

Table 2. Major advantages and limitations of high-throughput in vitro assays in AA

Advantages	Limitations
Provides fast screening, particularly for potential alternatives for which there often are no data. Screening can also address large numbers of chemicals and help target additional research.	Concerns regarding the relevance of results to effects that may occur in the whole organism
Can easily test a range of concentrations	For some assays, higher likelihood of false positives and false negatives
More quantitative than descriptive methods	Can be difficult to link to exposure data
Less expensive than traditional approaches	The data generated can be difficult to interpret and communicate, making it difficult for the public and third parties to understand how conclusions regarding toxicity were developed
Often provides mechanistic information that can facilitate translation to predictions of human health impacts	Some assays are proprietary, limiting access
Can compare active ingredient to complete product formulation	Mechanistic basis results in selection bias for known mechanisms and against unknown or difficult-to-predict pathways
Opportunity to evaluate mixtures	Investment in robotics can be expensive
Opportunity to examine genetic variability	Difficult to assess temporal patterns and longer-term effects
Ability to simulate different windows of exposure	May be difficult to assess important ecological effects such as persistence and bioaccumulation

AA = alternatives analysis.