

The Effect of Some Mycotoxins on the Brine Shrimp, *Artemia salina*

The chemical determination of aflatoxins and other mycotoxins in foods should be confirmed by bioassay. Many nontoxic compounds in nature fluoresce and behave chromatographically in a similar manner to the mycotoxins. A biological test to verify the chemical analysis should be relatively rapid and should not require extensive equipment or highly trained personnel. The present biological tests for aflatoxin are extremely involved, lengthy procedures (1,2).

The use of the brine shrimp, *Artemia salina*, in a bioassay of this kind has several distinct advantages (3). The relatively simple and rapid technique can be carried out in most laboratories.

Figure 1 represents data from tests conducted at 37.5 C. Aflatoxin B₁, at dose levels of 1.0 µg/ml and above, produced greater than 90% mortality after 24 hr. The lowest level of aflatoxin tested, 0.5 µg/ml, produced 61% mortality. Partially purified ochratoxin A showed an order of toxicity approximately 5 times less than that of aflatoxin B₁. At a level of 1.0 µg/ml, mortality was 15%; at 2.0 µg/ml, mortality was 23%. The highest dose level tested, 16.0 µg/ml, produced 49% mortality. Dose levels of 1–20 µl of an acetone extract of a culture of *Fusarium tricinctum* were tested. At all dose levels, mortality was 100% after 16 hr.

Because the test can be conducted in a volume of only 0.5 ml, a minimum amount of aflatoxin B₁ can be used; positive results, with a mortality of over 60%, can be achieved with 0.5 µg/ml of aflatoxin. Since aflatoxin is soluble in artificial sea water to a concentration of about 15 µg/ml, the sensitivity of this test is below the upper solubility limits. The test volume, 0.5 ml, can maintain up to about 50 brine shrimp larvae without affecting the results. Living cultures of the test organisms need not be maintained; enough larvae to conduct a test can be made available by placing eggs in artificial sea water at 27 C from 18 to 24 hr before they are needed.

The brine shrimp test was also used effectively with partially purified ochratoxin A and an acetone extract of a culture of *Fusarium tricinctum*. The possibility of its effective use as a bioassay for other mycotoxins warrants further investigation.

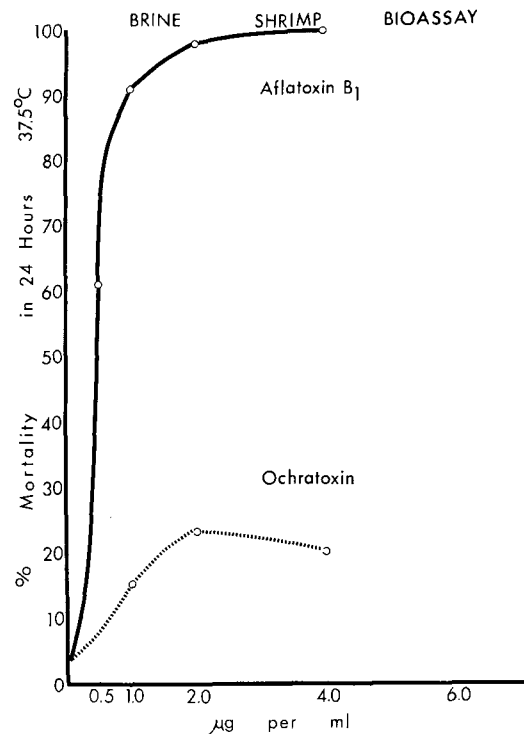


FIG. 1. Brine shrimp bioassay of aflatoxin B₁ and ochratoxin A.

R. F. BROWN
 Division of Microbiology
 Food and Drug Administration
 Department of Health, Education, and Welfare
 Washington, D.C. 20204

REFERENCES

1. Verrett, M. J., J. Mariac and J. McLaughlin, *J. Assoc. Offic. Anal. Chemists* **47**, 1003–1006 (1964).
2. Legator, M. S., and A. Withrow, *Ibid.* **47**, 1007–1009 (1964).
3. Brown, R. F., J. D. Wildman and R. M. Eppley, *Ibid.* **51**, 905–906 (1968).

[Received September 26, 1968]