

representation of a data set is an indispensable aid to interpretation. Graphical displays facilitate visual judgements about central tendency, confidence intervals, significant difference etc. Such judgements are a valuable prelude to the use of statistat

Examples

Here we show three examples of kernel distributions of data from interlaboratory exercises in analytical science, namely, proficiency test results from the Food Analysis Performance Assessment Scheme (FAPAS™) [4].

Figure 1 shows results obtained for the mycotoxin aflatoxin M1 in milk (FAPAS 0472). The data points alone (Figure 3) suggest the possibility of a multimodal dataset. This appearance often happens by chance in dotplots and histograms of small random samples from unimodal populations. However, comparable interlaboratory studies [5] tell us that in this instance a reproducibility standard deviation of about 14 parts per trillion should be expected. We can use this value to obtain a suitable h value: 0.75 times the expected value should be wide enough to smooth out any artifactual modes, but small enough to avoid undue 'smearing' of the data. When we construct a kernel density on this basis, we see a unimodal and almost symmetric curve (Figure 3). Close inspection shows that the curve has slightly heavier tails than a normal distribution.

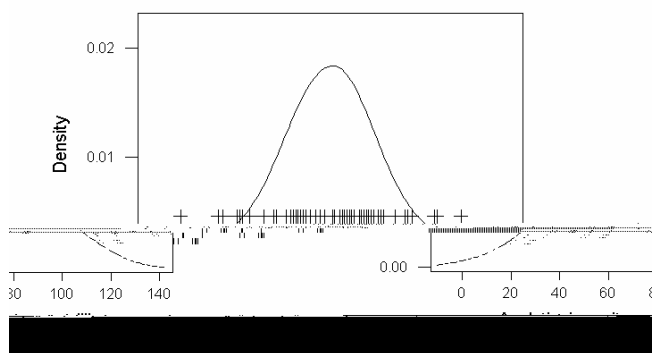


Figure 3. Analytical results for aflatoxin M1 in milk (FAPAS 0472), showing data points (crosses) and the kernel density representation (line).

Figure 4 shows results for polyunsaturated fatty acids in cooking oil (FAPAS 1416). Again the dotplot suggests that the data might be multimodal. Considerations similar to the above show that an h -value of 0.55 % would be appropriate, and this gave rise to a kernel density with a mode at about 39.3 and a pronounced shoulder at 40.6 %. Further investigation showed that these features were accounted for by the use of two different calibration protocols among the participants.

Figure 5 shows results for tin in fruit juice (FAPAS 0760). Here the dotplot rather strongly suggests that the data are multimodal. When we con