Purpose: To evaluate the dose response of EBT2 films in regions of low dose using the decomposition of the image's color channels (RGB, Red, Green and Blue).

Methods: Doses ranging from 1 Gy to 60 Gy were used to calibrate the dose response of Gafchromic® EBT2 films irradiated in 6MV photons beams. Segments of film with dimensions of 8.5 cm x 8.5 cm were used. Another segment of film with dimensions 8.5 cm x 20.25 cm was also irradiated with a maximum dose of 4 Gy to determine the percentage depth dose (PDD). The films were digitized by a LaserJet M1132 MFP - HP® scanner in standard resolution of 150 dpi and analyzed by a routine created in MatLab to convert the image to gray levels as well as assess the desired color components from the image.

Results: The green component presented the higher sensitivity (17.8 a.u./Gy) when the separated color channels and the shades of gray analysis are compared. The red component presented the highest signal to noise ratio in the low dose range (63% at 1 Gy). The blue component presented low sensitivity (0.66 a.u./Gy) in the entire dose range. A linear fitting (r=0.998) was used to the green and gray components until a dose of 4 Gy. The red component presented a non-linear behavior in the entire dose range. The useful dose range found was from 1 Gy to 15 Gy. The maximum differences between the reference PDD, measured with ionization chamber in a water phantom, and the PDDs determined with film were 6%, 9% and 14% for the green, gray and red components, respectively.

Conclusions: This work results show that the use of radiochromic films on planning verification procedures in low dose ranges can be benefit from the analysis of the image's separated color components.