# iCheck Iron
# Measuring Iron in Bouillon Cubes

## 1. Method Principle and Application


The iCheck Iron device is a single-wavelength portable photometer that converts absorption units into iron concentration in mg per liter (mg/L). The reagent vials supplied in the iCheck Iron Test Kit are developed to extract iron from water dispersible samples and detect iron using colorimetric reaction.

Iron quantification is based on a colorimetric reaction with bathophenanthroline. The resulting red complex correlates with iron concentration and is measured at 525 nm with the iCheck device. The measurement range of iCheck Iron is 1.5 – 12.0 mg/L.

The method is suitable for iron quantification in vitamin premixes, bouillon cube, fortified rice kernels (FRK), flour, corn soya blend (CSB), lipid-based nutritional supplements (LNS), soy and fish sauce and beverages. Handling requires only one day training.

## 2. iCheck Iron Performance with Bouillon Cube

Typically, iron is added to fortified bouillon cube as ferric pyrophosphate (FPP). iCheck Iron performance has been assessed with bouillon cube fortified with FPP and results compared to a reference method inductively coupled plasma mass spectrometry (ICP-MS). The table below summarizes the results:

**Table 1. The Performance of iCheck Iron Device compared to a Reference Method**

| Sample Type | Fortificant Type | Added Concentration of iron | iCheck Precision as RSD [1] | ICP-MS Precision as RSD | iCheck Recovery vs. ICP-MS |
|---|---|---|---|---|---|
| Bouillon cube | Ferric Pyrophosphate | 400-600 mg/kg | ±6% | ±10% | 95-102% |

(1) RSD – relative standard deviation

## 3. Analyzing the Iron Content in Bouillon Cube

The measurement range of iCheck Iron is 1.5 – 12 mg/L. Samples must be diluted appropriately to fall within this measurement range.

Ferric pyrophosphate is not readily soluble in water. Therefore, we recommend flour dilution in acid (0.2 – 0.4 M HCl) to ensure homogeneity of the diluted sample.

- Crush the bouillon cube into a fine powder using a laboratory mortar and pestle.
- Weigh the sample according to the specifications in Table 2 and record the exact weight.

**Table 2. Dilution of Bouillon Cubes in HCl for Iron Quantification with iCheck Iron**

| Sample Type | Expected Conc. [mg/kg] | Dilution | Sample Weight [g] | Total diluted volume in HCl [mL] | Expected diluted conc. [mg/L] |
|---|---|---|---|---|---|
| **Bouillon cubes** | 400 - 600 | 1:100 | 2 | 200 | 4 - 6 |

- Dilute the sample in 0.2 – 0.4 M HCl solution.
- Shake the mixture vigorously for approximately 2 minutes.
- Incubate the mixture for 30 minutes.
- After the incubation, shake the sample solution vigorously once more. Immediately take up approximately 0.6 mL of the solution into the syringe.
- Adjust the volume to exactly 0.4 mL and inject it into an activated iCheck Iron reagent vial.
- Proceed as described in the iCheck Iron User Manual.

## 4. Dilution Factor (DF) Calculation

The value displayed on the iCheck Iron after measurement will reflect the concentration of iron in the diluted sample. To obtain the original bouillon cube iron concentration, you must first calculate the dilution factor according to the following formula:

$$DF = \frac{Total\ sample\ solution\ volume\ (mL)}{Sample\ weight\ (g)}$$

Once you have calculated the dilution factor, multiply the iCheck Iron result by the dilution factor.

$$Iron\ in\ bouillon\ cube\left(\frac{mg}{kg}\right) = iCheck\ Iron\ result\ (\frac{mg}{L})\ x\ DF$$

For technical support email us: **support@bioanalyt.com**

Last Update: June 2025