DEFINITION OF MINIMUM REPRESENTATIVE AREA FOR SONOGRAPHIC BOVINE CORPUS LUTEUM IMAGE ANALYSIS

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Ultrasonography is a safe and non-invasive technique, of simple execution and with immediate results, which allows the study of internal organs by the generation of bi- or tri-dimension images corresponding to slices or surfaces of the structure under evaluation. The use of ultrasound gave a significant boost in the study of reproductive function, both in human and animal medicine, mainly in fields such as antral follicular dynamics, ovulation, luteal function and early pregnancy. However, almost all studies with ultrasound evaluation are limited to the identification and measurement of internal structures, and only recently differences in echo-texture (one of the ultrasound functioning principles) started being used as evaluation parameter. For corpora lutea, echo-texture differences reflect variations in vascularization and luteal cells proportion and, consequently, in steroidogenic capacity, but there is still no standard methodology for its analysis. The aim of the present study was to establish the minimum representative area (MRA) for luteal echo-texture analysis. Sonographic corpora lutea images were obtained from animals in the 10th day of estrous cycle, using a portable ultrasound device (Aloka SSD 500, Aloka Co.) equipped with a linear rectal 5MHz probe. Images were recorded in videotape and digitalized in .TIFF format, at a resolution of 1500x1125, by a video capture board (Pinnacle DC10, Pinnacle Systems). Using a specific software, 10 delimitated and decreasing areas were analyzed to density, with each image dot (pixel) receiving a numeric value ranging from 0 (black) to 255 (white). The criteria proposed by Van den Bygaart & Protz (1999) was applied, being defined as MRA the area in which the parameter value (echogenicity) did not change more than ±5% from the large (original) area. Analysis began with an area of 10x10mm (10.404 pixels, A1), being reduced to 7.5x7.5 (5.929 pixels, A2), 5x5 (2.704 pixels, A3), 2.5x2.5 (729 pixels, A4) and 1.25x1.25mm (187 pixels, A5). The mean echo-texture value for corpora lutea of cows in the 10th day of estrous cycle was 76.67±16.06. The absolute mean variation in echo-texture from the first measure (A1) was 2.83% for A2, 4.25% for A3, 8.58% for A4 and 13.44% for A5. There was no trend to a positive or negative variation among animals. Based on these results, MRA was determined as $25mm^2$, equivalent to 2.704 pixels, for luteal tissue analysis. This area, however, shall be re-estimated when different probes or frequencies are used, or when capture format changes.