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Nombre del trabajo: Cartas de control de calidad.

Materia: Control total de calidad.

Grado: 7^o cuatrimestre.

Grupo: Administración de Empresas.

Ocosingo, Chiapas a 03 de diciembre de 2023.

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Graficas de control de calidad Cartas de \bar{X} y R

Se realiza una revisión del porcentaje de de humedad de una muestra de granos de maíz, diariamente se toman 5 costales al azar durante 20 días y se checa este parametro, se tiene como base que debe estar a 11% de humedad.

| Día | Muestra 1 | Muestra 2 | Muestra 3 | Muestra 4 | Muestra 5 |
|-----|-----------|-----------|-----------|-----------|-----------|
| 1 | 12.5 | 13.8 | 12.5 | 13 | 10.3 |
| 2 | 12 | 14.4 | 10.4 | 12.4 | 11.4 |
| 3 | 13.5 | 13.2 | 13.6 | 12.4 | 13.2 |
| 4 | 14.3 | 11.3 | 12.4 | 13.2 | 12.8 |
| 5 | 12.8 | 12.4 | 12.6 | 12.6 | 12.9 |
| 6 | 13.7 | 13.1 | 14.1 | 12.1 | 13 |
| 7 | 11.4 | 11.8 | 12.1 | 12.3 | 12 |
| 8 | 10.5 | 13.5 | 11 | 11.6 | 11.9 |
| 9 | 11.3 | 12.2 | 11.4 | 13.2 | 13.5 |
| 10 | 13.2 | 11.5 | 13.2 | 13.6 | 13.8 |
| 11 | 11.3 | 10.5 | 10.5 | 10 | 11 |
| 12 | 12.4 | 11.7 | 12.1 | 12.3 | 11.8 |
| 13 | 14.6 | 16.4 | 15.5 | 16.7 | 14.6 |
| 14 | 12.1 | 11.2 | 11.4 | 11.6 | 10.6 |
| 15 | 12 | 13.2 | 13.4 | 13.2 | 13.7 |
| 16 | 11.6 | 14.1 | 13 | 14.2 | 12.9 |
| 17 | 10.6 | 12.5 | 12 | 12.8 | 13 |
| 18 | 10.2 | 13.7 | 11.4 | 12.3 | 12.4 |
| 19 | 10.5 | 10.7 | 11 | 13.2 | 13.1 |
| 20 | 11.3 | 13.1 | 13.3 | 14 | 10.9 |

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| Día | Muestra 1 | Muestra 2 | Muestra 3 | Muestra 4 | Muestra 5 |
|-----|-----------|-----------|-----------|-----------|-----------|
| 1 | 1.5 | 2.8 | 1.5 | 2 | -0.7 |
| 2 | 1 | 0.4 | -0.6 | 1.4 | 0.4 |
| 3 | 2.5 | 2.2 | 2.6 | 1.4 | 2.2 |
| 4 | 3.3 | 0.3 | 1.4 | 2.2 | 1.8 |
| 5 | 1.8 | 1.4 | 1.6 | 1.6 | 1.9 |
| 6 | 2.7 | 2.1 | 0.1 | 1.1 | 2 |
| 7 | 0.4 | 0.8 | 1.1 | 1.3 | 1 |
| 8 | -0.5 | 2.5 | 0 | 0.6 | 0.9 |
| 9 | 0.3 | 1.2 | 0.4 | 2.2 | 2.5 |
| 10 | 2.2 | 0.5 | 2.2 | 2.6 | 2.8 |
| 11 | 0.3 | -0.5 | -0.5 | -1 | 0 |
| 12 | 1.4 | 0.7 | 1.1 | 1.3 | 0.8 |
| 13 | 3.6 | 5.4 | 4.5 | 5.7 | 3.6 |
| 14 | 1.1 | 0.2 | 0.4 | 0.6 | 0.4 |
| 15 | 1 | 2.2 | 2.4 | 2.2 | 2.7 |
| 16 | 0.6 | 3.1 | 2 | 3.2 | 1.9 |
| 17 | -0.4 | 1.5 | 1 | 1.8 | 2 |
| 18 | -0.8 | 2.7 | 0.4 | 1.3 | 1.4 |
| 19 | -0.5 | -0.3 | 0 | 2.2 | 2.1 |
| 20 | 0.3 | 2.1 | 2.3 | 3 | 0.9 |

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| Día | \bar{x} | R |
|--------|-----------|------|
| 1 | 1.42 | 3.5 |
| 2 | 0.52 | 2 |
| 3 | 2.18 | 1.2 |
| 4 | 1.18 | 3 |
| 5 | 1.66 | 0.5 |
| 6 | 1.6 | 2.6 |
| 7 | 0.92 | 0.9 |
| 8 | 0.7 | 3 |
| 9 | 1.32 | 2.2 |
| 10 | 2.06 | 2.3 |
| 11 | -0.34 | 1.3 |
| 12 | 1.06 | 0.7 |
| 13 | 4.56 | 2.1 |
| 14 | 0.38 | 1.5 |
| 15 | 2.1 | 1.7 |
| 16 | 2.16 | 2.6 |
| 17 | 1.18 | 2.4 |
| 18 | 1 | 3.5 |
| 19 | 0.7 | 2.7 |
| 20 | 1.52 | 3.1 |
| Total: | 1.425 | 2.14 |

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X-DAR, R CHART

\bar{X} Chart Control Limits

$$UCL = \bar{\bar{x}} + A_2 \bar{R}$$

$$LCL = \bar{\bar{x}} - A_2 \bar{R}$$

R Chart Control Limits

$$UCL = D_4 \bar{R}$$

$$LCL = D_3 \bar{R}$$

| X Chart | |
|---------|---------|
| LCL | 0.19022 |
| X bar | 1.425 |
| UCL | 2.65978 |

$$LCL = 1.425 - (0.577 \times 2.14) = 0.19022$$

$$UCL = 1.425 + (0.577 \times 2.14) = 2.65978$$

| R Chart | |
|---------|----------|
| LCL | 0 |
| R bar | 2.14 |
| UCL | 4.524816 |

$$LCL = 0 \times 2.14 = 0$$

$$UCL = 2.1144 \times 2.14 = 4.524816$$



