Phytoconstituents of *Jatropha curcas* L. Leaves and their Immunomodulatory Activity on Humoral and Cell-Mediated Immune Response in Chicks

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Z. Naturforsch. **64c**, 495–501 (2009); received September 24, 2008/March 1, 2009

A novel biflavone di-*C*-glucoside, 6,6∃-di-*C*-*b*-D-glucopyranoside-methylene-(8,8∃)-biapigenin (**1**), was isolated from the leaves of *Jatropha curcas* L. (Euphorbiaceae), together with six known compounds; apigenin 7-*O*-*b*-D-neohesperidoside (**2**), apigenin 7-*O*-*b*-D-galactoside (**3**), orientin (**4**), vitexin (**5**), vicenin II (**6**), and apigenin (**7**). Their structures were determined on the basis of extensive chemical and spectroscopic analyses (UV, NMR and HRESI-MS). The immunomodulatory effect of an 80% aqueous methanol extract (AME) and compounds **1**–**5** (0.25 mg/kg body wt) to one-day-old specific pathogen-free (SPF) chicks was determined. Stimulation of both humoral and cell-mediated seroresponse was observed, especially those of AME and compound **1**. Remarkable effective increases of the antibody titers, lymphocyte and macrophage cells, in blood were recorded. SPF chicks treated with the tested samples exhibited protection against Newcastle disease challenge virus after being vaccinated.

Key words: Jatropha curcas, Biflavone Di-*C*-glucoside, Immune Response