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# Modelling ramp-up curves to reflect learning: improving capacity planning in secondary pharmaceutical production

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## Abstract

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empirically observed ramp-up curves to demonstrate its value as decision support tool. We demonstrate the superiority of our volume-dependent method over the traditional time-dependent ramp-up functions and derive managerial insights into the selection of ramp-up function and the value of shortening ramp-ups.

Keywords: ramp-up learning experience time- vs. volume-dependent empirically observed curves mixed-integer planning model

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