



18 January 2016
Brigadier Nicolaas van Graan
Legal Support: Crime Operations
South African Police Service
PRETORIA

Via e-mail

Dear Brigadier Van Graan

TOXICOLOGY AND POTENTIAL HEALTH IMPACTS OF GLYPHOSATE AS PRESENT IN KILO MAX

Kilo Max (registration number L8310, contains sodium salt of glyphosate) is registered under the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) as a herbicide for the control of a variety of weeds in forestry, non-crop and industrial areas. It is specifically also registered as a herbicide for the control of the prohibited *Cannabis sativa* (dagga) narcotic plant. The product is registered to be applied by aerial application as per label instructions and can therefore be applied by fixed wing or rotary wing aircraft according to the specifications of SANS 10118 (the South African National Standard for the aerial application of agricultural remedies).

Glyphosate as is present in Kilo Max is a glycine derivative with the following toxicological properties:

Acute toxicity

Mammals: >5,000 mg/kg for rats, >3,350 mg/kg for goats
Birds: >3,851 mg/kg for bobwhite quail
Fish: >86 mg/l for trout, >1,000 mg/l for sheephead minnows

Irritation

It is a mild eye irritant but not a skin irritant.

Inhalation toxicity

Mammals: >4.98 mg/l air over a 4 hour period

Given the application as per label instructions of the Kilo Max label, i.e. 1.62 kg per hectare it is very low dosage per square meter:

Kilo max contains 700 grams glyphosate per kilogram formulation. This is equivalent to applying 1.134 kg glyphosate per hectare or 113.4 milligrams glyphosate per square meter. It is physically impossible for any organism whether mammal (including human being), bird or fish to be exposed to sufficient glyphosate at this rate of application to warrant any concerns about acute toxicity, dermal irritation or even eye irritation – this is derived from the assumption that given a surface area of 10,000 square meters per hectare and a spray volume over the *Cannabis* plantations of 10 meter height (equals 1,000,000 cubic meters) with a glyphosate load of 1.134 mg/cubic meter of air or 0.001134 mg/liter of air. Even with a continued exposure of 12 hours a human being will not inhale more than 1.64 mg of glyphosate – that is less than a third of the acute inhalation dosage over a period of four hours. Given the nature of aerial application there is no possibility that a person in the vicinity of the application can inhale glyphosate spray over a twelve hour period as the spray settles rapidly. Oral ingestion can only be the result of eating plants there were sprayed with glyphosate. Even if cattle would eat Cannabis plants it is impossible to consume sufficient plants to ingest glyphosate that would cause any ill-effects. Dermal toxicity for glyphosate is extremely low and once again it cannot manifest in any ill-effects even if sprayed directly.



Chronic toxicity

In two year feeding trails rats showed no ill-effects after being exposed to 410 mg/kg glyphosate in their diet. Dogs that were fed 500 mg/kg glyphosate in their diet over a one year period also showed no ill-effects at all. The lowest dosage at which rats showed no ill-effects was 31 mg/kg of their own body weight per day over a period of two years.

It is thus scientifically verifiable to state that the chances of symptoms developing either acutely or chronically by a spray operation once per annum or even twice per annum by people or animals who may be close to or in the immediate vicinity of *Cannabis* crops is technically zero.

The recent classification of glyphosate by the World Health Organisation as a Class 2A carcinogen (meaning a probable human carcinogen) was highly contested by scientist all over the world. The classification was based on incomplete data sets and had not taken into account the risk posed by the glyphosate use at the normal exposure levels that people may be exposed to. The European Food Safety Association in their EFSA Journal (2105, 13(11), 4302) concluded that the classification of glyphosate as a probable human carcinogen was incorrect. EFSA's conclusions are based on a massive amount of independent and peer reviewed scientific data. There is no reason to believe that EFSA's evaluation is incorrect whereas the WHO classification was challenged from all over the world. Please view the attached media statement and associated report of EFSA for greater details.

The allegations made by the plaintive in this case are not substantiated or supported by any clinical evidence. It is extremely unlikely that the alleged symptoms in human beings and animals are linked to the application of glyphosate. People are exposed to other factors such a pollen, tobacco smoke, wood fire smoke, viral and bacterial infections, unhealthy dietary habits and others that are most likely the causes of health effects. It is also extremely unlikely that allegations of animal health effects are linked to glyphosate. Unless the plaintive can substantiate the allegations of ill-effects by affidavits from health care practitioners and veterinarians it can only treated with contempt.

There is to my knowledge no evidence in South Africa under farmers or farm workers that work with glyphosate very often of any ill-effects induced by glyphosate. It is therefore totally unlikely that the effects claimed by the plaintive are linked to the very limited application of glyphosate.

What is of concern with glyphosate formulation is the presence of other formulants such as POE-tallow amine especially in liquid formulations. It is generally considered that tallow amine is more toxic than glyphosate and hence EFSA's call for more studies on other formulants. However, Kilo Max does not contain POE-tallow amine and those concerns are therefore not applicable.

The South African Police Service acts well within its mandate to apply Kilo Max by aerial application to eradicate this narcotic plant. Kilo Max is legally registered by the Department of Agriculture for Cannabis control, the aerial applicators are registered as Pest Control Operators by the Department of Agriculture and they operate within the confines of Act No. 36 of 1947, the SANS 10118 and the Pest Control Operators Regulations of Act No. 36 of 1947. Glyphosate is used elsewhere in South Africa for weed control in agriculture, environmental weed management in conservation areas and water bodies and also for the control of weeds in timber plantations. No claims as those made by the plaintive have ever been made in South Africa even though glyphosate is used in quantities vastly larger than those used to eradicate the *Cannabis* plantations. There is also no evidence either recorded or alleged of ill-effects on the general health of applicators or animals in areas where glyphosate is used regularly for weed control.

The fact that other nations have restricted the use of glyphosate to eradicate other narcotic weeds such cocaine plantations in South America was politically motivated and not based on any risk assessment or cost benefit analysis. Had such politicians been au fait with the real toxicological profile of glyphosate they would not have succumbed to the pressure to terminate its application.



It is also important to note that some of the studies used in assessing the toxicology of glyphosate and its potential to trigger adverse health effects were conducted with excessively high dosages of glyphosate. It is extremely unlikely that such high levels of glyphosate could ever be achieved in the field and therefore extrapolating any results from such studies to brand glyphosate as a probable human cancer agent or endocrine disruptor are very suspicious. All pesticide have a hazard (danger) profile but that seldom translates into risk due to the low dosages being applied in typical application situations.

I suggest that the SA Police Service also consults Dr Ockie Fourie on the status of glyphosate for another independent opinion.

Best wishes.

Sincerely,

DR GERHARD H VERDOORN
DIRECTOR: GRIFFON POISON INFORMATION CENTRE