**Electronic Supplementary Material**

**Instrument-free detection of polyphenols with a thread-based analytical device**

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**1. The length data with different Fe2+ Concentration**

Table 1. The length of colored band formed on the threads with 0.2, 0.4 and 0.8 g L-1 of Fe2+ (three replica runs were performed for each concentration).

|  |  |  |  |
| --- | --- | --- | --- |
|  | 0.2 g L-1 | 0.4 g L-1 | 0.8 g L-1 |
| 1 | 24 mm | 21 mm | 16 mm |
| 2 | 27 mm | 25 mm | 19 mm |
| 3 | 25 mm | 22 mm | 19 mm |

**2. The data obtained with different pH**

Table 2. The length of colored band obtained by varying pH of chromogenic reagents solution (three replica runs were performed for each pH).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | pH=2 | pH=3 | pH=4 | pH=5 |
| 1 | 30 mm | 22 mm | 22 mm | 22 mm |
| 2 | 32 mm | 23 mm | 21 mm | 23 mm |
| 3 | 32 mm | 23 mm | 21 mm | 21 mm |

**3. The data obtained with different polyphenol concentration**

Table 3. The length of colored band obtained with different concentrations of polyphenols (three replica runs were performed for each concentration).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 0.1 g L-1 | 0.2 g L-1 | 0.4 g L-1 | 0.6 g L-1 | 0.8 g L-1 |
| 1 | 13 mm | 17 mm | 22 mm | 26 mm | 28 mm |
| 2 | 14 mm | 18 mm | 21 mm | 26 mm | 30 mm |
| 3 | 14 mm | 17 mm | 22 mm | 25 mm | 30 mm |

**4. The data used for calculation of detection limit**

Table 4. The length of colored band from 11 replica assays of 0.05 g L-1 polyphenol solution.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Operation | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Length (mm) | 9 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 11 | 11 | 9 |

**5. The data obtained from the study of effect of foreign species (glucose, protein, caffeine, ascorbic acid and amino acids)**

Table 5. The length of colored band obtained with solution containing 0.4 g L-1 polyphenols and solution containing 0.4 g L-1 polyphenols and 0.4 g L-1 glucose (three replica runs were performed for each solution).

|  |  |  |
| --- | --- | --- |
|  | 0.4 g L-1 polyphenols | 0.4 g L-1 polyphenols + 0.4 g L-1 glucose |
| 1 | 21 mm | 21 mm |
| 2 | 22 mm | 22 mm |
| 3 | 20 mm | 19 mm |

Table 6. The length of colored band obtained with solution containing 0.4 g L-1 polyphenols and solution containing 0.4 g L-1 polyphenols and 0.4 g L-1 protein (three replica runs were performed for each solution).

|  |  |  |
| --- | --- | --- |
|  | 0.4 g L-1 polyphenols | 0.4 g L-1 polyphenols + 0.4 g L-1 proteins |
| 1 | 21 mm | 21 mm |
| 2 | 21 mm | 22 mm |
| 3 | 23 mm | 21 mm |

Table 7. The length of colored band obtained with solution containing 0.4 g L-1 polyphenols and solution containing 0.4 g L-1 polyphenols and 0.4 g L-1 caffeine (three replica runs were performed for each solution).

|  |  |  |
| --- | --- | --- |
|  | 0.4 g L-1 polyphenols | 0.4 g L-1 polyphenols + 0.4 g L-1 caffeine |
| 1 | 23 mm | 22 mm |
| 2 | 22 mm | 23 mm |
| 3 | 23 mm | 22 mm |

Table 8. The length of colored band obtained with solution containing 0.4 g L-1 polyphenols and solution containing 0.4 g L-1 polyphenols and 0.06 g L-1 ascorbic acid (three replica runs were performed for each solution).

|  |  |  |
| --- | --- | --- |
|  | 0.4 g L-1 polyphenols | 0.4 g L-1 polyphenols + 0.06 g L-1 ascorbic acid |
| 1 | 19 mm | 21 mm |
| 2 | 20 mm | 18 mm |
| 3 | 21 mm | 21 mm |

Table 9. The length of colored band obtained with solution containing 0.4 g L-1 polyphenols and solution containing 0.4 g L-1 polyphenols and 0.2 g L-1 amino acids (three replica runs were performed for each solution).

|  |  |  |
| --- | --- | --- |
|  | 0.4 g L-1 polyphenols | 0.4 g L-1 polyphenols + 0.2 g L-1 amino acids |
| 1 | 22 mm | 21 mm |
| 2 | 22 mm | 21 mm |
| 3 | 20 mm | 22 mm |

**6. The data of real sample analysis with thread-based devices**

Table10. The length of colored band resulted from three replica assays of the sample which was four-folded diluted.

|  |  |  |  |
| --- | --- | --- | --- |
| Operation | 1 | 2 | 3 |
| Length | 20 mm | 23 mm | 33 mm |

7. **Data with a standard method (spectrophotometric method)**

Table 11. Absorbance obtained with different polyphenols concentrations (three replica runs were performed for each concentration).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 0.2 g L-1 | 0.4 g L-1 | 0.6 g L-1 | 0.8 g L-1 | 1.0 g L-1 |
| 1 | 0.094 | 0.152 | 0.219 | 0.287 | 0.346 |
| 2 | 0.095 | 0.153 | 0.221 | 0.287 | 0.349 |
| 3 | 0.091 | 0.154 | 0.220 | 0.288 | 0.347 |

Table 12. The absorbance obtained from three replica assays of the sample which was two-folded diluted.

|  |  |  |  |
| --- | --- | --- | --- |
|  | 1 | 2 | 3 |
| Absorbance | 0.322 | 0.322 | 0.324 |