narrow as possible is desired to provide a product as uniform and homogenous as possible; further, high molar masses are favorable due to the fact that during PHA processing, e.g., by melt extrusion or injection molding, significant losses of molar mass are commonly observed, thus negatively impacting the material quality [32].

Furthermore, in the case of such substrates that reveal growth-inhibiting effects on the cells already at low concentration levels, it is challenging to obtain high productivity in discontinuous systems. Such substrates, typically fatty acids, are especially needed for *mcl*-PHA production by bacteria from the pseudomonad group [33–38]. As detailed later, continuous cultivation strategies provide a solution for this problem.

It is known that continuous cultivation regimes in chemostats (short for "chemical environment is static") can guarantee growth of microorganisms under defined nutrient limitations for extended time periods, and, a long-term genetic stability of the organism provided, can result in both high productivities and constant product quality. As soon as steady-state conditions are reached, the concentration of biomass, PHA and all substrates is kept constant under such chemostat regimes [38–40]. Harvest of biomass that harbors a desired PHA-mass fraction also occurs continuously in chemostat regimes, which constitutes another considerable advantage to batch-processes. This can be visualized by the manageable quantities of PHA-rich biomass that permanently accrue for subsequent product recovery; these quantities can conveniently be processed in rather small facilities. This is in clear contrast to the enormous lot of PHA-rich biomass that accrues for one moment to the other after harvest of a batch, which requires large facilities for product recovery.

As pivotal process-engineering parameters of continuous processes, dilution rate D and residence time τ need to be explained. D (1/h) describes the quotient of the flow rate F (L/h) and the bioreactor's volume V (L), whereas τ (h) is calculated as the inverse number of D, or as the quotient of V and F, respectively [38–40].

Apart from enhanced productivity and product quality (composition, molar mass and PDI of PHA), chemostat processes are also suitable to elucidate the physiological background of bioprocesses; kinetics of cell growth and PHA formation under constant environmental conditions, and the impact of changing conditions on the kinetics and on product properties, can conveniently be investigated [39]. This way, the optimization of nutritional media composition can easily be accomplished in chemostat processes by changing concentrations of single nutrients in the feed stream during steady-state, and monitoring the resulting reaction of microbial kinetics (growth rate, product formation rate, yields) [41].

Table 2 summarizes the discussed benefits arising from continuous PHA production.

Table 2. Advantages of continuous PHA-production.

Criterion	Benefit	References
Investment costs for bioreactor	Due to higher volumetric productivity in continuous processes, (fed)batch cultivation requires large bioreactor facilities to generate the same output per time; continuous production contributes to lower investment costs by resorting to smaller operation facilities	[32]
Time demand	No "dead time" needed for pre- and post-treatment ("re-vamping") of bioreactor	[32]