Peripheral nerve injury is a debilitating clinical condition that affects both motor and sensitive functions diminishing the patient’s quality of life. Current treatments for nerve defects are nerve grafts. A promising alternative to conventional grafting is the use of artificial nerve grafts produced by nanotechnology for tissue engineering proposals. Biomaterials that are biodegradable and biocompatible, such as poly(lactic-co-glycolic acid) PLGA, are extensively used in nerve tissue engineering. In this study, a PLGA conduit of aligned nanofibers was produced by the electrospinning method and its physical-chemical properties were characterized. The aligned fibers were produced by electrospinning an 18% PLGA solution in THF and DMF (7:3) and collecting the fibers on a rotating mandrel to achieve alignment. The applied voltage was 20 kV, the feeding rate of the pump 2 ml/h, the distance between the spinneret tip and the collector was 15 cm, air humidity 45% and a temperature of 22°C. The rotating speed of the rotor was 3000 RPM and the time of collection was 1 hour. To avoid shrinkage of the conduit due to fiber relaxation, the PLGA scaffolds were fixed at the borders and incubated at 37°C for 24 hours. The nerve conduits were made by rolling 1cm² pieces of scaffold on a 0.8 mm diameter needle and fixing the end with an 18% PLGA solution. Their properties were analyzed by scanning electron microscopy (SEM) and contact angle measurements. The SEM images show that the scaffolds presented uniform aligned fibers. The two groups, PLGA none treatment and PLGA 37°C 24h showed similar average fiber diameters of 0.90µm ± 0.366 and 0.88 ± 0.33, respectively. The PLGA none treatment group showed a fiber alignment coefficient of 0.87, a 0.054± 0.0049mm thickness and a contact angle of 107.3° ± 0.33. The PLGA fibers group incubated at 37°C had a fiber alignment coefficient of 0.72, a thickness of 0.045 ± 0.005 and a contact angle of 112.5° ± 0.12. The conduits were also incubated at 37°C in cell culture media. The result was a shrinkage from 1 cm length and 0.8 mm internal diameter to 0.7 cm length and 0.8 mm internal diameter for the 37°C treated group and 0.7 mm length and 0.5 mm internal length for the cell culture media treated group. It is considered that these nerve conduits may be a promising substitute for autologous nerve grafts.