



**A PHYSICAL - MATHEMATICAL MODEL DESCRIBING THE PROCESS BEHAVIOUR OF PLANETARY
ROLLER EXTRUDERS**

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The planetary roller extruder was developed over 40 years ago for the compounding of PVC. It excels itself with very good mixing effects coexistent with an exact temperature control. Therefore it has established in plastic processing for the compounding of shear- and temperature sensitive materials like PVC or Wood Plastic Composites. Beyond that this extruder is used in the chemical, pharmaceutical and food industry. Even though this machine is well established in polymer industry no valid model to estimate the process behaviour has been published so far. Within the investigations presented here, we developed a first physical-mathematical model to estimate the process behaviour of planetary roller extruders. The basic approach is to model each section of the extruder separately and to couple the model afterwards. The model predictions were compared to experimental data. Regarding the necessary simplifications made during modelling, the model shows good agreement with the experiments. So far the models developed are only valid for melt fed extruders. Further work is planned to investigate melting and to improve the current model.