The aim of this work was to study the continuous beer fermentation with brewing yeast immobilized on spent grains (main brewing by-product). The used worts had original gravities of 11,3°P and 7,5°P (obtained by diluting the 11,3°P wort with distilled water) and the employed yeast was an industrial strain of Saccharomyces cerevisiae (lager type). The experiment was carried out at 15°C in an internal-loop airlift reactor with a total working volume of 3,7 L. Results showed that the optimum fermentation performance of the immobilized cell bioreactor was achieved at a residence time of 25 h (dilution rate 0,04 h⁻¹) with the 11,3°P wort, and was characterized by a beer with an apparent extract and ethanol concentration of 2,56°P and 4,62% v/v, respectively. Microscopic observations revealed that the yeast adhesion to the surface of the plain sheet-like carrier particles occurred in multiple layers and resulted in a maximum cell load of 0,37 g dry cell/g dry carrier.