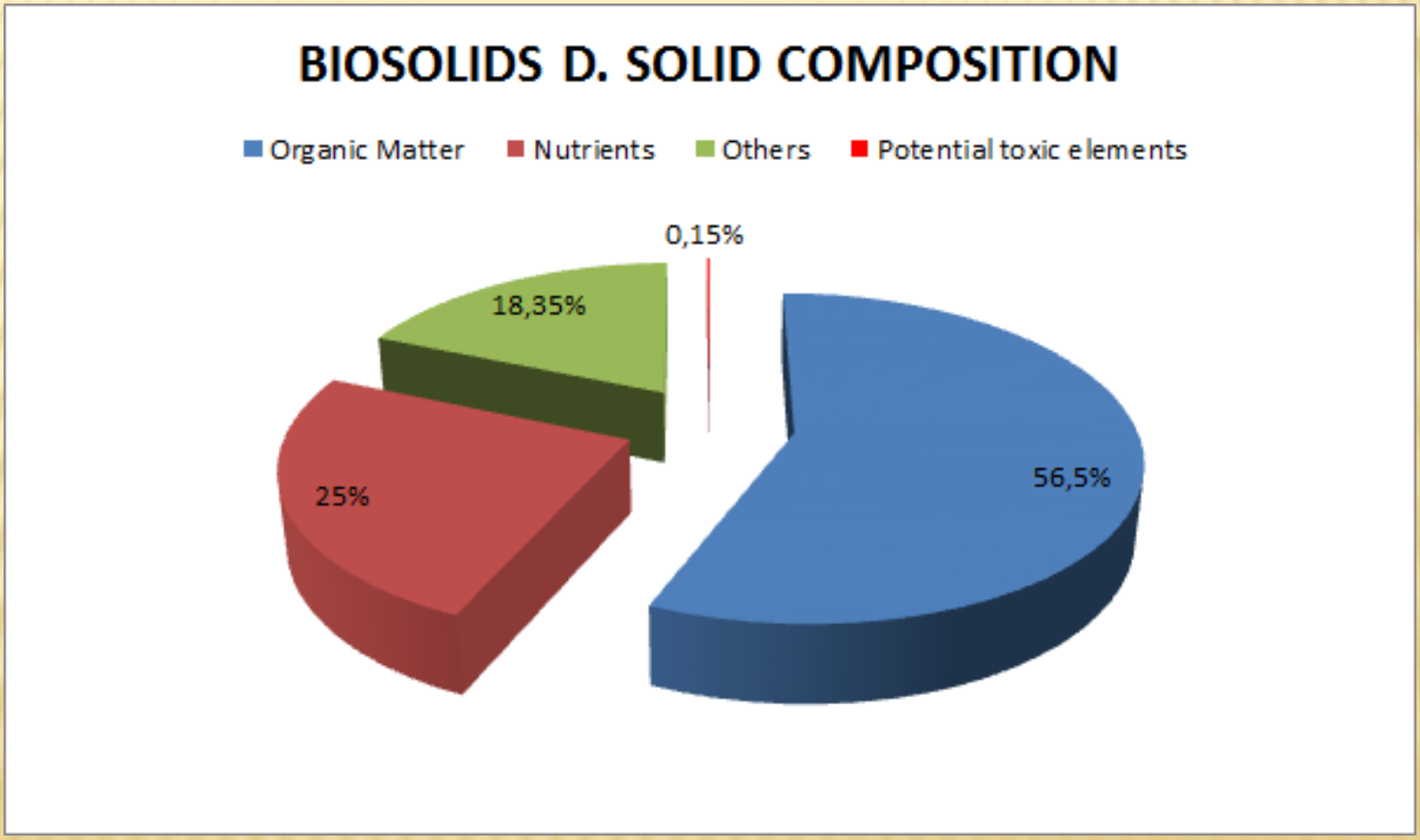
BIOSOLIDS LAND APPLICATION AND FOOD CROP QUALITY ASSURANCE SCHEME

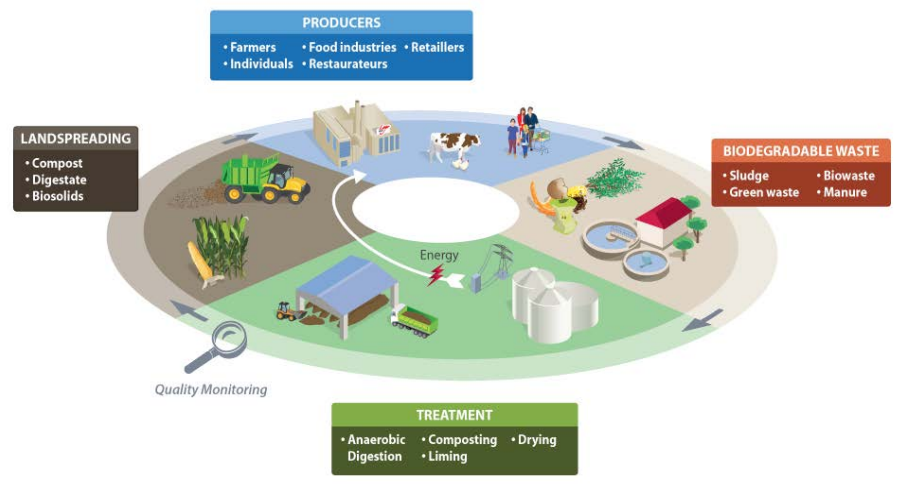
WHAT IS BIOSOLIDS COMPOSITION ?



MAJOR BENEFITS OF BIOSOLIDS LAND APPLICATION

Biosolids land application allows:

- ❑ soil replenishment in organic matter
- ❑ crop nutrition and mineral fertilisers savings
- ❑ climate change mitigation
- ❑ local development of the circular economy



SCIENTIFIC FINDINGS

Decades of research worldwide and long term experiment have concluded that recycling of biosolids has consistently positive outcomes.

SCIENTIFIC FINDINGS

- ★ *In nearly all situations the* ***Biosolids*** *fertilizer* ***gave similar crops yields*** *to those obtained from the application of ammonium nitrate fertilizer (****CORDIS****)*
- ★ ***Pollutants present in Biosolids do not pose a significant threat to crops (CORDIS)***
- ★ *Organic* ***micro-pollutant concentrations returned to background concentrations within a year (CORDIS)***
- ★ ***Uptake of organic pollutants by plants is considered to be negligible (CORDIS)***
- ★ *Long-term amendment with* ***Biosolids*** *(equivalent to more than 100 years of application) had* ***minimal effect on plant uptake of potentially toxic elements (Copenhagen University)****.*
- ★ *Repeated* ***Biosolids*** *land application* ***increases crop yield and soil organic matter (Copenhagen University) .***
- ★ ***Input of Biosolids enhances soil properties*** *proportionally to the application rates and/or frequency amounts* ***(Copenhagen University)****.*

SCIENTIFIC FINDINGS

- ***Soil microbial community did not appear to be adversely affected*** *by 20 years of land application of Class B* ***Biosolids (Arizona State University)****.*
- *Increase of organic matter rate following Biosolids compost land application results in the* ***improvement of soil physical*** *(structure and water availability)* ***and biological properties*** *(diversity and size of microbial populations) This contributes to a higher nitrogen availability for crop production (****INRA****).*
- *Monitoring of microbial population and analysis of organic contaminants demonstrate that* ***repeated biosolids compost land application have no health impact on soils and crops*** *(****INRA****).*
- *Follow up of* ***13 pharmaceuticals*** *following land application of different organic waste including Biosolids show a* ***very limited eco-toxicological risk****: the* ***accumulation of these compounds in soil is very limited*** *and their concentration in groundwater are very low (****INRA****).*

CONVERGING RISK ASSESSMENT RESULTS

CONVERGING RISK ASSESSMENT RESULTS

- *The **aggregate risk** from Biosolids use or disposal in the US **is especially low** (US EPA).*
- *Recycling sewage sludge on farmland as a soil conditioner and alternative fertiliser within current guidelines is a **safe and sustainable practice** (**Imperial College London**).*
- *VKM considers the use of sewage sludge to constitute a **low risk to the soil ecosystem** ; Most of the estimated exposures are well below any predicted effect concentration(**Norwegian Scientific Committee for Food Safety**).*
- *Land application of sewage sludge and composted sewage sludge, in regard of assumptions and exposure scenario of this study, is presenting a **related risk significantly under the limit values** (INERIS-CNRS).*
- *Obtained results showed that the use of Biosolids results in a **low health risk** (**Catania University**).*

INTEGRATION OF BIOSOLIDS LAND APPLICATION IN FOOD CROP QUALITY ASSURANCE SCHEME

- **Compliance with local regulation**

  Product sheet accompanying biosolids deliveries shall include a statement of compliance with local regulations.

- **Biosolids management under quality assurance**

- **Biosolids monitoring and traceability** per batches of no more than 2000 tons (maximum once/month).

INTEGRATION OF BIOSOLIDS LAND APPLICATION IN FOOD CROP QUALITY ASSURANCE SCHEME

- Maximum PTE levels in biosolids

Compound	Unit	Composted Biosolids	Other Forms of Biosolids
TRACE ELEMENTS			
Cadmium	mg/kg DS	2	4
Chromium (total)	mg/kg DS	80	160
Mercury	mg/kg DS	1	2
Nickel	mg/kg DS	50	100
Lead	mg/kg DS	120	240
Arsenic	mg/kg DS	40	80
Copper	mg/kg DS	300	600
Zinc	mg/kg DS	800	1600
ORGANIC COMPOUNDS			
PAH 16	mg/kg DS	6	12
PATHOGENS			
Salmonella	CFU	Absence in 25 g or 25 ml	
E Coli or Enterococcacae	CFU	1000 in 1 g or ml	
IMPURITIES			
Marcroscopic impurities (glass, metal, plastics > 2 mm)	g/kg	3	

INTEGRATION OF BIOSOLIDS LAND APPLICATION IN FOOD CROP QUALITY ASSURANCE SCHEME

- Maximum PTE addition to soil

Compound	Unit	Maximum flow
TRACE ELEMENTS		
Cadmium	kg/ha/yr	0,01
Chromium (total)	kg/ha/yr	0,4
Mercury	kg/ha/yr	0,005
Nickel	kg/ha/yr	0,25
Lead	kg/ha/yr	0,6
Arsenic	kg/ha/yr	0,2
Copper	kg/ha/yr	1,5
Zinc	kg/ha/yr	4
ORGANIC COMPOUNDS		
PAH 16	kg/ha/yr	0,03

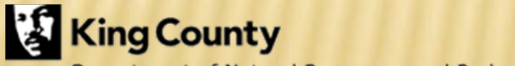
INTEGRATION OF BIOSOLIDS LAND APPLICATION IN FOOD CROP QUALITY ASSURANCE SCHEME

Communicating on the beneficial use of Biosolids:

- ❑ resources savings certificate delivered to final users
- ❑ GHG balance per farm (emissions avoidance + C sequestration).
- ❑ Use of the sustainable fertiliser brand logo on any documentation delivered to third party.

SUPPORTERS OF THE BIOSOLIDS ALLIANCE QAS

OK Ranch, BC



THANK YOU FOR YOUR ATTENTION