Table S1. Energy levels in (cm^{-1}) for the lowest 71 fine structure levels, arising from $n \leq 6$, $l \leq (n-1)$ configurations of He-like Li, calculated by different methods: FAC, RCI and MBPT. Experimental data from the NIST database [12] as well as the results extracted from the theoretical reference works by Aggarwal [19] are also represented.

Index	Index of energy level.
Configuration	Configuration of energy level
Level	Level.
$E_{\rm FAC}$ (cm^{-1})	Energy levels calculated with theflexible atomic code (FAC) method
$E_{\rm RCI}$ (cm^{-1})	Energy levels calculated with the relativistic configuration interaction (RCI) method
$E_{\rm MBPT}$ (cm^{-1})	Energy levels calculated with the the many-body perturbation theory (MBPT) method
$E_{\rm Aggarwal}$ (cm^{-1})	Energy levels calculated by Aggarwal *et al* (Aggarwal used the FAC code) [19]
$E_{\rm NIST}$ (cm^{-1})	Energy levels compiled by the NIST database [12]

Table S2. Wavelengths in Å of a set of allowed ($E1$) transitions, arising of $n \leq 6$, $l \leq (n-1)$ configurations of He-like Li, calculated by FAC, RCI and MBPT methods. Experimental data from the NIST database are presented [12]. *i* and *j* are the lower and upper levels of the transition.

Index	Index of transition
i	The lower level of the transition
j	The upper level of the transition
$\lambda_{\rm FAC}$ (Å)	Wavelengths calculated with the FAC method
$\lambda_{\rm RCI}$ (Å)	Wavelengths calculated with the RCI method
$\lambda_{\rm MBPT}$ (Å)	Wavelengths calculated with the MBPT method
$\lambda_{\rm NIST}$ (Å)	Wavelengths compiled by the NIST database [12]

Table S3. Weighted oscillator strengths (dimensionless) and transition rates in (s^{-1}) of a set of allowed ($E1$) transitions, arising from $n \leq 6$, $l \leq (n-1)$ configurations of He-like Li, calculated by FAC, RCI and MBPT. Experimental data from the NIST database [12] are also represented. *i* and *j* are the lower and upper levels of the transition.

i	The lower level of the transition
j	The upper level of the transition
$gf_{\rm FAC}$, $A_{\rm FAC}$ (s^{-1})	Weighted oscillator strengths and transitions rates calculated with the FAC method
$gf_{\rm RCI}$, $A_{\rm RCI}$ (s^{-1})	Weighted oscillator strengths and transitions rates calculated with the RCI method.
$gf_{\rm MBPT}$, $A_{\rm MBPT}$ (s^{-1})	Weighted oscillator strengths and transitions rates calculated with the MBPT method
$gf_{\rm NIST}$, $A_{\rm NIST}$ (s^{-1})	Weighted oscillator strengths and transitions rates compiled by the NIST database [12]

Table S4. Lifetimes in (s) for 71 lowest levels, arising from $n \leq 6$, $l \leq (n-1)$ configurations of He-like Li, calculated by FAC, RCI and MBPT. Experimental data [17, 30] as well as theoretical data from Aggarwal *et al* [19] are also presented.

Index	Index of energy level
Configuration	Configuration of energy level
Level	Level
$\tau_{\rm FAC}$ (s)	Lifetime calculated with the FAC method.
$\tau_{\rm RCI}$ (s)	Lifetime calculated with the RCI method
$\tau_{\rm MBPT}$ (s)	Lifetime calculated with the MBPT method
$\tau_{\rm Aggarwal}$ (s)	Lifetime calculated by Aggarwal *et al* [19]
$\tau_{\rm others}$ (s)	Lifetime compiled by others [17, 30]