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JAL obtained is BSc in Chemical Engineer in 1997 and a PhD in Chemical Engineering in 2001. The academic professional career developed initially at the Faculty of Pharmacy of U.Porto and U.Lisbon. He created and consolidated a research group in the areas of process analytical technology and chemometrics having more than 80 scientific articles published. He participated and coordinated several IDT projects. He started the consulting company Worldmetrics Solutions in 2006 deploying solutions for efficient process and quality control directed to manufacturing companies from the agrofood to pharmaceutical sectors. He co-founded ANICT in 2010 and completed a mandate as President.

A bried overview on the assimilation of neural network based solutions by the (bio)pharmaceutical industry

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Resumo

Neural networks and structurally related mathematical models have gained much attention essentially in the 80s and 90s for modelling processes of different nature. Their ability to identify non-linear relationships among data of virtually any nature (empirical approaches) and flexible utilization (prediction, classification, clustering, filtering) was the major driving force for the growing implementation of these modelling systems over the mentioned period. More specifically, their implementation to assist the modelling of pharmaceutical manufacturing processes, was not an exception with many applications being proposed essentially regarding the manufacturing of active ingredients (primary industry) either by chemical synthesis of bioprocessing and production of biopharmaceuticals. The ability to capture the underlying non-linear relations between CPPs and CQAs in these processes was the objective. In many situations, first principle models described by energy and mass balances coupled to kinetic equations were replaced by these empirical models with reported substantial advantages. Despite the possibility of integrating recursive elements in neural network models to better adjust to non-stationary process states, this was not fully explored in general reported applications. Moreover, as the chemometric word started to spread, including in its palette empirical models based on latent variables, these gained a lot of importance and in many situations became the primary tool to be used when an empirical approach was the goal. This communication focuses of this recent history of the use of neural networks for different purposes to model and to assist pharmaceutical manufacturing processes. Strengths and weaknesses of these systems help to explain the perceived spreading of their utilization in the (bio)pharma sector and allows a forecasting of their expected importance in the forthcoming years .