In this study caprine skin was acellularized, and biocompatibility was evaluated on clinical abdominal hernias in buffaloes. Fresh skin was de-epithelialized with different concentrations of NaCl/trypsin over a range of periods. Further, de-epithelialized skin was acellularized with different concentrations of sodium dodecyl sulfate (SDS) over a range of periods. Acellularization completeness was confirmed histologically. Prepared caprine acellular dermal matrix (CADM) was further characterized by Masson’s trichrome and Weigert staining, scanning electron microscopy (SEM), DNA quantification, and Fourier transform infrared (FTIR) spectroscopy. Twenty Jaffarabadi buffaloes with abdominal hernias were assigned into two equal groups: implanted with CADM (I) and polypropylene mesh (PPM, II).

Clinical, hematological, biochemical and antioxidants evaluation was carried to assess healing progress. Histologically, skin treated with 0.25 % trypsin/4 M NaCl combination for 8 h resulted in complete de-epithelialization. Further treatment with 2 % SDS for 48 h demonstrated complete acellularity and orderly arranged collagen fibers. SEM examination confirmed preservation of collagen fibrils arrangement within CADM. Decrease in DNA content was significant ($P < 0.05$) in CADM (46.20 ± 7.94 ng/mg of tissue) as compared to fresh skin (662.56 ± 156.11 ng/mg of tissue). FTIR spectra of native skin with peaks at 1236.41, 1546.96, 1657.87, 2936.72, 3288.74 cm$^{-1}$; de-epithelialized skin at 1238.34, 1530.57, 1658.84, 2953.12, 3306.10 cm$^{-1}$; and CADM at 1238.34, 1530.57, 1658.84, 2953.12, 3306.10 cm$^{-1}$ were similar to that of amide bonds of L-hydroxyproline of collagen. Animals with CADM implant recovered uneventfully and remain sound, whereas, surgical site infection, dehiscence, mesh infection (5 animals), and even death (one animal) were observed in animals with PPM implant. Hematological, biochemical, circulating antioxidants evaluation too revealed uncomplicated healing of abdominal hernias with CADM implant. Results presented in this study proved biocompatibility of caprine acellular dermal matrix for abdominal hernioplasty in buffaloes.