The use of selective inhibitors to estimation of cholinesterases activity of liver and muscle for food animals

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Cholinesterases (ChEs) are a pivotal enzyme in the cholinergic nervous system. Its primary function is to catalyze hydrolysis of released acetylcholine (ACh) and thus maintain homeostasis of this neurotransmitter in the central and peripheral nervous systems. Hence, AChE is important in both pharmacological and toxicological. Two types of ChEs activity have been identified in mammalian tissues; these are distinguished according to their sensitivity to the selective inhibitors. The first is acetylcholinesterase (AChE, EC.3.1.1.7), which is systematically called acetylcholine acetylhydrolase. The second is butyrylcholinesterase (BChE, EC.3.1.1.8). ChEs activities were determined using the Ellman (1961) method, adapted for a plate reader. The inhibitors BW284c51 and iso-OMPA (identified in mammalian studies as diagnostic inhibitors of AChE and BChE respectively). BW284c51 were strongly reduced ATCI and PTCI hydrolysis and slightly affected that of BTCI in liver, the inhibition ranges 94, 80, and 88% for ATCI, BTCI, and PTCI, respectively for liver and muscles. Iso-OMPA had no significant effect for muscle BTCI of sheep and pig, although inhibition in the liver was 75, 64, and 48% for ATCI, BTCI, and PTCI, respectively. Good correlation and significance were obtained in liver assayed with two specific inhibitors ($r > 0.84$; $P < 0.05$). Results from this study, indicate that BChE is the enzyme present predominantly in liver, whereas in both liver and muscle, the presence of atypical AChE. Furthermore, these findings designate that characterization of ChEs is necessary prior to use in monitoring programs. Since the main intention of this study is to investigate and compare the effect of different substrate on selective enzymes inhibition.