

REVIEWER'S REPORT

Manuscript No.: IJAR- 56888

Title Determination of Uranium in Phosphate Industry Effluents Using WDXRF: Concentration Assessment and Environmental Implications.

Recommendation:

Accept as it is

Accept after minor revision

Accept after major revision

Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality		✓		
Techn. Quality		✓		
Clarity			✓	
Significance			✓	

Reviewer Name: **ANAPANA GOPAL**

Reviewer's Comment for Publication.

General Comments

The manuscript focuses on the determination of uranium in phosphate industry effluents using WDXRF, addressing an important environmental and analytical chemistry problem. The topic is relevant due to increasing concerns about radioactive contaminants in industrial wastewaters and the need for rapid monitoring techniques. The study demonstrates that WDXRF can be applied for direct uranium determination with reasonable precision. However, the manuscript in its current form is methodologically weak and lacks depth, particularly in validation, comparative analysis, and environmental interpretation. Significant improvements are required before it can be considered for publication.

Content and Originality

Strengths:

- The study addresses a relevant environmental issue (uranium contamination).
- Application of WDXRF to liquid effluents is relatively less common compared to solid matrices.
- Focus on rapid, non-destructive analysis is valuable for industrial monitoring.

Concerns:

- The level of originality is limited:
 - Similar applications of WDXRF for trace metals are already well documented.
- The manuscript lacks:
 - Clear novelty statement
 - Comparison with existing analytical techniques (e.g., ICP-OES, ICP-MS)
- Environmental implications are superficial and not quantitatively assessed.

Suggestion:

Explicitly state:

- What is new (e.g., direct liquid analysis without digestion, method optimization)
- How this method improves over existing techniques

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Technical Quality

Strengths:

- Instrumental parameters are provided (voltage, current, crystal, line used).
- Replicate measurements (10 samples) indicate some level of reproducibility.

Minor Concerns:

1. Lack of Method Validation

- No calibration details:
 - Standard preparation
 - Calibration curve
 - Linearity (R^2)
- No:
 - Limit of Detection (LOD)
 - Limit of Quantification (LOQ)
 - Accuracy or recovery studies
- No certified reference materials (CRMs)

2. No Comparative Technique

- ICP-OES is mentioned but not used for validation
- No cross-verification of results

3. Sample Preparation Issues

- Claim of “no preparation” contradicts:
 - Filtration
 - Dilution (mentioned in abstract but not detailed later)
- Matrix effects are acknowledged but not corrected or quantified

4. Data Presentation

- Results are overly simplistic:
 - Only ~10 ppm across all samples
 - Very low variability → raises concerns about:
 - Sensitivity
 - Instrument resolution
- No statistical tests beyond CV

5. Interpretation Issues

- Environmental risk discussion is not supported by standards:
 - No comparison with WHO/EPA permissible limits
- 10 ppm uranium is significant, but context is missing

Suggestion:

- Include full method validation parameters
- Compare results with ICP-OES or ICP-MS
- Provide regulatory comparison values
- Discuss matrix effects quantitatively

Language and Presentation

Strengths:

- Generally understandable scientific English
- Appropriate use of technical terms

Minor Issues:

- Frequent grammar and formatting errors, e.g.:
 - “UsingWDXRF” (missing space)
 - “aims todevelop”

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- “effluentsand”
- Inconsistent formatting:
 - Units (ppm, keV, μm spacing inconsistent)
 - Bullet points not standardized
- Some sentences are awkward or incomplete

Suggestion:

- Perform professional language editing
- Ensure consistency in:
 - Units
 - Spacing
 - Scientific notation

Structure and Organization

Strengths:

- Follows standard scientific format (Abstract → Introduction → Methods → Results → Conclusion)
- Logical flow of sections

Concerns:

- Section numbering is inconsistent (e.g., “1. Experimental” followed by “2. Conclusion”)
- Results and Discussion are merged but not deeply discussed
- Figures:
 - Referenced but not properly described or analyzed
- Table is minimal and lacks:
 - Error values
 - Replicates

Suggestion:

- Separate:
 - Results
 - Discussion
- Improve figure and table descriptions
- Maintain consistent section numbering

References and Citations

Strengths:

- Includes relevant sources:
 - WHO, IAEA, UNSCEAR
 - Analytical chemistry textbooks

Concerns:

- Several references are:
 - Too general (reports instead of research articles)
- Lack of recent experimental studies on WDXRF for uranium
- Inconsistent citation formatting

Suggestion:

- Add recent peer-reviewed journal articles
- Standardize reference style
- Ensure all citations are complete and consistent

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Overall Recommendation

The manuscript addresses an important topic but suffers from serious methodological and presentation limitations. The lack of validation and insufficient analytical depth significantly weaken the scientific contribution.

Final Decision:

Minor Revision Required