

Section 1 - Identification of Chemical Product and Company

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Substance: Fenitrothion is an organophosphorus derivative.
Trade Name: Farmoz Fenitrothion 1000 Insecticide
Product Use: Agricultural insecticide for use as described on the product label.
Creation Date: November, 2002
Revision Date: October, 2008

Section 2 - Hazards Identification

Statement of Hazardous Nature

This product is classified as: Hazardous according to the criteria of ASCC Australia.

Dangerous according to the Australian Dangerous Goods (ADG) Code.

Risk Phrases: R10, R25, R20/21. Flammable. Toxic if swallowed. Harmful by inhalation and in contact with skin.

Safety Phrases: S16, S20, S24, S38. Keep away from sources of ignition - No smoking. When using, do not eat or drink. Avoid contact with skin. In case of insufficient ventilation, wear suitable respiratory equipment.

SUSDP Classification: S6

ADG Classification: Class 6.1, Sub risk 3 (ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE)

UN Number: 3017

Emergency Overview

Physical Description & colour: Pale yellow oily liquid.

Odour: Characteristic odour.

Major Health Hazards: toxic if swallowed, harmful by inhalation and in contact with skin. Signs and symptoms associated with mild exposures to organophosphate and carbamate pesticides include: headache, fatigue, dizziness, loss of appetite with nausea, stomach cramps and diarrhoea; blurred vision associated with excessive tearing; contracted pupils of the eye; excessive sweating and salivation; slowed heartbeat, often fewer than 50 per minute; rippling of surface muscles just under the skin. These symptoms may be mistaken for those of flu, heat stroke or heat exhaustion, or upset stomach. Moderately severe organophosphate and carbamate insecticide poisoning cases exhibit all the signs and symptoms found in mild poisonings, but in addition, the victim: is unable to walk; often complains of chest discomfort and tightness; exhibits marked constriction of the pupils (pinpoint pupils); exhibits muscle twitching; has involuntary urination and bowel movement. Severe poisonings are indicated by incontinence, unconsciousness and seizures. This product is a cumulative poison. Minor exposures over a period of time may lead to serious health problems.

Potential Health Effects

See section 11 for Chronic exposure studies.

Inhalation

Short term exposure: Symptoms are described fully above.

Skin Contact:

Short term exposure: Symptoms are described fully above.

Eye Contact:

Short term exposure: Available data shows that this product is not harmful. In addition this product is believed to be not irritating to eyes.

Ingestion:

Short term exposure: Symptoms are described fully above.

Carcinogen Status:

ASCC: No significant ingredient is classified as carcinogenic by ASCC.

NTP: No significant ingredient is classified as carcinogenic by NTP.

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IARC: Cyclohexanone is Class 3 - unclassifiable as to carcinogenicity to humans.

Section 3 - Composition/Information on Ingredients

| Ingredients | CAS No | Conc, % | TWA (mg/m ³) | STEL (mg/m ³) |
|---------------------------------|----------|---------|--------------------------|---------------------------|
| Fenitrothion | 122-14-5 | 80 | not set | not set |
| Cyclohexanone | 108-94-1 | 10 | 100 | not set |
| Other non hazardous ingredients | secret | to 100 | not set | not set |

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non hazardous ingredients are also possible.

The TWA exposure value is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. The STEL (Short Term Exposure Limit) is an exposure value that should not be exceeded for more than 15 minutes and should not be repeated for more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The term "peak" is used when the TWA limit, because of the rapid action of the substance, should never be exceeded, even briefly.

Section 4 - First Aid Measures

General Information:

You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 13 1126 from anywhere in Australia and is available at all times. Have this MSDS with you when you call.

Atropine tablets 0.6mg and activated charcoal should be available in the area where this product is used, or in a nearby unlocked medicine cabinet. If swallowed, splashed on skin or inhaled, contact a Poisons Information Centre or a doctor at once. Remove any contaminated clothing and wash skin thoroughly. If swallowed, use of activated charcoal may be advised. Give atropine if instructed. The usual instruction is to give one atropine tablet every 5 minutes until dryness of the mouth occurs.

Inhalation: If symptoms of poisoning become evident, contact a Poisons Information Centre, or call a doctor at once. Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary oedema can be delayed up to 48 hours after exposure. See instructions above about treatment with atropine.

Skin Contact: If any symptoms become evident, or if in doubt, contact a Poisons Information Centre or a doctor. See instructions above about treatment with atropine.

Eye Contact: First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Ingestion: If swallowed, rinse mouth thoroughly with water and contact a Poisons Information Centre, or call a doctor at once. Give activated charcoal if instructed. See instructions above about treatment with atropine.

Section 5 - Fire Fighting Measures

Fire and Explosion Hazards: This product is classified as a flammable liquid. There is a moderate risk of an explosion from this product if commercial quantities are involved in a fire. Firefighters should take care and appropriate precautions. Violent steam generation or eruption may occur upon application of direct water stream on hot liquids. Vapours from this product are heavier than air and may accumulate in sumps, pits and other low-lying spaces, forming potentially explosive mixtures. They may also flash back considerable distances.

Fire decomposition products from this product are likely to be irritating if inhaled.

Extinguishing Media: Alcohol resistant foam is the preferred firefighting medium but, if it is not available, normal foam can be used. Try to contain spills, minimise spillage entering drains or water courses.

Fire Fighting: If a significant quantity of this product is involved in a fire, call the fire brigade. There is a danger of a violent reaction or explosion if significant quantities of this product are involved in a fire. Recommended personal protective equipment is liquid-tight chemical protective clothing and breathing apparatus.

Flash point: 40-50°C

Upper Flammability Limit: No data.

Lower Flammability Limit: No data.

Autoignition temperature: No data.

Flammability Class: Flammable liquid.

Section 6 - Accidental Release Measures

Accidental release: In the event of a major spill, prevent spillage from entering drains or water courses. Evacuate the spill area and deny entry to unnecessary and unprotected personnel. Immediately call the Fire Brigade. Wear full protective chemically resistant clothing including face mask, face shield, gauntlets and self contained breathing

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apparatus. See above under Personal Protection regarding Australian Standards relating to personal protective equipment. Suitable materials for protective clothing include rubber, PVC. Stop leak if safe to do so, and contain spill. Absorb onto sand, vermiculite or other suitable absorbent material. If spill is too large or if absorbent material is not available, try to create a dike to stop material spreading or going into drains or waterways. Because of the toxicity of this product, special personal care should be taken in any cleanup operation. Sweep up and shovel or collect recoverable product into labelled containers for recycling or salvage, and dispose of promptly. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. Full details regarding disposal of used containers, spillage and unused material may be found on the label. If there is any conflict between this MSDS and the label, instructions on the label prevail. Ensure legality of disposal by consulting regulations prior to disposal. Thoroughly launder protective clothing before storage or re-use. Advise laundry of nature of contamination when sending contaminated clothing to laundry.

Section 7 - Handling and Storage

Handling: Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this MSDS for details of personal protective measures, and make sure that those measures are followed. The measures detailed below under "Storage" should be followed during handling in order to minimise risks to persons using the product in the workplace. Also, avoid contact or contamination of product with incompatible materials listed in Section 10.

Storage: This product is a Scheduled Poison. Observe all relevant regulations regarding sale, transport and storage of this class of poison. Store in a cool, well ventilated area. Check containers periodically for leaks. Containers should be kept closed in order to minimise contamination. Make sure that the product does not come into contact with substances listed under "Materials to avoid" in Section 10. If you keep more than 1000kg or 1000L of Toxic Substances of Packaging Group III, you will require a license to do so. If you have any doubts, we suggest you contact your licensing authority in order to clarify your obligations. Check packaging - there may be further storage instructions on the label.

Section 8 - Exposure Controls and Personal Protection

The following Australian Standards will provide general advice regarding safety clothing and equipment:

Respiratory equipment: **AS/NZS 1715**, Protective Gloves: **AS 2161**, Industrial Clothing: **AS2919**, Industrial Eye Protection: **AS1336** and **AS/NZS 1337**, Occupational Protective Footwear: **AS/NZS2210**.

| Exposure Limits | TWA (mg/m ³) | STEL (mg/m ³) |
|-----------------|--------------------------|---------------------------|
| Cyclohexanone | 100 | not set |

The ADI for Fenitrothion is set at 0.002mg/kg/day. The corresponding NOEL is set at 0.2mg/kg/day. ADI means Acceptable Daily Intake and NOEL means No-observable-effect-level. Values taken from Australian ADI List, June 2002.

Ventilation: No special ventilation requirements are normally necessary for this product. However make sure that the work environment remains clean and that dusts are minimised.

Eye Protection: Eye protection is not normally necessary when this product is being used. However, if in doubt, wear suitable protective glasses or goggles.

Skin Protection: Prevent skin contact by wearing impervious gloves, clothes and, preferably, apron. Make sure that all skin areas are covered. See below for suitable material types.

Protective Material Types: We suggest that protective clothing be made from the following materials: rubber, PVC.

Respirator: Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned above.

Safety deluge showers should be provided near to where this product is being used.

Section 9 - Physical and Chemical Properties:

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|---|--|
| Physical Description & colour: | Pale yellow oily liquid. |
| Odour: | Characteristic odour. |
| Boiling Point: | Fenitrothion boils at 164°C, 1mm Hg |
| Freezing/Melting Point: | Fenitrothion melts about 3°C |
| Volatiles: | No specific data. Expected to be low at 100°C. |
| Vapour Pressure: | No data. |
| Vapour Density: | No data. |
| Specific Gravity: | Approx 1.3 at 20°C |
| Water Solubility: | Emulsifiable. |
| pH: | No data. |

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|--------------------------------------|-----------------------------------|
| Volatility: | No data. |
| Odour Threshold: | No data. |
| Evaporation Rate: | No data. |
| Coeff Oil/water distribution: | 3.5 at 20°C (log P octanol/water) |
| Autoignition temp: | No data. |

Section 10 - Stability and Reactivity

Reactivity: This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf life properties.

Conditions to Avoid: This product should be kept in a cool place, preferably below 30°C. Containers should be kept dry. Keep away from heat, flames and sparks. Keep away from sources of sparks or ignition.

Incompatibilities: strong acids, strong bases, oxidising agents.

Fire Decomposition: Carbon dioxide, and if combustion is incomplete, carbon monoxide and smoke. Nitrogen and its compounds, and under some circumstances, oxides of nitrogen. Occasionally hydrogen cyanide gas. Oxides of sulfur (sulfur dioxide is a respiratory hazard) and other sulfur compounds. Most will have a foul odour. Oxides of phosphorus and other phosphorus compounds. Water. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of judgment, and unconsciousness followed by coma and death. Hydrogen cyanide poisoning signs and symptoms are weakness, dizziness, headache, nausea, vomiting, coma, convulsions, and death. Death results from respiratory arrest. Hydrogen cyanide gas acts very rapidly; symptoms and death can both occur quickly.

Polymerisation: This product is unlikely to undergo polymerisation processes.

Section 11 - Toxicological Information

Toxicity: Acute Toxicity: The acute oral LD50 of Fenitrothion for rats ranges between 250-800 mg/kg; 715-870 mg/kg for mice; and 500 mg/kg for guinea pigs. The acute dermal LD50 for rats is >890 mg/kg and >3,000 mg/kg for mice. The acute inhalation LC50 in rats was reported to be 5.0 mg/l. Mice had acute toxicity values of 2500 mg/kg dermal LD50; 229 mg/kg oral LD50. Guinea pigs were reported to have acute toxicity values of 500 mg/kg oral LD50. The oral acute toxicity for cats was 142 mg/kg. Studies reported primary dermal irritation; mild dermal irritation was reported in a rabbit study. Primary eye irritation was also reported; mild irritation was seen after a single application of 0.1 ml of Fenitrothion into unwashed eyes of albino rabbits. The acute oral toxicity reported for a human female was a TDLo of 800 mg/kg.

Chronic Toxicity: Chronic symptoms in humans include: general malaise, fatigue, headache, loss of memory and ability to concentrate, anorexia, nausea, thirst, loss of weight, cramps, muscular weakness and tremors. Fenitrothion at sufficient dosage produces typical cholinergic poisoning. In a study with rats, a dietary level of 500 ppm for 90 days was tolerated. They grew normally, and cholinesterase in plasma, red cells and tissues was decreased. A dietary level of 30 ppm for six months decreased the red cell and brain cholinesterase of female but not male rats; neither sex showed any sign of toxicity. A dietary level of 5 ppm for 92 weeks was a no-effect-level (NEL). Sumithion 50EC (a product containing Fenitrothion) has been shown to cause delayed neurotoxicity in adult rats, as well as humans.

Reproductive Effects: Behavioral deficits have been noted in newborn mammals. No significant behavioral effects could be measured at the lowest dose of 5 mg/kg/day. At the 10 and 15 mg/kg/day doses, while several of the behavioral outcomes were significantly different from controls, there seemed to be a difference between the "simple" behavioral measures such as motor activity and motor coordination and the more "complex" measures such as conditioned escape and social interactions. Behavioral measures showed significant alterations as long as 104 days following birth, indicating that prenatal intoxication with Sumithion had persistent effects that showed the offspring to be different from untreated animals. The lack of effect at the 5 mg/kg/day dose indicates that this chemical has a steep dose-response function and that exposure of agricultural workers should be carefully monitored.

Teratogenic Effects: No teratogenic effects were observed in albino rabbits dosed with 0, 0.3 or 1 mg Fenitrothion/kg/day in gelatin capsules on gestation days 6 through 18.

Mutagenic Effects: No mutagenic effects were seen in *Drosophila melanogaster* or mice.

Carcinogenic Effects: In a two-year feeding study in rats (50 males and 50 females), no dose-related increase in tumor incidence was found upon histopathological examinations of all groups. Fenitrothion was administered in the diet to groups of 50 male and 50 female ICR Swiss mice at dose levels of 0, 30, 100 and 200 ppm for 78 weeks. There was no evidence of compound-related effects on appearance and behavior, body weight or mortality. Gross necropsies revealed no consistent compound-related changes in any organs or tissues. The histopathological examinations revealed no consistent treatment-related increase in tumor incidences.

Organ Toxicity: One of the contaminants of Fenitrothion, O,O,S-trimethyl phosphorothioate, has a distinct cytotoxic effect on the lungs of rats and is known to modulate immune responses in mice. Fenitrothion is an immunotoxin. In patients who died of pesticide poisoning, 240 ppm Fenitrothion were found in the liver. Fenitrothion is considered a suspect viral enhancer, implicated in Reye's syndrome.

Fate in Humans and Animals: Eighteen people were subjected to clinical examination while spraying Fenitrothion. The level of blood plasma cholinesterase was determined at regular intervals but no abnormalities were found.

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cholinesterase was analyzed in a large number of inhabitants of Nigeria where Fenitrothion had been sprayed. After spraying for one week, a 50% reduction in blood cholinesterase in 20 spray men was recorded. Rapid return to normal levels subsequently took place. Single oral doses of between 2.5 and 20 mg Fenitrothion (approximately 0.042 to 0.33 mg/kg body weight) were administered orally to 24 human subjects. The urinary excretion of the metabolite 3-methyl-4-nitrophenol was almost complete in 24 hours, the excretion peak occurring after 12 hours. The plasma cholinesterase level did not decline, except in one of the subjects who had received 0.33 mg/kg Fenitrothion.

Section 12 - Ecological Information

Effects on Birds: Negative results were observed in studies on delayed neurotoxicity in hens. The oral LD50 for chickens was reported as 28 mg/kg. Fenitrothion was found to be highly toxic to upland gamebirds and slightly toxic to waterfowl (acute oral toxicity value to bobwhite quail and mallards was determined to be 23.6 mg/kg and 1,190 mg/kg, respectively). The LC50 for pheasants was 450 to 500 ppm in diets of 2-week-old birds when fed Fenitrothion-treated feed for 5 days, followed by untreated feed for 3 days.

Effects on Aquatic Organisms: Fenitrothion is considered somewhat toxic to fish. The 96-hour LC50 was 1.7 ppm for brook trout and 3.8 ppm for bluegill sunfish; moderately toxic to both warmwater and coldwater fish. The 96-hour LC50 to various species of North American freshwater fish has also been reported as 2-12 micrograms/l. The chronic toxicity of Fenitrothion to fish is considered low. The 48-hour LC50 values for carp ranged between 2.0 mg/l and 4.1 mg/l. The toxicity of Fenitrothion to rainbow trout increased with increasing temperature.

Effects on Other Animals (Nontarget species): There is sufficient information to characterize Fenitrothion as highly toxic to honeybees (acute toxicity value = 0.383 micrograms/bee) when bees are exposed to direct treatment or to dried residues on foliage. Fenitrothion is considered toxic to spider mites with long residual action. Fenitrothion, applied to host eggs at field rates in the laboratory were found to be highly toxic to *Trichogramma orasilienis* released on the eggs, causing 84-100% mortality in 24 hours.

ENVIRONMENTAL FATE

In studies of lesser date moth control, Fenitrothion was added to a 1:1 mixture of wheat flour and pollen grains. This mixture was dusted on female clusters of date palms at the time of pollination. Not only did it prove to be effective, but this method of application was less environmentally polluting than the use of high-pressure sprays.

Breakdown of Chemical in Soil and Groundwater: Preliminary data indicates Fenitrothion degrades fairly rapidly in soil with a half-life of less than one week in non-sterile muck, sandy loam soils. The compound is intermediately mobile in a variety of soils ranging from sandy loam to clay.

Breakdown of Chemical in Surface Water: Surface foam on lakes acts as a scavenger and a trap for organic pollutants. Following aerial spraying of Fenitrothion, 701 micrograms/l of Fenitrothion was recorded in a surface slick formed by wind actions, compared to 9.5 micrograms/l in the subsurface water. Another study indicated the half-life for the disappearance of Fenitrothion at 23 degrees C and pH 7.5 in buffered lake water and natural lake water in the dark (10 ppm sol.) was 21.6 and 49.5 days, respectively. In a field experiment (pH 7.0-7.5, 19-23 degrees C), the half-life of Fenitrothion was 1.5-2 days upon spraying of a 10% Fenitrothion EC-formulation at a rate of 250g/Ha to a model water system.

Breakdown of Chemical in Vegetation: Fenitrothion has been known to be phytotoxic to cotton, Brassica crops, and certain fruit crops when high rates were applied. Certain apple varieties may be russeted. In a study conducted by FAO/WHO, about 50% of 32P-labelled Fenitrothion sprayed on rice plants penetrated into the tissues in 24 hours. At the end of this period only 10% was left, indicating rapid decomposition. Rice grains harvested 46 days after treatment contained 0.0007 ppm Fenitrothion and less than 1 ppm of p-nitroresol and dimethyl phosphorothioic acid. The half-life of Fenitrothion in green plants ranges between one and two days.

Breakdown of Chemical in Air: An experiment was carried out in a vacant dormitory building in order to establish the airborne residue of concentrations of seven pesticides used for cockroach control. Airborne concentrations of Fenitrothion on the day of application were 3 micrograms/cubic meter. All were below 0.7 micrograms/cubic meter by the third day after application. The airborne concentrations correlated well with the vapor pressures of the various pesticides.

Section 13 - Disposal Considerations

Disposal: Instructions concerning the disposal of this product and its containers are given on the product label. These should be carefully followed. Special help is available for the disposal of Agricultural Chemicals. The product label will give general advice regarding disposal of small quantities, and how to cleanse containers. However, for help with the collection of unwanted rural chemicals, contact ChemClear 1800 008 182 <http://www.chemclear.com.au/> and for help with the disposal of empty drums, contact DrumMuster <http://www.drummuster.com.au/> where you will find contact details for your area.

Section 14 - Transport Information

ADG Code: 3017, ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE

Hazchem Code: 3W

Special Provisions: 61, 223, 274

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Limited quantities: ADG 7 specifies a Limited Quantity value of 5 L for this class of product.

Dangerous Goods Class: Class 6.1, Toxic Substances.

Sub Risk: Class 3, Flammable liquids

Packaging Group: III

Packaging Method: P001, IBC03

Class 6 Toxic Substances shall not be loaded in the same vehicle or packed in the same freight container with Classes 1 (Explosives), 3 (Flammable Liquids where the Flammable Liquid is nitromethane), 5.1 (Oxidising Agents where the Toxic Substances are Fire Risk Substances), 5.2 (Organic Peroxides where the Toxic Substances are Fire Risk Substances), 8 (Corrosive Substances where the Toxic Substances are cyanides and the Corrosives are acids), Foodstuffs and foodstuff empties. They may however be loaded in the same vehicle or packed in the same freight container with Classes, 2.1 (Flammable Gases), 2.2 (Non-Flammable, Non-Toxic Gases), 2.3 (Toxic Gases), 3 (Flammable liquids, except where the flammable liquid is nitromethane), 4.1 (Flammable Solids), 4.2 (Spontaneously Combustible Substances), 4.3 (Dangerous When Wet Substances), 5.1 (Oxidising Agents except where the Toxic Substances are Fire Risk Substances), 5.2 (Organic Peroxides except where the Toxic Substances are Fire Risk Substances), 7 (Radioactive Substances), 8 (Corrosive Substances except where the Toxic Substances are cyanides and the Corrosives are acids), 9 (Miscellaneous Dangerous Goods)

Section 15 - Regulatory Information

AICS: All of the significant ingredients in this formulation are to be found in the public AICS Database.

Section 16 - Other Information

This MSDS contains only safety-related information. For other data see product literature.

Acronyms:

| | |
|-----------------------|---|
| ADG Code | Australian Code for the Transport of Dangerous Goods by Road and Rail, 7th Edition |
| AICS | Australian Inventory of Chemical Substances |
| CAS number | Chemical Abstracts Service Registry Number |
| Hazchem Number | Emergency action code of numbers and letters that provide information to emergency services especially firefighters |
| IARC | International Agency for Research on Cancer |
| ASCC | Office of the Australian Safety and Compensation Council |
| NOS | Not otherwise specified |
| NTP | National Toxicology Program (USA) |
| R-Phrase | Risk Phrase |
| SUSDP | Standard for the Uniform Scheduling of Drugs & Poisons |
| UN Number | United Nations Number |

Contact Points:

Call Farmoz on (02)9431 7800

Fax: (02)9431 7700 and ask for the technical manager.

Police and Fire Brigade:

Dial 000

Emergency contact:

1800 024 973 (24 hours)

If ineffective:

**Dial Poisons Information Centre
(13 1126 from anywhere in Australia)**

The information contained in this Material Safety Data Sheet is provided in good faith and is believed to be correct at the date hereof. However, it is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Farmoz Pty Ltd makes no representation as to the accuracy or comprehensiveness of the information and to the full extent allowed by law excludes all liability whatsoever, whether with respect to negligence or otherwise, for any loss or damage arising from or connection with the supply or use of the information in this Material Safety Data Sheet.

Please read all labels carefully before using product.

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