Oxidation reactions occurring on food surface are one of the main causes of deterioration of fresh and processed food products. Packaging is one of the most important tools to protect foodstuffs from these oxidative processes. This work aims at developing innovative films by coating a polymer surface activated by plasma with a layer-by-layer structure made of chitosan and tannin extract from Galla chinensis (GT). Experiments were performed using three different polymeric films, which were coated with GT solutions at different concentrations (1, 3 and 5%). Oxygen transmission rate (OTR), thermal behaviour, antioxidant activity (DPPH) and total phenolic content (TPC) of active films were evaluated. The OTR values were reduced to one third compared to untreated films. The m-ATR spectra of the active films suggest that some interactions occurred between chitosan and the tannin extract. The new films added of tannin extract (TPC values between 0.5 and 5.4 mg GAE/dm² of film) showed a radical scavenging activity with values ranged between 10.5 and 55.8 μmol TE/dm² of film.

The obtained results suggest that the active films produced could be exploited for developing active packaging suitable in the food industry to extend the shelf life of foodstuffs.