**Immunomodulatory Effect of Arsenicum album on Zebrafish Embryos**

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**Abstract**

**Background:** Globally, 2.4 million neonates succumbed in 2019, constituting 47% of all under-5 mortalities [1]. India bore the highest neonatal mortality in the same year, attributed predominantly to infections [2]. Innate immunity, bestowed at birth, represents our primary defense against neonatal mortality. Exposure to crude forms of arsenic in zebrafish embryos has been shown to significantly down-regulate the innate immune responses [3-8]. Such studies reveal the realm of operation, susceptible cells, and mechanisms through which arsenic can engage with our system, aiding in the understanding of the Homoeopathic medicine *Arsenicum album*. **Methods:** Zebrafish were acclimatised for 7 days, under 28.5 ± 2 °C under a 12-hour light/dark cycle, then bred to collect embryos at the single-cell stage. Embryos were categorised into 8 triplicate groups: unexposed uninfected control, unexposed infected control, alcohol-exposed control, Arsenicum album exposed at 5 potencies (6x, 30c, 200c, 1M, lm/1). Embryos were exposed to medications in egg water medium for four days. From four days post-fertilization (dpf), they were transferred to four-litre tanks. On the seventh day post-exposure (dpe), they were infected with Edwardsiella tarda at 1 × 10⁸ colony forming units (CFU)/ml for five hours. Fishes were collected at 5-hours and 30-hours post-infection (hpi) for assessing innate immunological responses. Survival rates, respiratory bursts and bacterial loads were statistically analysed. The protocols followed for the experimental rearing, handling, and sampling of zebrafish were ethically approved by the Institute where the study was conducted. The experimental fish were maintained in adherence to the guidelines outlined in the ARRIVE (Animal Research: Reporting of In Vivo Experiments) recommendations as put forth by Percie du Sert et al. in 2020[9]. **Results:** The *Arsenicum album* LM/1 group had the highest survival rate, followed by the 1M group. Highest respiratory burst at 5 hpi and lowest bacterial load at 5 and 30 hpi were in the 1M group. lm/1 had highest respiratory burst at 30 hpi. The 6x group had the lowest survival rate, below the negative control. These findings highlight *Arsenicum album's* impact on innate immunity in zebrafish embryos. **Conclusion:** This study emphasizes *Arsenicum album's* innate immunomodulatory effect across potencies. Subsequent focused research is imperative to acquire a more nuanced comprehension.

**Keywords:** *Arsenicum album*, Innate immunity, Embryonic exposure, Danio rerio.

**References**


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