**List of Tables**

Table 1EDX results of raw biomass (R.B. Seeds) and activated carbon

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Raw material** | | | **Activated carbon** | | |
| Elements(K) | Weight % | Atomic % | Elements(K) | Weight % | Atomic % |
| C | 58.70 | 67.40 | C | 78.28 | 85.86 |
| O | 34.96 | 30.14 | O | 14.40 | 11.83 |
| Ca | 3.88 | 1.34 | Ca | 0.65 | 1.97 |
| K | 0.64 | 0.23 | Si | 0.47 | 0.22 |
| Mg | 0.22 | 0.13 | K | 0.65 | 0.22 |
| Al | 0.38 | 0.20 | Mg | 0.20 | 0.11 |
| Si | 0.82 | 0.40 |  |  |  |
| S | 0.40 | 0.17 |  |  |  |
| Total | 100.00 | 100.00 | Total | 100.00 | 100.00 |

Table 2.Comparison of Adsorption capacities (mg/g) of lead (II) by various adsorbents

|  |  |  |
| --- | --- | --- |
| **Bioadsorbent** | **qmax(mg g-1)** | **References** |
| *Spirogyra neglecta* | 132.00 | [30] |
| *Cladophora fascicularis* | 198.5 | [31] |
| Coconut shell | 76.66 | [32] |
| Pyrolusite-modified sewage  sludge carbon | 69.87 | [33] |
| Oryza sativa L husk | 8.6 | [34] |
| Tobacco stems | 5.54 | [35] |
| Tea waste | 1.35 | [36] |
| *Rhizopus arrhizus* | 76.40 | [37] |
| Apricote stone activated carbon | 51.0 | Present work |

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Table 3.Comparison of adsorption parameters calculated using Langmuir isotherm for adsorption of Pb2+ on adsorbents

|  |  |  |
| --- | --- | --- |
| **Constants** | **Adsorbents** | |
| **Raw biomass** | **Activated carbon** |
| R2 | 0.99 | 0.998 |
| KL (dm3/mg) | 0.01 | 0.10 |
| RL | 0.23 | 0.02 |
| qm (mg/g) | 259.97 | 525.78 |

Table 4. Comparison of adsorption parameters calculated using Freundlich isotherm for adsorption of Pb2+ on adsorbents

|  |  |  |
| --- | --- | --- |
| **Constants** | **Adsorbents** | |
| **Raw biomass** | **Activated carbon** |
| R2 | 0.95 | 0.87 |
| KF(mg/g) | 3.11 | 148.70 |
| 1/n | 0.69 | 0.22 |

Table 5.Thermodynamic parameters values for Lead ion adsorption on raw biomass

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Thermodynamics constants** | **Temperature (K)** | | | | | | |
| **283** | **293** | **303** | **313** | **323** | **333** | **343** |
| Ko (mLg-1) | 1118.12 | 713.59 | 295.93 | 245.60 | 176.77 | 149.01 | 51.51 |
| ΔGo(kcalth mol-1) | -3.95 | -3.83 | -3.43 | -3.42 | -3.32 | -3.31 | -2.69 |
| ΔHo(kcalth mol-1) | -8.87 | -8.87 | -8.87 | -8.87 | -8.87 | -8.87 | -8.87 |
| ΔSo(kcalth mol-1 deg-1) | -0.02 | -0.02 | -0.02 | -0.02 | -0.02 | -0.02 | -0.02 |

Table 6.Various thermodynamic parameters values for Lead ion adsorption on ACs

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Thermodynamics constants** | **Temperature (K)** | | | | | | |
| **283** | **293** | **303** | **313** | **323** | **333** | **343** |
| Ko (mLg-1) | 1459.25 | 1091.343 | 1061.72 | 955.69 | 902.60 | 769.29 | 600.35 |
| ΔGo(kcalth mol-1) | -4.097 | -4.07 | -4.195 | -4.27 | -4.37 | -4.397 | -4.36 |
| ΔHo(kcalth mol-1) | -2.42 | -2.42 | -2.42 | -2.42 | -2.42 | -2.42 | -2.42 |
| ΔSo(kcalth mol-1 deg-1) | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 |