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Untargeted LC–MS Metabolites across Developmental Stages of Daehwangjam (*Bombyx mori*) Larvae

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Silkworms contain bioactive compounds, including 1-deoxynojirimycin, chitin, and chitosan, with reported antioxidant, anti-inflammatory, hypoglycemic, and antihypertensive effects. However, studies on Daehwangjam (DHJ)—a strain developed by the Rural Development Administration—remain limited, especially regarding its metabolome and function. We profiled DHJ during the fifth instar (Days 1, 3, and 7) by LC–Orbitrap MS and identified 93 metabolites. Amino acids, peptides, carboxylic acids, and lipids were most abundant. Heatmap analysis showed clear shifts as larvae matured, with a transient Day-3 rise in flavonoids, select lipids, and peptides. Consistent results from volcano plots indicated that many metabolites peaked on Day 3 and declined by Day 7. Together, these data suggest temporally regulated biosynthesis in DHJ, concentrating physiological activity at specific stages. Our findings provide a basis for optimizing harvest time to maximize functional ingredients and support the use of DHJ as a source of value-added biofunctional materials.