Supplementary material
Sub-Saharan Africa sweetpotato virome

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Abstract

Results and supplementary figures of the Sub-Saharan Africa sweet-potato virome (SSA-SPV).

1 Gravity model

We evaluate the cropland density of sweetpotato using a cropland connecitvity risk index (Yanru et la., 2020). Implementing a gravity model using a negative exponential distribution using the sweetpotato density of 1degree pixel from the Monfreda and MapSpam databases (REFs).

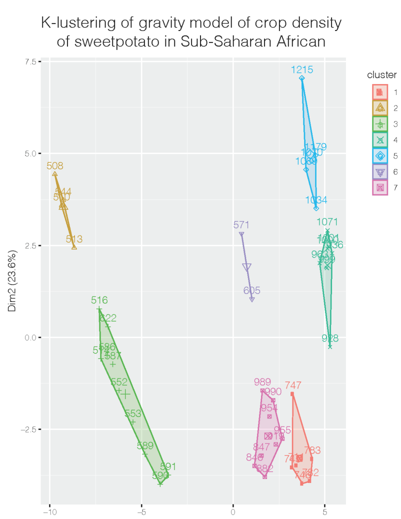

Figure 1: Gravity model Sub-Saharan Africa sweetpotato virome.

$$2Mg + O_2 \longrightarrow 2MgO$$

1.1 Regions

Seven regions of sweetpotato were identified with a gravity model (table 1).

K-cluster	Regions	Countries	Samples
Region 1	East	Tanzania, Uganda	228
Region 2	Near West	Ghana, Benin and Nigeria	36
Region 3	Southwest	Angola	171
Region 4	East group 1	Mozambique, Zimbabwe	262
Region 5	East group 2	Mozambique, Tanzania, Zimbabwe	151
Region 6	East group 3	Rwanda, Tanzania, Uganda	261
Region 7	Far East	Ethiopia	171
Total			1286

2 Regions

2.1 Region 1

a

2.2 Region 2

a

2.3 Region 3

a

2.4 Region 4

a

2.5 Region 5

a

2.6 Region 6

a

2.7 Region 7

a

2.8 Region 1

a

3 Sample Calculation

Mass of magnesium metal	$= 8.59\,\text{g} - 7.28\,\text{g}$
	$= 1.31\,\text{g}$
Mass of magnesium oxide	$= 9.46\,\text{g} - 7.28\,\text{g}$
	$= 2.18\,\text{g}$
Mass of oxygen	$= 2.18\,\text{g} - 1.31\,\text{g}$
	$= 0.87\,\text{g}$

Because of this reaction, the required ratio is the atomic weight of magnesium: 16.00 g of oxygen as experimental mass of Mg: experimental mass of oxygen or $\frac{x}{1.31} = \frac{16}{0.87}$ from which, $M_{\mathrm{Mg}} = 16.00 \times \frac{1.31}{0.87} = 24.1 = 24\,\mathrm{g\,mol^{-1}}$ (to two significant figures).

4 Results and Conclusions

The atomic weight of magnesium is concluded to be $24\,\mathrm{g\,mol^{-1}}$, as determined by the stoichiometry of its chemical combination with oxygen. This result is in agreement with the accepted value.

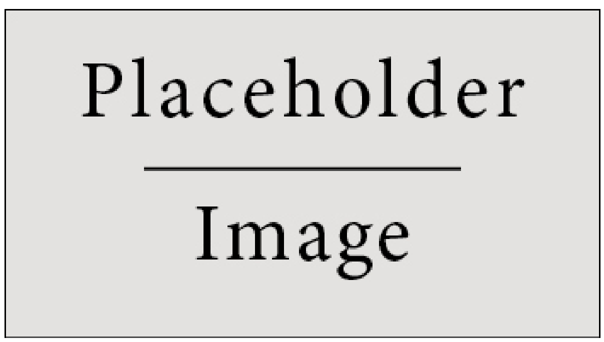

Figure 2: Figure caption.

5 Discussion of Experimental Uncertainty

The accepted value (periodic table) is $24.3\,\mathrm{g\,mol^{-1}}$ Smith and Jones (2012). The percentage discrepancy between the accepted value and the result obtained here is 1.3%. Because only a single measurement was made, it is not possible to calculate an estimated standard deviation.

The most obvious source of experimental uncertainty is the limited precision of the balance. Other potential sources of experimental uncertainty are: the reaction might not be complete; if not enough time was allowed for total oxidation, less than complete oxidation of the magnesium might have, in part, reacted with nitrogen in the air (incorrect reaction); the magnesium oxide might have absorbed water from the air, and thus weigh "too much." Because the result obtained is close to the accepted value it is possible that some of these experimental uncertainties have fortuitously cancelled one another.

6 Answers to Definitions

a. The *atomic weight of an element* is the relative weight of one of its atoms compared to C-12 with a weight of 12.0000000…, hydrogen with a weight of 1.008, to oxygen with a weight of 16.00. Atomic weight is also the average weight of all the atoms of that element as they occur in nature.

b. The *units of atomic weight* are two-fold, with an identical numerical value. They are g/mole of atoms (or just g/mol) or amu/atom.

c. *Percentage discrepancy* between an accepted (literature) value and an experimental value is

$$\frac{\text{experimental result} - \text{accepted result}}{\text{accepted result}}$$

References

Smith, J. M. and Jones, A. B. (2012). *Chemistry.* Publisher, 7th edition.