Artificial food colourings and additives (AFCAs) have long been suggested to adversely affect the learning and behaviour in children. In this study, we aimed to provide additional data to clarify the possible side effects of colouring additives on behaviour and memory. We administered acceptable daily intake values of AFCAs as a mixture (Eritrosin, Ponceau 4R, Allura Red AC, Sunset Yellow FCF, Tartrazin, Amaranth, Brilliant Blue, Azorubin and Indigotin) to female rats before and during gestation and then tested their effects on behaviour and on spatial working memory in their offspring. Effects on spatial learning and memory were evaluated by Morris water maze, behavioural effects were evaluated by open-field test and forced swim test. Our results showed that commonly used artificial food colourings have no adverse effects on spatial working memory and did not create a depressive behaviour in offspring. But they showed a few significant effects on locomotor activity as AFCAs increased some parameters of locomotor activity.