

USING WYD CHECKER MACHINE TO DETERMINE IODINE CONTENT IN SALT SAMPLES

Prof. Victor J Temple

Micronutrient Research Lab, Division of BMS,
School of Medicine and Health Sciences, UPNG

OVERVIEW OF WYD CHECKER MACHINE

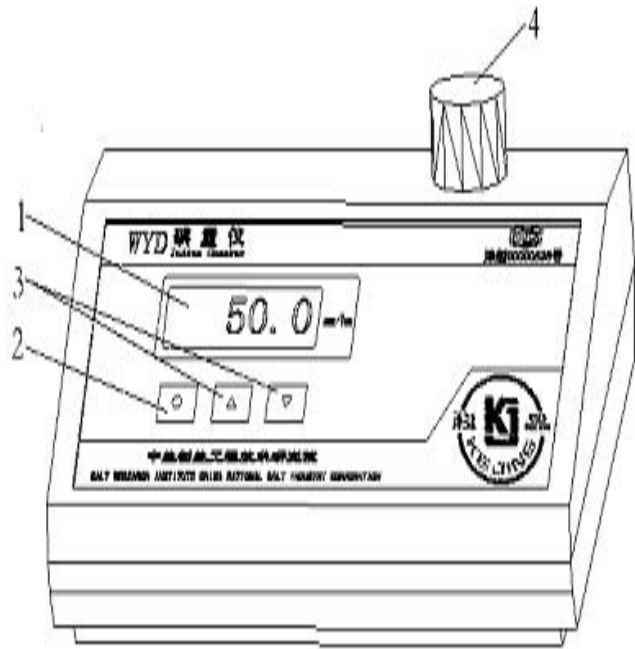
- WYD Iodine Checker is a single-wavelength spectrophotometer that measures iodine level (mg/kg or ppm) in salt based on the absorption of the iodine-starch blue compound at 585nm;
- Performance testing results indicated that the WYD Checker is a highly precise, accurate, and sensitive tool for measuring salt iodine content;
- It is a user-friendly instrument that is based on a simple methodology and straightforward salt sample preparation and testing procedure;

WYD overview cont.....

- WYD machine can operate on 220V AC voltage or DC 9V, which requires six AA batteries. Thus, it can be used outside (in the field);
- Two reagents are required for the operation of the machine:
- **Solution A:** Starch-based solution;
- **Solution B:** Sulfuric acid solution;
- These solutions should be prepared in the lab and can be stored for several months in the refrigerator at 4 to 8 C.

WYD overview cont....

- Items required for assay of iodine in salt by WYD
- Two 50 ml Volumetric flasks with lids,
- Two 500ml Conical flasks with lids,
- Two semi-automated 5.0 ml Pipettes,
- Several pipette tips,
- Large volume of distilled water (bottle water),
- One water bottle for distilled water
- Solution A
- Solution B



Preparation of Salt solution for analysis using WYD:

1. Take 2 clean 50ml conical flasks with screw caps and label each of them clearly (flask_1 and flask_2);
2. Fill the small plastic spoon provided with salt (1.0g of salt) and put in the 50.0 ml Conical flask_1;
 - (NB: The salt must be properly mixed before taking it with the plastic spoon);
3. Add 10.0ml of distilled water (or bottle water) into the conical flask_1 containing the salt
 - (NB: do not use tap water);
4. Mix the solution to dissolve the salt (ensure that the salt is completely dissolved),

Preparation of Salt solution for analysis using WYD: cont

5. Use the pipette to take 2.0 ml of **Solution A** and pour it into the conical flask_1;
 - Shake the flask_1 gently to mix the solution;
6. Use another pipette to take 2.0 ml of **Solution B** and pour it into the same flask_1;
7. Close flask_1 with the screw cap and shake the flask_1 to mix the solution properly;
8. Pour the solution in conical flask_1 into a clean 50.0ml volumetric flask;
9. Add enough distilled water or bottle water to make the volume up to 50.0 ml;

Preparation of Salt solution for analysis using WYD; cont...

10. Shake the volumetric flask properly to mix the solution thoroughly so as to obtain a uniform solution;
- 11. Pour the solution back into conical flask_1 and close the flask with the screw cap;**
- 12. REPEAT Steps 2 to 11 for conical flask_2;**

CALIBRATION OF ZERO POINT IN WYD CHECKER MACHINE

- Open the lid of the cuvette compartment in WYD machine, insert the cuvette containing distilled water then close the lid;
- Press the Auto-calibration Key (key O), the reading 0.0 should appear on the screen;
 - (NB: if the reading 0.0 does not appear use up/down key to set the zero);
- Open the lid and remove the cuvette with water, then close the lid; drain the water from the cuvette;

CALIBRATION OF WYD CHECKER MACHINE USING GREY GLASS

- Open lid of the cuvette compartment in WYD machine, insert Grey Glass and close the lid;
- Record the value shown on the screen;
 - NB: Expected value on the screen should be 50 ± 0.5 . However, the value will be predetermined in the Micronutrient lab from the Internal Quality Control (QC) procedure. Levy-Jenny's chart and Westgard Rules will be used to monitor the value of the Grey Glass shown on the screen.
- WYD machine will be considered calibrated and ready for use if the value of the Grey Glass on the screen is within the permissible limits of the Westgard Rules;

DETERMINATION OF IODINE CONTENT IN SALT SAMPLE

- Pour the salt solution in **Point 10** obtained for conical flask_1 above into the cuvette,
- Open the lid of the cuvette compartment in the WYD machine,
- Insert the cuvette containing the solution from conical flask_1 and close the lid;
- Record the reading on the screen.
- This is equal to Iodine content (mg/kg or ppm) in the salt sample in conical flask_1.

Determination of iodine content in salt sample; cont...

- Repeat the steps above for the solution in conical flask_2;
- Enter both results obtained in flask_1 and flask_2 in the appropriate section in salt questionnaire;
- This gives the results for salt sample in duplicate

REFERENCES

- **Lindsay H. Allen** Ending Hidden Hunger: The history of micronutrient deficiency control: Background paper of the World Bank-UNICEF nutrition assessment project, World Bank: Washington, DC, USA, 2000, 111 – 130.
- UNICEF The state of the world's children 2012 children in an urban world www.unicef.org/sowc2012.
- UNICEF-WHO-The World Bank joint child malnutrition estimates – Levels and trends: World Health Assembly 2012 report 13 year plan 2012 – 2025 www.who.int/nutgrowthdb/estimates/en/index.html
- WHO, UNICEF, UNU. Iron deficiency anaemia: assessment, prevention, and control. A guide for programme managers. Geneva, World Health Organization, 2001. WHO/NHD/01.3. www.who.int/nutrition/publications/micronutrients/anaemia_iron_deficiency/WHO_NHD_01.3/en/
- WHO, WFP, UNICEF; Preventing and controlling micronutrient deficiencies in populations affected by an emergency Multiple vitamin and mineral supplements for pregnant and lactating women, and for children aged 6 to 59 months: Joint statement by the World Health Organization, the World Food Programme and the United Nations Children's Fund; www.unicef.org/Joint_Statement_Micronutrients_March_2006.pdf
- Food Fortification Initiative (FFI). Rice fortification's impact on nutrition. Atlanta, USA: FFI, 2014. Available from www.FFInetwork.org
- Sajid Alavi, Betty Bugusu, Gail Cramer, Omar Dary, Tung-Ching Lee, Luann Martin, Jennifer McEntire, Eric Wailes; Rice Fortification in Developing Countries: A Critical Review of the Technical and Economic Feasibility. A2Z Project Academy for Educational Development, April 2008, 1 – 75, www.a2zproject.org
- Kayode O Osungbade and Adeolu O Oladunjoye; Anaemia in Developing Countries: Burden and Prospects of Prevention and Control, Anemia, Dr. Donald Silverberg (Ed.), ISBN: 978-953-51-0138-3, In Tech, Available from: www.intechopen.com/books/anemia/anaemia-in-developing-countries-burden-and-prospects-of-prevention-and-control, 2012

REFERENCES Cont...

- Georg Steiger, Nadina Muller-Fischer, Hector Cori and Beatrice Conde-Petit; Annals of the New York Academy of Sciences Issue: Technical Considerations for Rice Fortification in Public Health: Fortification of rice: technologies and nutrients. 2014, 1 – 11 doi: 10.1111/nyas.12418;
- Mark A. Beinner, Gustavo Velasquez-Melendez, Milene C. Pessoa, and Ted Greiner; Iron-Fortified Rice Is As Efficacious As Supplemental Iron Drops in Infants and Young Children J. Nutr. 140: 49–53, 2010
- Moench-pfanner, R.; Lailou, A.; Berger, J. Introduction: Large-scale fortification, an important nutrition-specific intervention. Food Nutr. Bull. 2012, 33, S255–S259
- Copenhagen Consensus 2012.
www.copenhagenconsensus.com/Admin/Public/DWSDownload.aspx?_1105.pdf.
- Khov Kuong, Arnaud Lailou, Chantum Chea, Chhoun Chamnan, Jacques Berger and Frank T. Wieringa. Stability of Vitamin A, Iron and Zinc in Fortified Rice during Storage and Its Impact on Future National Standards and Programs—Case Study in Cambodia; Nutrients, 8, 51, 2016; doi: 10.3390/nu8010051 www.mdpi.com/journal/nutrients
- Papua New Guinea National Department of Health, Food Sanitation Regulation, Statutory Instrument No. 01, Port Moresby 2007.
- Papua New Guinea National Nutrition Survey 2005, Chapter 5; Pac J Med Sci. Vol. 8, No. 2, May 2011; 53–57. <http://www.pacjmedsci.com/vol8no-22011pngnns.htm>
- “Food Fortification Initiative (FFI). Documenting a field-use rapid qualitative assay for fortified rice. Atlanta, USA: FFI, 2015. Available from www.FFInetwork.org }
- Saskia De Pee, 2014. Proposing nutrients and nutrient levels for rice fortification. 10.1111/nyas.12478