

# DESIGN, FORMULATION AND EVALUATION OF PIROXICAM TABLETS USING ARTIFICIAL NEURAL NETWORK

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## ABSTRACT

In the realm of pharmaceuticals, artificial intelligence (AI) denotes the application of automated algorithms to tasks traditionally associated with human cognitive abilities. An artificial neural network (ANN) serves as a simulation of the human brain, aiming to replicate both the structure and functionality of genuine neurons. Oral disintegrating tablets (ODTs), which can dissolve on the tongue in three minutes or less, are an unusual dosage form, particularly concerning the elderly and young patients. Formulation studies of ODTs face challenges, as they often depend on conventional laboratory trial-and-error methods and the expertise of pharmaceutical professionals. Unfortunately, this approach proves inefficient and time-consuming. The primary focus of the present research was to create an artificial neural network (ANN) prediction model tailored for ODT formulations employing the wet granulation technique. A literature review was carried out by collecting 307 formulation data set to train the data. For the ODT formulation, the ANN predicted and practically obtained values were compared. Formulations were subjected to pre-compression and post-compression parameters due to oral disintegration; the focus was on assessment of disintegration period and rate of *in vitro* dissolution. Notably, in the case of the PF7 formulation, the predicted disintegration time was precisely 48.476 seconds, closely aligning with the obtained result of 45.1 seconds. Additionally, the *in vitro* dissolution rate was accurately predicted at 92.34%, with the actual result being 93.74%. Besides, this dissolution rate stands out as the highest among all the formulations examined. Experimental data revealed, the almost identical estimate for ODT formulations compared to the ANN prediction. The application of this prediction model could efficiently reduce the time and cost required to produce a pharmaceutical and consequently facilitate the advancement of a potent drug product.