Antimicrobial peptides (AMP) have a great potential in medicine and pharmacy. Mechanism of their impact is an interaction with a cell membrane leading to the penetration of the membrane. The way of disruption of the cell membrane is not completely understand, therefore we focused on the interaction of AMP HAL-1, isolated from the venom of the bee Halictus sexctinctus, with a model membrane of 100 nm liposomes consisting of phosphatidylcholin and phosphatidylglycerol. Circular dichroism and infrared spectroscopy (FTIR) proved the change of the secondary structure from the random coil of free HAL-1 to -helix in an interaction with the membrane. The next step was preparation of the lipid bilayer on the surface of ATR prism, which will enable usage of the polarized FTIR spectroscopy to study the interaction of AMP with model membranes in future. Therefore, the ATR-FTIR spectroscopy and factor analyses were applied to study dynamics of drying of the liposomes and their subsequent hydration also with an addition of HAL-1. We focused on the stabilization of the system. Hydratation of the lipid bilayer by 2 μl sample showed stability for minutes, nevertheless after dilution the stabilization decay in minutes. The protective influence of the peptide on the lipid bilayer and slowing down of the drying out of the system was observed. This could be caused by origin of the carpet-like structure on the surface. Nevertheless, the system is not completely stable and oscilates between dehydration/hydratation. However, the stabilization is enough for a polarized measurements