

**OPTIMIZATION OF CONTROL SYSTEM ON DUCK EGG INCUBATOR AT UD
PUTRA JEMBER USING PI (PROPORTIONAL-INTEGRAL) METHOD**

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ABSTRACT

Duck farming in Indonesia holds great potential for fulfilling the community's protein needs through the production of meat and eggs. The high demand for duck meat and eggs opens up opportunities for local businesses, including UD Putra Jember, located in Mujomulyo Village, Puger District, East Java. However, egg hatching productivity has faced several challenges due to the use of old incubators that still rely on manual systems, such as using membranes as temperature sensors and periodic replacement of incandescent bulbs for temperature control. Humidity control is conducted manually by spraying water at scheduled times using a manual sprayer. These inadequate control methods and tools can lead to non-ideal conditions inside the incubator, where sudden changes in temperature or ineffective humidity control can disrupt the hatching process. The application of control system methods with reliable and optimal Ziegler-Nichols tuning techniques and modern technologies such as microcontrollers and sensors can replace the previously less optimal manual methods. By employing methods including literature review, control system design, testing, and data analysis, optimizing the system in the duck egg incubator using the PI method can support productivity in the egg hatching process

Keywords: *Egg incubator, PI control system, Ziegler-Nichols, Microcontroller*