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BEAD MILLS IN PHARMACEUTICAL AND BIOTECHNOLOGY PRODUCTION

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Abstract: The cells of mycelial fungi, yeast, unicellular algae and bacteria contain valuable components, for example, proteins, polysaccharides, lipids, enzymes, biodegradable polymers, vitamins, amino acids, and also produce the substances with therapeutic properties. The method of disruption of cells of microorganisms in the bead mills is used mainly for mycelial fungi, yeast and certain types of unicellular algae, with the aim of their further separation into liquid and solid phases and extraction of valuable components.

The bead mill consists of the following main parts: working chamber; working elements; working bodies (beads); bead separator; cooling jacket of the working chamber; suspension circulation system; suspension cooling system; drive of working elements; drive of the bead separator; frame; fixing device of the working chamber.

The orientation of the working chamber – vertical, horizontal and conical affects its functionality and slightly affects productivity.

The working elements of bead mills are discs, fingers or turbines. Disc working elements can have a flat surface or grooves (gaps) – blind and through, straight and complex, usually spiral-shaped. The main purpose of the grooves is to create intensive circulation of beads in the working chamber of the mill. The rotational speed of the working elements of the bead mill is usually 1000–2500 rpm.

The diameter of beads for disruption of the microbial cells is usually 0.4–0.6 mm; the turbine-type working elements allows the use of a smaller bead size. The slot, cartridge and centrifugal separators can be used for separation the processed suspension of microorganisms from the beads. Most often, a combination of a cartridge and centrifugal separator is used.

Keywords: *beads, cell, destruction, microorganism, mill, structure.*