advantages of this system is that spore extraction is under negative pressure, vented to the outside of the building via standard pipes (100-110 mm waste pipes have been successfully used for this purpose). Nevertheless, normal safety procedures must apply, with workers wearing 1 µm pore dust masks; however, this is an additional safety precaution and the process is not dusty.

### Particle size specifications

MH 3 units have been shown to separate conidial preparations of *Metarhizium anisopliae* that are equivalent to the MycoHarvester Mk I and substantially better than other processes. This is illustrated in the following diagram:

### MycoHarvester Extractions of *Metarhizium* isolates



— M. acridum (MH 3)      — M. acridum (MH 5)  
— M. anisopliae (MH 3)      — M. acridum: 106 µm sieve

MycoHarvesters are products from an ongoing research and development programme, and are normally designed to collect particles in an optimum range of approximately 3-10 µm. If you are interested in collecting particles in other size ranges, please contact us to discuss details.

**Estimated costs:** for supply and installation of complete units are typically between £35,000 - £50,000, depending on the configuration and freight costs. A site visit is usually necessary, prior to commencing work, in order to assess factory layout and custom build for specific processes. If required, the cyclone and fan units can be supplied separately for approximately £21,500 (without site visit, depending on specific requirements).

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