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Rainwater harvesting: What are the potential effects of roof maintenance on runoff quality? France as an example

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Plan

- Introduction
- Methodology
- Results / Discussion
- Conclusion

Introduction

- Currently in France:
 - Success of rainwater harvesting & re-use
 - Governmental promotion harvesting & re-use (tax reduction) for soil cleaning, toilets,...
- BUT...
 - No reflexion about rainwater quality & risks associated
→ rainwater are « pure »
 - Contaminations by trace metals (Robert-Sainte, 2009) & organic micro pollutants (Burkhardt *et al.*, 2007)

Introduction (2)

- Practices are source of micro pollutants
 - Cleaning the roof for embellishment
 - Use of biocide
 - During rain possible leaching of these biocides
- Necessary to evaluate level of contamination & risks of roof runoff re-use !

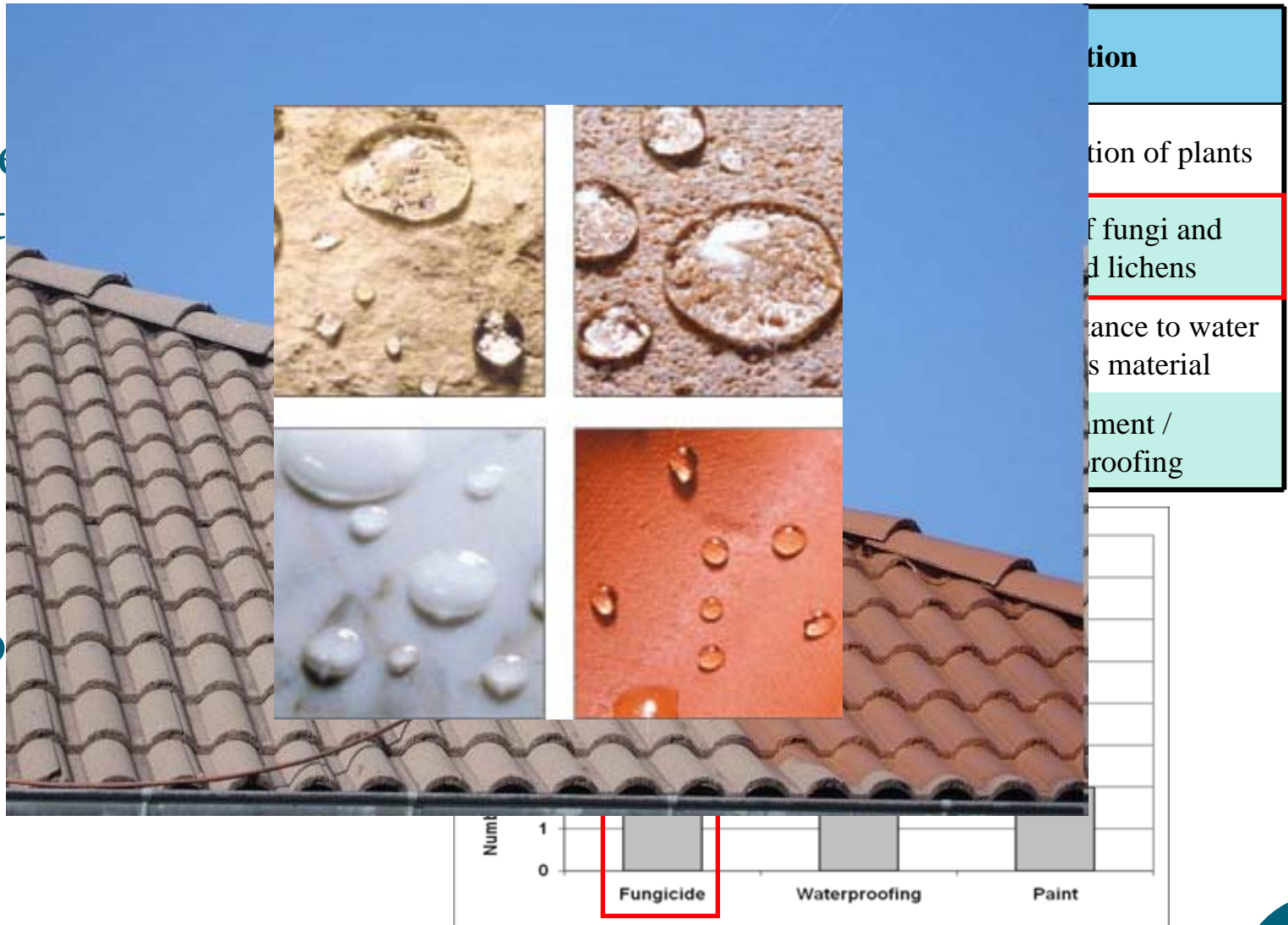
Methodology

- Listing roof treatment products / Survey of professionals
 - Determination of practices
 - Knowledge of roof treatment undertaken
- Compositions (SDS)
 - Isolation of biocide molecule(s) & toxicity
- Bibliography
 - Types of contamination in countries where rainwater is drunk (developing countries, ...)

Results & Discussion: Listing / Survey

- Fungicide popular treatment product

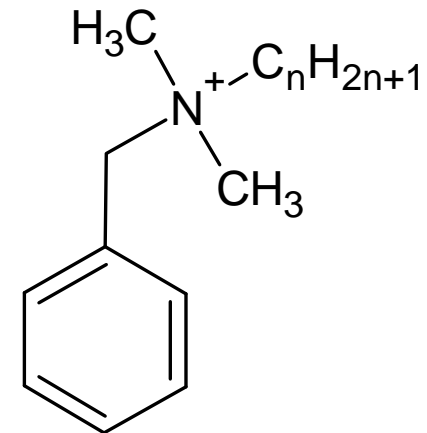
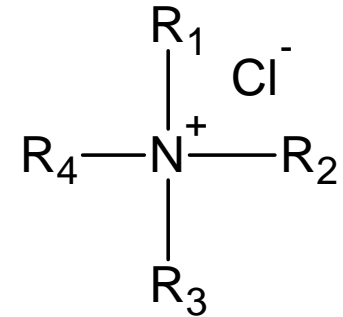
- Result comparison survey:



Results & Discussion: Biocide used

- Quaternary Ammonium Compounds (QACs):
- Toxicity:
 - Highly toxic for aquatic environment (EC50 < 1 mg/L)
 - Irritant and allergen to skin contact, possible asthmatic reactions
- For 100m² roof: 400g → 1000g of QACs

→ Risks exist for users and environment by mobilisation of QACs



Alkylbenzyltrimethylammonium
(n° CAS : 8001-54-5)

Results & Discussion: Drinking water

- Rainwater = Source of drinking water for countries without good or enough water resources
- Not a novel concept in Africa
 - South Africa: Rainwater → major source of drinking water during rainy season
 - Development in rural areas

Results & Discussion: Drinking water (2)

- For drinking water → Quality has to be good enough !
 - Studies in New Zealand and India:
 - Bacteriological factor limits the consumption of rainwater (for 30 to 90% of cases)
 - Small proportion of chemical contamination but more difficult to eliminate
- Risk by bacteriological & chemical pollution

Conclusion

- Rainwater harvesting → contemporary issue
- Contaminations exist for countries with **good source of drinking water (a)** and countries which **need rainwater for drunk (b)**
- Sources of pollution different
- Different approaches:
 - (a): guide maintenance of roof and storage tank
 - (b): increase knowledge of rainwater contamination & harvesting technics and guide population if possible health risks

Thank you for your attention

