INFORMATION ESSENTIAL FOR CHARACTERIZING A FLOW-BASED ANALYTICAL SYSTEM
INTRODUCTION

- Classification and definition of flow-based analytical methods
  Existing terminology → incomplete / ambiguous

- Analytical procedures and related instrumentation
  Often partially described

- IUPAC recommendations
  [Pure Appl. Chem. 66 (1994) 2493]
  Complementation required
OBJECTIVES

- Guidelines for characterizing a flow analyzer and related methods

- Minimal requirements for scientific or technical reports

- Checklist to strengthen the tendency toward normalization
Elements to be considered for proper description of the flow system

Description of the components of the system
- establishment of the flowing streams
- sample introduction (possibility of reagent introduction)
- manifold
- sample processing
- detection

Performance (figures of merit)
- sampling rate, accuracy, sensitivity, detection limit, selectivity, dynamic range, precision, robustness, portability

Recommendations concerning essential, redundant information

Meaning of absence of information
PRACTICAL EXAMPLE

Here, the project is exemplified by taking into account a classical article* prepared by the group led by H. Bergamin Fº, which originally exploited the concept of commutation and the use of immobilized reagents in flow-injection analysis. Nitrate and nitrite were sequentially determined.

# citations: ~150 [ISI - 2001]
C_s(water) and C_{R1} (phosphoric acid) = carrier streams for the sample (S) and color-forming reagent (R_1)
R_2 = masking/buffering reagent
PP = peristaltic pump with flow rates in ml min^{-1}
C_1, C_2, C_3 = 15, 150, 15-cm coils
D = detector; W = waste
Column placed between C_1 and C_2
DIAGRAM OF THE INJECTOR - COMMUTATOR

\[a, b = \text{sampling loops}; \quad c = \text{reducing column}; d, e = \text{connectors}; f, g = \text{reagent loops}; \quad M = \text{manifold}\]
<table>
<thead>
<tr>
<th>Original</th>
<th>Recommended</th>
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</thead>
<tbody>
<tr>
<td><strong>PUMP</strong></td>
<td>nihil</td>
</tr>
<tr>
<td>as in earlier work</td>
<td>specify winding</td>
</tr>
<tr>
<td><strong>REACTOR</strong></td>
<td>specify building-up or mention manufacturer</td>
</tr>
<tr>
<td>as in earlier work diameter</td>
<td></td>
</tr>
<tr>
<td><strong>VALVE</strong></td>
<td></td>
</tr>
<tr>
<td>injector commutator</td>
<td></td>
</tr>
<tr>
<td><strong>FLOW DIAGRAM</strong></td>
<td></td>
</tr>
<tr>
<td>two illustrations</td>
<td>one figure</td>
</tr>
</tbody>
</table>
DETECTOR

wavelength, optical path, add illuminated volume
inner volume

FIGURES OF MERIT

accuracy, precision, sampling add dispersion coefficient
rate, drift, % NO₃ reduction residence times
(total - inside column)

GENERAL

nihil mention available
commercial devices
FIA (BIA,SIA,TAS,...) flow analysis
CONCLUSIONS

- Tendency to normalization
- Easier implementation of a given method to other analyzer
- Reduction of redundant information
- Enhanced suitability for less skilled analysts

Task group

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ACKNOWLEDGMENTS

Those who have motivated this project since its inception; V. Grassi for assistance in preparing this poster.