EFFECTS OF LOW INTENSITY PULSED ELECTRIC FIELDS IN TECHNO-FUNCTIONAL PROPERTIES OF CHICKPEA (Cicer arietinum L) FLOUR

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Chickpea is a legume recognized for its high nutritional value whit a protein content around 19 – 22g/100g (d.b.), being constituted by globulins, albumins and glutenins. These proteins are characterized by having good techno-functional properties such as water (WAC) and oil (OAC) absorption capacity, emulsifying, foaming and gelling. Therefore, chickpeas represent a potential source for the development of high-protein ingredients. Depending on treatment conditions, protein techno-functional properties could be improved. Recently, pulsed electric fields (PEF) habe been applied to enhance protein techno-functionality of different sources of plant-protein concentrates and isolates, such as soybean, mung bean, peas, rice, and gluten, among others, with interesting results. The aim of this research was to evaluate the effects of moderate intensity PEF (E: 1, 2, 3 kV/cm during 750, 2250 and 3300 µs) on techno-functional properties (WAC, OAC, emulsifying, foaming and gelling) of chickpea flour. PEF processes were performed in an EPULSUS®-LPM1A-10-System using mono-polar square wave pulses at 20 Hz. 100 g of soaked chickpeas (15 h) suspended in 300 ml of water were treated in triplicate in a parallel chamber with stainless steel electrodes. PEF-treated chickpeas were subsequently dried, obtaining a drying curve for each sample. Dried samples were grounded to obtain the flour, which was subsequently analyzed, having flour from untreated chickpeas as reference. Results indicated that drying time of PEF-treated chickpeas significantly decreased regarding the untreated sample. Likewise, flour from chickpeas treated at 1 kV/cm showed greater WAC (1.93, 1.93, 2.07g/g during 750, 2250 and 300 µs, respectively) and similar OAC (0.92, 0.93, 0.89g/g during 750, 2250 and 300 µs, respectively) than the control chickpea flour (WAC:1.44g/g and OAC:0.82g/g). PEF process at different E and treatment time caused a decrease in the foaming capacity (27 – 35%) of chickpea flours regarding to the control (43%), while emulsifying capacity did not present significant differences. Likewise, flour from PEF-treated chickpea (1 kV/cm, 220 µs) showed the greatest gelling capacity. PEF treatment at low intensity (1 kV/cm) represents a potential alternative to improve some techno-functional properties, such as WAC, OAC and gelling, of chickpea flour that could be used to develop high-protein ingredients.