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## TOXICITY and ADVERSE EFFECTS of TRINITROTOLUENE (TNT)

A Partially Annotated Bibliography

  
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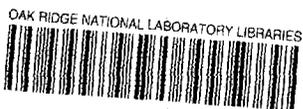
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TOXICITY AND ADVERSE EFFECTS OF TRINITROTOLUENE (TNT):  
A PARTIALLY ANNOTATED BIBLIOGRAPHY

Kathy C. Miller  
June 1973

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## PREFACE

The Toxicology Information Response Center (TIRC) began operation in 1971 to establish a national and international center of toxicology information. Toxicology is defined in its broadest sense as the science dealing with the adverse effects of chemical and physical agents on living systems. TIRC gathers, selects, and disseminates toxicology and peripherally oriented information on drugs, food additives, pesticides, industrial chemicals, and environmental pollutants.

Sponsored by the National Library of Medicine's Toxicology Information Program (NLM/TIP) and located at the Oak Ridge National Laboratory (ORNL), TIRC is part of a larger scientific and technical information division known as the Environmental Information System Office (EISO). EISO coordinates the functions and activities of environmentally oriented information units within ORNL. This association affords a unique opportunity for extensive scientific and technical interactions. It is in this atmosphere that TIRC provides vast toxicology information.

Requests for information or literature searches should be directed to:

Toxicology Information Response Center  
Environmental Information System Office  
Oak Ridge National Laboratory  
Post Office Box Y, Building 9224  
Oak Ridge, TN 37830

Telephone: Area Code 615 483-8611 Ext. 3-5296  
FTS 615 483-5296



# TOXICOLOGY INFORMATION RESPONSE CENTER

## TOXICITY AND ADVERSE EFFECTS OF TRINITROTOLUENE (TNT)

TIP 73-169-1191

Compiled and Partially Annotated by:  
Kathy C. Miller

June, 1973

### ABSTRACT

This partially annotated bibliography, containing 71 references, was prepared by the Toxicology Information Response Center in response to a specific request. The citations are divided into two sections, secondary and primary references, each arranged by year in alphabetical order by the first author's last name. The sources searched covered a seven-year time period, from 1965 through May 1973. Physiologic and toxicologic effects of TNT, incidences of industrial exposure, and a few articles on environmental impact and waste water effluent treatments following TNT manufacture are included.

Sources Searched: TOXLINE Data Base: As of 5-24-73  
MEDLINE Data Base: Jan. 1970 through June 1973 Index  
Medicus  
Index Medicus: 1965 through 1969  
Chemical Abstracts: Vol. 56: 1962 through Vol. 78(20):  
May 21, 1973  
Biological Abstracts: Vol. 46: 1965 through Vol. 55(8):  
April 15, 1973  
Clinical Toxicology: Vol. 1: 1968 through Vol. 5(1):  
1972  
Archives of Environmental Health: Vol. 10: 1965 through  
Vol. 26(4): April 1973  
Critical Reviews in Toxicology: Vol. 1(1-3): 1971  
Critical Reviews in Environmental Control: Vol. 1: 1970  
through Vol. 2(3): 1971  
Toxicology Information Response Center Request Files  
Toxicology Information Response Center Reference Library  
Environmental Mutagen Information Center Data Base: As of  
5-30-73

Terms Searched: 2,4,6-trinitrotoluene  
TNT  
Alpha-trinitrotoluol  
sym-trinitrotoluene  
toluene, trinitro-1-methyl-2,4,6-trinitrobenzene  
Tolit  
Trilit  
Trotyl

## TOXICOLOGY INFORMATION RESPONSE CENTER

TIRC Keywords: . Acute effects  
Adverse effects  
Chemicals, organic  
Exposures  
Humans  
LD50  
Lethal dose  
Toxicity

NTIS Keywords: Trinitrotoluene  
Ordnance  
Toxicity

Citations: 71

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TNT - 3

Secondary References

1972

Christensen, H.E. (Ed.)  
The Toxic Substances List, p. 529, HSM 72-10265,  
Dept. HEW, NIOSH, Rockville, Md. (1972)  
The oral lethal dose of TNT in cats is 480 mg/kg.

1971

Hassman, P.  
Trinitrotoluene  
Prac. Lek. 23(8): 285-94 (1971) (Czech)  
A review of the metabolism, biological effects,  
and physicochemical properties of TNT; 113  
references.

1969

Fairhall, L.T.  
Industrial Toxicology, 2nd ed., pp. 352-4, Hafner  
Publishing Co., New York (1969)  
The physical and chemical characteristics,  
industrial uses, toxicity, and analysis of TNT are  
summarized.

1968

Sax, N.I.  
Trinitrotoluene  
Dangerous Properties of Industrial Materials, 3rd ed.,  
p. 1203, Van Nostrand Reinhold Co., New York (1968)  
TNT is of moderate to high toxicity following  
any route of administration. When decomposed by  
heat it gives off highly toxic fumes of oxides of  
nitrogen.

Stecher, P.G. (Ed.)  
The Merck Index, 8th ed., p. 1079, Merck and Co.,  
Inc., Rahway, N.J. (1968)  
Symptoms of human exposure may be dermatitis,  
sensitization, headache, weakness, anemia, and  
liver injury. TNT may be absorbed percutaneously.  
It is used as a high explosive.

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TNT - 4

1967

Patty, F.A. (Ed.)  
Trinitrotoluenes  
Industrial Hygiene and Toxicology, Vol. II., 2nd ed.,  
pp. 2152-7, 2167-9, Fassett, D.W.; Irish, D.D.  
(Eds.), Interscience Publishers, New York (1967)  
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Stokinger, H.E., et al.  
Threshold limit values for 1963  
J. Occupational Med. 5(10): 491-8 (1963)  
The maximum allowable concentration of TNT in  
workroom air is included.

1957

Shubik, P.; Hartwell, J.L.  
2,4,6-Trinitrotoluene  
Survey of Compounds Which Have Been Tested for  
Carcinogenic Activity, Suppl. I., PHS 149, p. 121,  
GPO, Washington, D.C. (1957)  
In feeding studies of TNT in rats and rabbits,  
during periods up to 90 days, no tumors were  
observed.

1956

Spector, W.S.  
Handbook of Toxicology, Vol. I., pp. 306-7, W.B.  
Saunders Co., Philadelphia (1956)  
The lethal dose of TNT in rats is > 700 mg/kg  
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s.c. in cats, and 480 mg/kg orally in cats.

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Vrach. Delo. 5: 126-9 (1972) (Russ)  
The clinical symptomatology and neurologic  
manifestations of trinitrotoluene poisoning are  
presented.

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Goodwin, J.W.

Twenty years handling TNT in a shell loading plant  
Am. Ind. Hyg. Assoc. J. 33: 41-4 (1972)

Kleiner, A.I.

Effect of trinitrotoluene on the main functions of  
the stomach of dogs in chronic experiments  
Farmakol. Toksikol. 35(4): 445-8 (1972) (Russ)

The gastric functions of dogs, which had either  
inhaled or percutaneously absorbed TNT for  
periods up to 2 years, were studied. In dogs with  
gastric fistulas, the evacuating and secretory  
stomach functions were disrupted.

Nay, M.W., Jr.

Biodegradability and treatability of TNT  
manufacturing wastes with activated sludge systems  
Thesis of Virginia Polytech. Inst., Blacksburg, VA,  
367 pp., Avail. Univ. Microfilms, Ann Arbor, Mich.,  
Order No. 72-16,293 (Diss. Abstr. Int. B 32(11): 6441,  
1972) (1972)

Possible methods of pollution control over TNT  
manufacturing wastes are discussed.

Shushkovskii, B.Z.

Prevention of trinitrotoluene poisoning in the  
Krivoi Rog Basin Mines  
Gig. Tr. Prof. Zabol. 16: 49-50 (1972) (Russ)

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Bringmann, G.; Kuehn, R.

Biological decomposition of nitrotoluenes and  
nitrobenzenes by *Azotobacter agilis*  
Gesundh.-Ing. 92(9): 276-86 (1971) (Ger)

Synthetic waste water containing mono-, di-, and  
trinitrotoluenes and benzenes was passed through an  
experimental water purifier inoculated with  
*A. agilis*. The bacteria were able to almost totally  
degrade the nitro compounds.

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Ind. Process Des. Water Pollut. Contr., Proc.  
Workshop, 3rd, 1970, pp. 99-102 (1971)

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72-6782, 113 pp. (Diss. Abstr. Int. B 32(8): 4418,  
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Excrinous function of the pancreas in dogs during  
chronic trinitrotoluene poisoning  
Gig. Tr. Prof. Zabol. 15(11): 47-8 (1971) (Russ)

Dogs injected s.c. with 0.1-1.0 and 5-20 mg/kg  
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disturbances in the pancreatic exocrinous function,  
vacuolization of acinus cells, and changes in the  
pancreatic secretion volume.

Kleiner, A.I.  
External secretory function of the liver in chronic  
trinitrotoluene intoxication  
Vrach. Delo (12): 121-2 (1971) (Russ)

Dogs were injected s.c. with 20-50 mg/kg TNT  
every other day for 3 months. They suffered  
increased latent period of bile secretion,  
decreased bile formation, and the bilirubin and  
cholic acid concentrations increased in the  
bile. During the third month, the cholic acid  
concentration dropped and the cholesterol  
concentration increased.

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Manoilova, I.K.; Zakharova, A.I.  
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Protection of workers exposed to trinitrotoluol  
Nar. Zdrav. 27: 199-202 (1971) (Croat)

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U.S. Clearinghouse Fed. Sci. Tech. Inform., AD 1971,  
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Clinical picture in chronic trinitrotoluene (TNT)  
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Special study of the effect of alpha-TNT on  
microbiological systems and the determination of  
biodegradability of alpha-TNT, No. 24-017-70/71,  
January-August 1970  
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(1970)

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TNT wastes on fish. I. Acute toxicity of  $\alpha$ -TNT to  
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Chronic trinitrotoluene poisoning (Clinical picture  
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Sovet Med. 32: 119-22 (1969) (Russ)

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Kralove. 12(5): 561-4 (1969) (Czech. and Russ. sum)

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Peripheral neuropathy in a person sensitive to  
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Can. Med. Assoc. J. 101(10): 102-4 (1969)

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Arh. Hig. Rada Toksikol. 20(2): 177-85 (1969)  
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Kazan Med. Zh. 1: 72-3 (1968)

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Environ. Health 10(1): 35-9 (1968)

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