ESTIMATION OF MULTIPLE TRAITS IN A PRODUCTION PROCESS

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Abstract

Monitoring a very large population of size $N \longrightarrow \infty$ is an important part of industrial, agricultural and human risk assessment. In applications where trait prevalence is likely low, it is common to test pools of subjects or specimens for the presence of a trait, rather than one-at-a-time testing. This technique is known as pooled (group) testing. In this paper, we shall revisit the problem of estimating the prevalence of a trait from pool testing, but we consider applications with multiple traits. The paper is unlike the previous research in pooled testing, which has largely assumed a single trait. To accomplish this, the study will employ the method of maximum likelihood estimator (MLE) in obtaining the estimators. For comparison with one-at-a-time testing procedure, properties of the estimators will be discussed. Furthermore asymptotic relative efficiency (ARE) will be constructed. Monte Carlo Simulation will be used in generating the mean square error (MSE) and Bias of the estimators.

Keywords: *Trait, pool testing, cut off value, Proportion,*