SCADA Application to the Malaxer for Obtaining High-Quality Extra Virgin Olive Oils

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**Abstract.** The supervisory control and data acquisition systems (SCADA) for industrial plants represent self-governing systems, based on the closed-loop concept, used to provide interactions among the devices involved. In the last years, particular attention was paid to the presence of oxygen during malaxation in the Extra Virgin Olive Oil extraction process and its influence on the healthy and organoleptic quality of the product. An innovative machine equipped with a SCADA system for oxygen monitoring and control during the process was realized by the authors. The system was designed to perform a periodic sampling of the atmosphere inside the malaxation machine and to return a reliable measurement of the oxygen concentration in the sample. The measurement cycle was demanded to the main control loop of the PLC, which extracts a gas sample from the headspace of the malaxation machine by means of a micropump and conveys it through a closed-loop pipe to the oxygen sensor. The oxygen measurements were performed every 30 s, and the data collected during malaxation process were displayed in real time on the standard human–machine interface (HMI) constituted by an OMRON 5.7” display. Experimental tests were performed on Nocellara del Belice and Cerasuola olive cultivar comparing unmodified malaxation to modified malaxation managed by the SCADA system. Modified malaxation was obtained by filling nitrogen before the olive paste entry, and then introducing oxygen at 20 min from the beginning of the process. Analytical determinations were performed on the EVOOs to obtain the main quality parameters. The SCADA system application in the EVOO extraction process produced a qualitative improvement of the Nocellara del Belice and Cerasuola olive oils.