6. CONCLUSION

The current scenario is need to develop plant based drugs for various ailments of human beings as well livestock instigated us to carry out this study which is a sincere attempt to disclose the anthelmintic effect and also the possible mode of action of AvEaE and PbEaE against Cotylophoron cotylophorum. The effect of AvEaE and PbEaE on the motility of C. cotylophorum clearly indicates the diverse mode of action of phytochemicals present in the plant extracts. Damage to mucopolysaccharide membrane by secondary metabolites viz. alkaloids, phenols, saponins, terpenoids present in A. vasica and P. betle may inhibit tubulin polymerization and increase calcium permeability. Increased permeability to calcium causes hyperpolarization of the tegumental membrane and led to tegumental damage and intestinal interruption. In addition, AvEaE and PbEaE persuaded–tegumental changes resulted in significant inhibition of phosphatases, decreased glucose uptake and glycogen exhaustion in C. cotylophorum. Inhibition of phosphatases rattled the nutrient uptake mechanism. Decrease in glucose and glycogen content implies the disruption of carbohydrate metabolism. Furthermore, both AvEaE and PbEaE hindered the energy metabolism of the parasites by inhibiting the PK, PEPCK, LDH, MDH and FR-SDH complex. Energy destitution results in the death of the parasites. Reduction of energy reserve might uncouple oxidative
phosphorylation, hinder ATP production and cause cessation of protein synthesis, which might prove fatal to the parasites.

Inhibition of AChE impaired the motility of the parasites leading to flaccid paralysis. Accumulation of toxic metabolites resulted with the inhibition of GST. Alterations in the trace elements had a devastating effect on the transport system and cellular metabolism of the flukes eventually leading to their paralysis. Thus, both AvEaE and PbEaE have multiple mode of action and are capable of causing a number of detrimental effects which altogether accounts for their effectiveness in combating the paramphistome, *C. ctylophorum*.

Phytochemical evaluation of *A. vasica* and *P. betle* showed that the plants bear the phytoconstituents which are responsible for the antiparasitic activity. *In vivo* studies entrenched the ameliorative role of PbEaE against paramphistome infection by promoting the health status of the host. *A. vasica* and *P. betle* are highly effective against paramphistomosis. The discovery and development of noval substances for helminth control is greatly needed and has promoted studies of traditionally used anthelmintic plants, which are generally considered to be very important source of bioactive substances. Hence *A. vasica* and *P. betle* could be used to treat paramphistomosis. This study paves the way for designing integrated solutions for the control of ruminal paramphistomosis.