

**Chemistry in a coffee cup: does coffee waste contain key elements for
plant growth?**

Phosphate worksheet

- Volume of water used for extraction: 200 ml
- Dilution 20×: 5 ml coffee extract in 100 ml volumetric flask
- Volume tested of diluted solution with aquarium kit: 10 ml

What phosphate concentration did you observe?

In NPK fertilisers, does P refer to phosphorus, phosphates or phosphorus pentoxide?

How many milligrams of phosphorus pentoxide P_2O_5 are present in the measured mass of coffee waste?

1. Convert ppm to mg of phosphate (PO_4^{3-}) in the 10 mL test sample:

2. How many milligrams of PO_4^{3-} were in the 100 ml flask?



3. Many milligrams of PO_4^{3-} were the 200 ml of water extracted from the coffee grounds?

4. Assuming all the PO_4^{3-} is extracted, how many mg PO_4^{3-} are in 1 kg of coffee waste?

5. NPK fertilizers contain phosphate in the form of P_2O_5 . How much P_2O_5 is present per kg of coffee waste.

Molar mass PO_4^{3-} :

Molar mass P_2O_5 :

How do high levels of phosphate affect plant growth and aquatic ecosystems?
