**Title of Lab**

**Name of Student**

**Name of Course**

**Teacher**

**Introduction**

In paragraph form, please include (i) identification of the problem(s), (ii) background information with appropriate citations (please include the answers to **all** the pre-lab questions), and a (iii) hypothesis that is specific. More than one paragraph may be necessary to adequately organize this information.

**Results**

 Please briefly summarize key results. Hit the highlights only! Also please include a data table or chart to reflect your findings. Do not report raw data – report only final values as in Table 1 below. Be sure that the titles of tables and figures are very detailed and specific. Compare to published data – averages, minimums and maximums – if relevant. The Rfwater and Rfalcohol value of the yellow dye in Marker #1 was 0.40 and 0.50, respectively, Table 1. These results are comparable to the Rfwater values for yellow dyes found in various beverage samples (Zahra et al., 2015).

Table 1: The Rf values for several green markers developed by paper chromatography with either 99% isopropyl alcohol or water as solvents.

|  |  |  |
| --- | --- | --- |
| Marker | Rfwater | Rfisopropyl alcohol |
| #1 – Yellow Dye | 0.40 | 0.50 |
| #1 – Blue Dye | 0.89 | 0.67 |
| #3 – Green Dye | 0.00 | 0.98 |

**Discussion and Conclusions**

Discuss results in paragraph form. Briefly describe the experiment. Please include the answers to the following questions: What happens to the ink spots as the chromatogram develops? Which markers are examples of solutions (homogeneous mixtures)? Defend your answer. Are any of these markers composed of the same substances? Defend your answer.

**Conclusion and Recommendations**

In this final paragraph, begin by highlighting key findings. Provide a recommendation to the Envirothon Club and justify your recommendation briefly. Briefly discuss any possible errors

**References**

Please cite according to ACS (American Chemical Society) citation style. These references should be formatted with a hanging indent.

Zahra, N.; Alim-un-Nisa, Z.F.; Kalim, I.; Saeed, K. Identification of synthetic food dyes in beverages by thin layer chromatography. *Pak. J. Food Sci.* [Online] **2015**, *25*, 178-181. https://psfst.org/paper\_files/1034\_173111\_A3.pdf (accessed Feb 13, 2020).

**Lab Rubric – CHEMISTRY 11-2**

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| --- | --- | --- | --- | --- | --- |
| **Criteria** | **Novice-****(<50%)** | **N+****(50-59%)** | **Apprentice-****(60-75%)** | **A+****(76-89%)** | **Journeyman (90-95%) Virtuoso (96-100%)** |
| **Level of Completion** | Missing 4 or more components, incomplete |  | Missing one or two components or components lacking |  | Includes **complete** introduction, results, discussion, conclusion, and references |
| **Presentation & Organization**  | Poorly organized, uses informal language and does not follow template |  | Follows template somewhat, may use “I” or “we” in text and is somewhat disorganized |  | Follows template provided (font, font size, *etc*.), never uses “I” or “we” in text and is extremely well- organized and concise |
| **Results Section: Tables & Figures** | Raw data only |  | Table or figure present but not original and may contain some raw data |  | Includes NO raw data! Results are presented concisely, creatively and with complete titles that are detailed and specific. |
| **Content Knowledge** | Lack of content knowledge / weak introduction and discussion |  | Introduction and discussion may contain some inaccurate information. Overall, the majority shows understanding. |  | Introduction and discussion show deep understanding of the problem and potential solution. A logical hypothesis is provided. Questions are answered to completion.  |
| **Problem Solving** | Incomplete conclusion. |  | A conclusion contains key components but needs more evidence to support solutions. Errors may not be plausible. |  | The conclusion concisely summarizes key results, justifies a possible solution and highlights several plausible errors. Demonstrates higher level thinking skills! |
| **Research** | No research to support ideas |  | Research supporting ideas might be less reliable, non-peer reviewed. Errors in citation. |  | Report references relevant information from peer-reviewed, science-based sources. Perfect citations!  |