



## Effect of Tin oxide and Nickel hydroxycarbonate on liver function enzymes sgot and sgpt in *Channa punctatus* (Bloch.)

Vishan Kumar<sup>1\*</sup>, Manish Maheshwari<sup>2</sup>, Surbhi Mittal<sup>3</sup>

<sup>1</sup> Department of Zoology, N. R. E. C. College Khurja, Bulandshahr, Ch. Charan Singh University, Meerut, Uttar Pradesh, India

<sup>2</sup> Department of Zoology, D. S. College, Aligarh, Raja Mahendra Pratap University, Aligarh, Uttar Pradesh, India

<sup>3</sup> Department of Zoology, Kisan P. G. College, Simbhaoli Hapur, Ch. Charan Singh University, Meerut, Uttar Pradesh, India

### Abstract

Khurja is an important industrial and commercial town in Uttar Pradesh's Bulundshahr region. Pottery and agriculture account for nearly half of Khurja's employment and livelihood. The pottery business directly employs approximately 25,000 people, with an additional 5000-7000 people involved in different support services and linked activities. Trade and commerce, as well as a limited amount of other manufacturing, are other sources of employment in Khurja. Lead leaking into food and drink from ceramics heated with lead glazes is a serious hazard. The Food and Drug Administration (FDA) of the United States and the Canadian Consumer and Corporate Affairs have both set limits on how much lead may leak from food ware into food and drink. Acidic solutions are very dangerous. Keeping these points in view, the present study is undertaken to assess impact of tin oxide and nickel hydroxycarbonate in *Channa punctatus* (Bloch.).

**Keywords:** *Channa punctatus* (Bloch.), tin oxide, nickel hydroxycarbonate, AST, ALT

### Introduction

In India, an early study (IDS) discovered in order on 100 ceramic production clusters. Many of them are tiny clusters, & data available on them is sparse. More specific data was provided for 24 clusters from fourteen different states. The Indian ceramic industry is divided into 2 primary categories which is white ware and red clay pottery (including terracotta), all of which are manufactured in India. Red Clay (surahi, utility articles such as kulhar, building bricks, roofing tiles, saucers, matka sets) and white wares are products of each of these groups (tea-sets, cups, mugs, stoneware kundis, jars, saucers, pressed porcelain insulators and other LT and HT insulators, Chemical porcelain items, toys, ash-trays, fire bricks, saggars, decorative pottery items such as flower vases and other heat resisting items). The industry also consumes a lot of electricity. The majority of the energy consumed is used to fire the clay in kilns and dryers. Gas, diesel oil, electricity, coal, kerosene, wood and cow dung are all utilized to power the kilns. Cow dung and wood are usually utilized in smaller and rural kilns, whereas coal is likely the most prevalent fuel used by the greatest number of units. Electricity is rarely used due to high costs and irregular availability outstanding to country shortages. In the modern oil-fired kilns, the fuel of option is diesel oil or the kerosene. Due to supply difficulties in India, gas is no longer widely available. However, as additional natural gas pipelines are installed, it is extremely likely that the supply and consumption of gas will gradually grow.

Tin oxide, or stannic oxide, is an inorganic substance having the formula SnO<sub>2</sub>. Cassiterite is the mineral form of SnO<sub>2</sub>, and it is the primary resource of tin. This tin oxide, also known by several other names, is an essential substance in tin chemistry. It is a solid that is colourless, diamagnetic, and amphoteric. Tin oxide has long been used in ceramic glazes as an opacifier and a white colourant. Nickel

carbonate is an inorganic chemical or a compound combination comprising nickel and carbonate. Nickel hydroxycarbonate is a chemical intermediate that is used to make nickel metal powder or other nickel salts. Another important application is as an intermediary in nickel catalysts. Nickel hydroxycarbonate can also be found in nickel plating solutions, as a pH regulator, and as an ingredient in tri-cation phosphating baths. Green powder is the appearance of nickel hydroxycarbonate.

*Channa punctatus* is hardy fish and easy to rear and maintain in laboratory conditions. It is comfortable with all experimental conditions in laboratory aquarium. The fishes are good indicator of any toxic change in surrounding water.

### Materials and methods

About forty adult clean water air breathing teleost, *Channa punctatus* (Bloch.), representing both sexes will be collected alive from the local fish bazaar. They will with awareness examine for injury & reserved in 1 percent solution of potassium permanganate for some minutes before transferring them into large aquaria measuring 75cmx37.5cmx37.5cm. The fishes will be collected in the season when room temperature ranged from 30°C to 35°C & that of the water from 25°C to 28°C. Dechlorinated water will be used in the aquaria, which was changed each alternate day. The fishes will feed daily two times with flour pellets and small pieces of boiled eggs albumin. Tin oxide and nickel hydroxyl-carbonate will be used as experimental compound to assess the effect of ceramic dyes. The serum glutamate oxaloacetate transaminase (SGOT) and serum glutamate pyruvate transaminase (SGPT) were estimated by the technique of Reitman and Frankel (1957) <sup>[1]</sup>.

All the statistical calculation for data has been conducted using computer software Ky plot version 3.0.

**Results and discussion**

The serum glutamate oxaloacetate transaminase has been observed 19.32±0.04 U/L in control set, while 21.47±0.30 U/L after 7 days treatment; 24.92±0.93 U/L after 14 days treatment; 28.9±0.44 U/L after 21 days treatment; 33.37±0.72 U/L after 28 days treatment of tin oxide. The values show significant (P<0.05) to very highly significantly (P<0.001) difference from control when compared to tin oxide treatment sets for 7, 14, 21 and 28 days (Table 1, Fig 1). The serum glutamate oxaloacetate transaminase has been observed 19.20±0.10 U/L in control set, while 21.65±0.32 U/L after 7 days treatment; 25.27±1.03 U/L after 14 days treatment; 29.42±0.42 U/L after 21 days treatment; 34.05±0.57 U/L after 28 days treatment of nickel hydroxycarbonate. The values show significant (P<0.05) to very highly significantly (P<0.001) difference from control when compared to nickel hydroxycarbonate treatment sets for 7, 14, 21 and 28 days (Table 1, Fig 1).

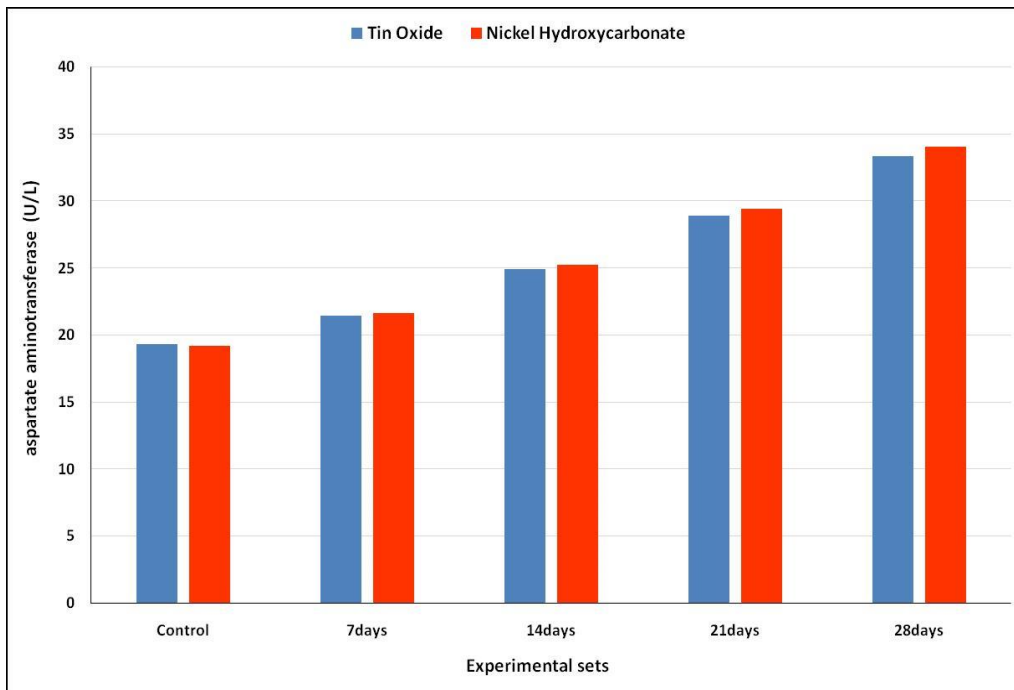
The serum glutamate pyruvate transaminase has been observed 25.65±0.19 U/L in control set, while 29.92±0.14 U/L after 7 days treatment; 32.62±0.95 U/L after 14 days treatment; 40±1.60 U/L after 21 days treatment; 48.92±2.04 U/L after 28 days treatment of tin oxide. The values show significant (P<0.05) to very highly significantly (P<0.001) difference from control when compared to tin oxide treatment sets for 7, 14, 21 and 28 days (Table 2, Fig 2).

The serum glutamate pyruvate transaminase has been observed 25.65±0.38 U/L in control set, while 30.22±0.13 U/L after 7 days treatment; 33.7±1.14 U/L after 14 days treatment; 40.80±1.67 U/L after 21 days treatment; 49.47±1.88 U/L after 28 days treatment of nickel hydroxycarbonate. The values show significant (P<0.05) to very highly significantly (P<0.001) difference from control when compared to nickel hydroxycarbonate treatment sets for 7, 14, 21 and 28 days (Table 2, Fig 2).

**Table 1:** Effect of pottery chemicals on aspartate aminotransferase (U/L) of fish *Channa punctatus* (Bloch.)

Treatment sets	Control (Mean±S.Em.)	7days (Mean±S.Em.)	14days (Mean±S.Em.)	21days (Mean±S.Em.)	28days (Mean±S.Em.)
Tin Oxide	19.32±0.04	21.47±0.30 <sup>c</sup>	24.92±0.93 <sup>c</sup>	28.9±0.44 <sup>c</sup>	33.37±0.72 <sup>c</sup>
Nickel Hydroxycarbonate	19.20±0.10	21.65±0.32 <sup>c</sup>	25.27±1.03 <sup>b</sup>	29.42±0.42 <sup>c</sup>	34.05±0.57 <sup>c</sup>

ns- Non-significant (P>0.05),  
 a- Significant (P<0.05),  
 b- Highly Significant (P<0.01),  
 c- Very Highly Significant (P<0.001)

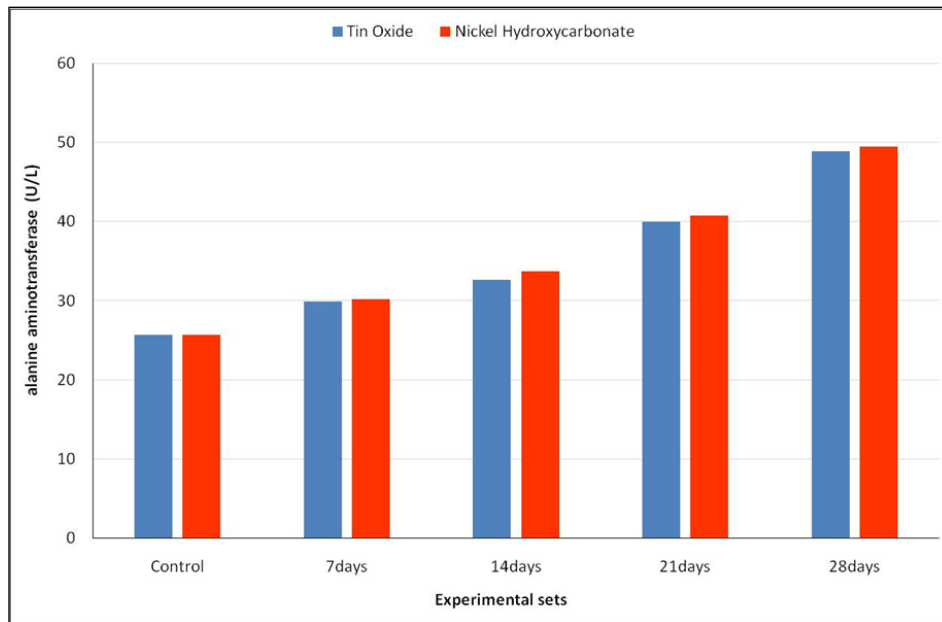


**Fig 1:** Effect of pottery chemicals on aspartate aminotransferase (U/L) of fish *Channa punctatus* (Bloch.)

**Table 2:** Effect of pottery chemicals on alanine aminotransferase (U/L) of fish- *Channa punctatus* (Bloch.)

Treatment sets	Control (Mean±S.Em.)	7days (Mean±S.Em.)	14days (Mean±S.Em.)	21days (Mean±S.Em.)	28days (Mean±S.Em.)
Tin Oxide	25.65±0.19	29.92±0.14 <sup>a</sup>	32.62±0.95 <sup>c</sup>	40±1.60 <sup>c</sup>	48.92±2.04 <sup>c</sup>
Nickel Hydroxycarbonate	25.65±0.38	30.22±0.13 <sup>c</sup>	33.7±1.14 <sup>c</sup>	40.80±1.67 <sup>c</sup>	49.47±1.88 <sup>c</sup>

ns- Non-significant (P>0.05)  
 a-Significant(P<0.05)  
 b-HighlySignificant(P<0.01)  
 c- Very Highly Significant (P<0.001)



**Fig 2:** Effect of pottery chemicals on alanine aminotransferase (U/L) of fish *Channa punctatus* (Bloch.)

The liver is the chief detoxification organ for organic xenobiotics. A wide variety of pesticides and other toxic substances in produce tend to accumulate in high concentrations. The liver, the main organ of detoxification (Dutta *et al.*, 1993) [2], undergoes grave morphological changes in fish exposed to insecticides (Rodrigues and Fanta, 1998) [3]. Changes in the liver can be functional markers of previous exposure to ecological stressors (Wong *et al.*, 1982) [4].

Serum glutamate pyruvate transaminase, is a transaminase. It exists in several important living tissues, mostly related to the liver. It catalyzes both parts of the alanine cycle. It catalyzes the transfer of an amino group from alanine to alpha-ketoglutarate, and the products of this reversible amination reaction are pyruvate and glutamic acid.  $\text{Glutamate} + \text{Pyruvate} \rightleftharpoons \text{Alpha Ketoglutarate} + \text{Alanine}$  Changes in serum glutamate pyruvate transaminase levels are also often indicative of various malfunctions in bodily systems and other bodily enzymes. It is for this reason that the serum glutamate pyruvate transaminase of the spotted snakehead was assessed in this survey under pervasive pressure in grams (Oshawa and Kawai 1981) [5]. In the current investigation, an increase in GPT was found in spotted snakeheads after poisoning with the insecticide carbofuran, possibly due to leakage of the enzyme from hepatocytes and elevated blood levels in snakeheads. Spotted snake have been reported by Attar (2005) [6] and Gupta and Guha (2006) [7], who also observed increases in serum glutamate pyruvate transaminase in fish species *Oreochromis niloticus* and *Myatus vittatus*, respectively, following sublethal exposure to cadmium, sarcyotoxin, and sevin insecticides. Similar conclusions could be drawn from this investigation after the use of sublethal concentrations of the insecticide carbofuran.

Serum glutamate oxaloacetate transaminase, a hepatocyte-associated transaminase. Any disturbance in serum glutamate oxaloacetate transaminase activity indicates changes in important biological systems, especially the liver system. It promotes the adaptation of aspartate and alpha ketoglutarate into oxaloacetate and glutamate and vice versa.

$\text{Oxaloacetate} + \text{glutamic acid} \rightleftharpoons \text{aspartic acid} + \alpha\text{-ketoglutarate}$

Serum glutamate oxaloacetate transaminase was found to increase in snakeheads under gram peroxide stress. An increase in ALT was found which clearly indicates a disturbance in the liver system where the enzyme eventually reaches the blood due to increased serum glutamate oxaloacetate transaminase levels as reported by Attar (2005) [6] and proteolysis, as reported by Gupta and Guha (2006) [7]. After exposure of fish *Oreochromis niloticus* and *Mystus vittatus* to the insecticides cadmium, sarcyotoxin and sevin, respectively. The alterations in morphological parameters viz. body weight, liver weight, kidney weight and pancreas weight along with their respective organ weight-body weight ratio. These alterations in weight parameters may be due to cellular destruction as evident by histological studies and enzyme level changes (Chadha, 1981) [8].

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