Conclusion

The present study was carried out to demonstrate histochemically the presence and distribution of proteins, glycogen, lipids, cholinesterase, alkaline phosphatase, acid phosphatase and calcium in *Paramphistomum cervi* of sheep in comparison with *Cotylophoron cotylophorum* of cattle. From this study it can be concluded that there is no significant difference in the histochemical distribution of various biochemical substances in the tissues of two amphistomes under study. This may be due to the fact that both these amphistomes are present in the same habitat that is, rumen of the host. However differential histochemical distribution of various biochemical substances in different tissues of both the amphistomes showed considerable difference. Present study revealed that high concentration of proteins is present in those organs which are metabolically more active and are involved in synthetic activities. Moderate amount of protein in caecal lining and content may be expected from dietary origin. Since parenchyma of trematodes serves as a storage organ for energy reserves and trematodes mostly use glycogen as energy metabolite, this is the possible reason for intense reaction for glycogen in parenchyma of these trematodes. In the present study, it was observed that reproductive organs particularly vitellaria revealed intense reaction
Discussion

for glycogen. The reason is that trematodes produce enormous amount of eggs and these eggs should contain sufficient amount of reserve food for the development of the embryo. During the present study the most conspicuous sites for the presence of lipids were excretory ducts. Most of the authors are of the opinion that trematodes particularly adult ones are incapable of utilizing lipids as a source of energy and are end products of carbohydrate metabolism. However in the current study moderate reaction for lipids was observed in the tegument, caeca and reproductive organs. Thus it can be concluded that lipids are not exclusively the end products of carbohydrate metabolism but they play their role in various metabolically active tissues/organs.

Cholinesterase is regarded as molecular marker of nervous system and is cholinergic. During the present study cholinesterase was localized in musculature of body wall, suckers, digestive system and reproductive system of the amphistomes under study. Presence of cholinesterase in the musculature of these organs suggests its role in contractility.

Alkaline phosphatase is the enzyme functionally associated with membrane transport. Present study revealed the presence of alkaline phosphatase in suckers, tegument, parenchyma, caeca, vitellaria and reproductive organs and the possible reason for this is
that the alkaline phosphatase in the metabolically active organs is associated with the intense transport of carbohydrates constituting the major source of energy for these parasites.

Acid phosphatase has been generally detected in site where absorption, secretion and excretion occur and are postulated to be associated with these functions. The present study revealed presence of acid phosphatase in sufficient amount in suckers, tegumental cells, intestinal caeca, vitellaria, reproductive organs and parenchyma. Presence of acid phosphatase in tegument and caeca suggests it role in absorption and hydrolytic processes. In vitelline cells acid phosphatase plays role in secretion of secretory granules in vitelline cells.

During the present study moderate reaction was observed in suckers, tegument, caeca and vitellaria for calcium. Since these organs are associated with higher muscular activity and for the muscle contraction calcium ions play important role, this may be the reason for the presence of calcium in these organs.

Besides this, from the present study it can be concluded that in Paramphistomes the majority of nutrients are absorbed through gut but atleast some part of their nutritive requirement is meant by transtegumental absorption. The parenchyma of the paramphistomes showed positive reaction for most of the
biochemical constituents localized in the present study, from which it can be concluded that parenchyma in these trematodes is not merely a storage organ but it serves as a transport system in them.

As more and more facts are becoming known about the biochemistry and physiology of trematodes, ever increasing efforts are being made to develop the anthelmintics by rationale approach rather than experimental approach. This can only be achieved if we know more and more about the nature and properties of biochemical components and enzyme systems of the parasite as well as their host. It is hoped that the results of this study will prove to be useful as a positive contribution in the vast field of parasite biochemistry and physiology. This should also help others in carrying out more purposeful studies with ever increasing new ideas and techniques.