The study was conducted to evaluate the effect of dietary supplementation of protected fatty acids (FA) on nutrient digestibility, rumen parameters, some blood components, milk yield and its composition and lambs growth performance during the pre-weaning period (2 months old) of Suffolk x Ossimi ewes.Generally, it could be concluded that the supplementation of calcium salt of fatty acids at different levels (FA4 or FA6) for rations of Suffolk x Ossimi crossbred ewes improved digestibility, feeding values, increased lambs birth weight and milk yield and its composition beside better feed efficiency, with superiority of 6% level (FA6).The basal rations composed of 60% concentrate feed mixture (CFM) and 40% roughage (berseem 30% + rice straw 10%, RS).Three digestibility trials were carried out using nine Suffolk x Ossimi crossbred rams with average 62 kg BW and aged 2-2.5 years to determine the digestibility and feeding values of the experimental rations.Values of concentrations of blood plasma total protein and its fractions, glucose, total cholesterol, triglycerides and total lipids of experimental ewes were higher in for supplemented groups than that of control one in the two stages of the whole production cycle.