6. SUMMARY

Liver fluke (*Fasciola hepatica* and *Fasciola gigantica*) is considered as one of the most important helminth parasites which affect food producing animals particularly sheep, cattle and buffaloes, by greatly threatening their life and lowering their productivity. Among food producing animals sheep are considered as an important animal affected by these parasites which may lead to a high mortality percentage especially in the acute stage of the disease.

In the present study, we tried to induce a some sort of protection to sheep against fasciolosis (liver fluke disease) by immunizing them using adult fluke products. The protocol of immunization included the dividing of number of 6 sheep into 2 groups (3 individuals for each); the first group was left as a control infected non-immunized group and the other received immunization in the form of excretory/secretory products of the fluke contained in Freund´s adjuvant as a vehicle, then the 2 groups were compared under the same conditions. The resulted degree of immunization is then evaluated parasitologically by counting number of *Fasciola* egg disseminated in feces after immunization, counting of number of adult flukes found in liver after slaughtering and determining the amount of bile found in gall bladder in each slaughtered animal. These parasitological findings were supported by estimating some blood parameters as blood proteins (total proteins, serum albumin, serum globulines and A/G ratio) and serum enzymes of hepatic origin which reflect the picture of the liver **{**e.g. alanine amino transferase (ALT), aspartate amino tranferase (AST) and alkaline phosphatase (ALP)**}**. All these parameters were determined along the period of challenge of infection. Finally, all these results were

confirmed by the pathological findings (histopathology and gross lesions) in the livers of slaughtered sheep. All together were used to participate in the formation of certain score for vaccine used to protect sheep against fasciolosis.

The parasitological findings revealed that the mean values of counting of *Fasciola gigantica* eggs in feces/gram at 12-15 weeks post infection in experimentally infected sheep showed that the 12th week recorded **35.66 ± 4.81** in the control non-immunized group and **33.00 ± 2.65** in the E/S immunized one, the 13th week recorded **169.00 ± 42.52** in the control infected non-immunized group and **160.67 ± 20.51** in the immunized one, the 14th week which was the only week that showed a significant reduction (**at P < 0.05**) in the E/S immunized group (**312.33 ± 46.31**) compared with that of the control infected non-immunized one (**565.00 ± 74.47**) and this indicates the effect of immunization on the fecundity effect (egg production) and finally the 15th week recorded **184.00 ± 45.74** in the control infected non-immunized group and **179.00 ± 61.07** in the immunized one. Moreover, the mean value of parasite burden in control group was **34.33 ± 4.91** while in the E/S immunized group it was **15.67 ± 2.33** respectively, and this indicates the effect of immunization on fluke burden. Finally, the mean value of the amount of bile/ml was **15.33 ± 0.33** in the control infected non-immunized group, while it was **7.33 ± 1.85** in the E/S immunized one.

Serological findings revealed that level of antibodies in E/S immunized group, by using ELISA, was higher than that of control non-immunized one.

Moreover, clinicopathological findings of immunized group showed elevated level of ALT and AST but non-significant. Alkaline phosphatase changes were in the form of a significant increase only in the 4th and 5th weeks post infection. Also, protein expression of immunized group revealed a significant increase in total protein during the period of 6 – 9 weeks post infection, non-significant changes for albumin level. In contrast, the globulin level was significantly increased from the 3rd week till the 9th week post infection and finally albumin/globulin (A/G) ratio in this immunized group was constantly reduced during all the period of experiment due to elevation of globulin value as a reaction against the liver fluke.

Furthermore, histopathological lesions were characteristic to differentiate between both control non-immunized and E/S immunized groups; where the biliary changes were less obvious in E/S immunized group in the form of necrosis, trauma, cirrhosis, presence of newly formed bile ductules and even the presence of adult flukes in the biliary passage. Besides, the parenchymal status was indicative for the immunized group by its reduced intensity which was in the form of hepatic cells degeneration. Confirmely, the picture of the gall bladders was less damaged in the immunized group and this was appeared as lower form of mucosal hyperplasia, fibrosis, degeneration and necrosis.