

Baicalin: a powerful antioxidant flavonoid for bovine mammary cells

Marie-Hélène Perruchot¹, Florence Gondret¹, Fabrice Robert², Emilien Dupuis², Hélène Quesnel¹, Frédéric Dessauge¹

¹PEGASE, Agrocampus Ouest, INRA, 35590 Saint-Gilles, France

²CCPA Group, ZA du bois de Teillay, 35150 Janze, France

* **Corresponding author:** Frederic Dessauge, INRA, UMR1348 Pegase, Domaine de la Prise, 35590 Saint-Gilles, France. Tel: +33 2 23 48 50 97; Fax : +33 2 23 48 50 80; E-mail:

frederic.dessauge@inra.fr

ABSTRACT

In dairy cows, inflammation increases after parturition. Pro-inflammatory cytokines may decrease milk production, notably by affecting systemic and intra-mammary nitric oxide production as well as immunological and anatomical features of the mammary gland. There is a huge need to identify anti-inflammatory natural compounds that can be administered during the peripartum period to improve mammary cell development and health. Flavonoid extracts have been shown to have anti-inflammatory effects in humans and mice. Recently, extracts of *Scutellaria baicalensis*, one of the 50 fundamental herbs used in traditional Chinese medicine, has been shown to improve milk production when distributed to dairy cows after parturition. The aim of this study was to characterize the effects of baicalin, the major chemical compound of *Scutellaria baicalensis* extracts, on bovine mammary epithelial cells. We demonstrated that baicalin had no or slight positive effects on proliferation and viability in bovine mammary epithelial cells at low doses (1 to 10 $\mu\text{g/mL}$), but decreased proliferation at high doses ($> 50 \mu\text{g/mL}$). Baicalin also had an anti-apoptotic effect at low concentrations but increased apoptosis at larger doses ($> 100 \mu\text{g/mL}$). ROS production was lowered in treated cells with baicalin, compared to untreated cells, irrespective of baicalin doses. When oxidation was triggered by hydrogen peroxide added in baicalin pre-treated cells, we demonstrated also a huge anti-oxidative effect of baicalin on mammary epithelial cells. In conclusion, these results suggest that the *in vivo* effect of *Scutellaria baicalensis* on milk production could be related to the anti-oxidative effect of baicalin on mammary epithelial cells.