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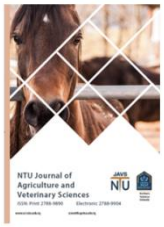

Natural Cholinesterase Activity in Some Local Animals: Review

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A B S T R A C T

Organophosphorus pesticides are common causes of poisoning due to their easy access to local markets, low price, lack of awareness about them, and misuse by the user, which exposes the environment surrounding animals and birds to poisoning by these pesticides. The current study aims to provide the normal values of cholinesterase enzyme in some field animals, whose activity was measured using a simple electrical method to measure blood samples (plasma and red blood cells) of animals. References related to the normal activities of cholinesterase enzyme in a number of animals were cited, including (cows, sheep, buffalo, goats, dogs, and cats), and cholinesterase enzyme activity (ChE) was measured using the electrical measurement method. The electrical measurement method was effective, simple, accurate, and reproducible to detect exposure of animals in the natural environment to organophosphate pesticides or carbamates as an indicator of environmental pollution.

Introduction

Compounds such as carbamates and organophosphorus are used as pesticides in public health, farming, and veterinary medicine [1]. to control zoonotic diseases and treat internal and external parasites [2,3]. The misuse of carbamates and organophosphorus can lead to environmental contamination and toxicity through exposure [4,5,6,7,8]. Intoxication occurs through inhibition (ChE) activity activity an enzyme essential for normal nervous system function, and prolonged exposure to it can lead to neurological issues and reproductive disorders caused by causing accumulation of acetylcholine (Ach) in nerve terminals, leading to eventual death with nicotine-, muscarinic-, and central nervous system-related intoxication [9, 10]. Assessing blood ChE activity can help detect influences by organophosphorus and carbamate pesticides At the beginning of poisoning exposure. A 25-30% decrease in cholinesterase activity in exposure to organophosphorus or carbamate pesticides is the first step to poisoning. Cholinesterase activity reduced by 25-30%Red blood cells or plasma indicates exposure to this toxicant [1, 6]. A number of methods appear to detect cholinesterase activity, such as the Ellman method [10]. Michel method [11] and improved electrometric measurement method [12]. The latter method is inexpensive, measures more samples in less time, is simple, and requires many tools such as a water bath and pH meter This study aims to present the results of a modified electrometry method obtained by researchers at the University of Mosul by measuring "cholinesterase activity in red blood cells and plasma" of various animals. How about conducting the same study or using animal samples to detect environmental contamination by pesticides, comparing the data with informed researchers to detect exposure or poisoning from these pesticides. These values are a starting point for future research using the values described here.

RESULTS

Table (1) shows the normal value in plasma and erythrocyte cholinesterase activity in a number of local animal species.

Table 1. Normal cholinesterase activity in local animals

Species	Sex	Cholinesterase	ΔpH	Base material	Incubation time/ mints	Reference
Cattle	Male	plasma	0.10	Acetylcholine iodide	20	[13,14]
		erythrocytes	0.91			
	Female	plasma	0.19	Acetylcholine iodide		
		erythrocytes	0.86			
Goats	Male	plasma	0.22	Acetylcholine iodide	40	[15,16]
		erythrocytes	0.54			
	Female	plasma	0.22	Acetylcholine iodide		
		erythrocytes	0.44			
Sheep	Male	plasma	0.21	Acetylcholine iodide	30	[17,18,19]
		erythrocytes	0.63			
	Female	plasma	0.19	Acetylcholine iodide		
		erythrocytes	0.62			
Cats	Male	Plasma	0.37	Acetylcholine iodide	30	[20]
		Erythrocytes	0.63			
Dogs	Male	Plasma	0.81	Acetylcholine iodide	30	[21]
		Erythrocytes	0.67			
Buffalo	Female	Plasma	0.075	Acetylcholine iodide	40	[22]
		Erythrocytes	0.46			
Rats	Male	Plasma	0.29	Acetylcholine iodide	30	[23]
		Erythrocytes	0.29			
Rabbits	Male	Erythrocytes	0.45	Acetylcholine iodide	30	[24]
Chickens	Mixed breed	Plasma	0.49	Acetylcholine iodide	30	[25]
Rock dove	Female	Plasma	1.28	Acetylthiocholine iodide	30	[26]
Sand grouse	Male	Plasma	1.81	Acetylthiocholine iodide	30	[27]
Quail	Female	Plasma	1.23	Acetylthiocholine iodide	30	[28]
Starling	Male	Plasma	1.10	Acetylthiocholine iodide	30	[29]
Local Doves	Mixed	Plasma	1.04	Acetylcholine iodide	30	[30]

shows the normal blood (plasma, erythrocyte) cholinesterase activity values of different local animal species.

Conclusion

Electrometric methods may be a practical and simple method for detecting ChE in the blood tissue of animals exposed directly or indirectly to phosphorus and carbamate pesticides. This method has proven its ability to bio-assess the environmental contamination of local animals with anti-cholinesterase pesticides.

References. All references must follow the example format at the end of this document, and the reference list must include all cited literature.

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