# The influence of chemical structure in the drug release of two modulated flavanones formulated in a nano system

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Prenylated flavanones include a diverse class of naturally flavonoids oxygen-containing heterocycles that contain prenyl substituents. Nowadays many studies proved their anti-oxidative, anti-obesity, anti-inflammatory and other various biological effects that could apply in the prevention of various pathologies including cancer [1-3]. Recently, the flavanone (2*S*)-5,7-dihydroxy-6-(3-methyl-2-buten-1-yl)-2-phenyl-2,3-dihydro-4H-1Benzopyran-4-one **1** was isolated from a methanol extract obtained from the aerial parts of *E. platycarpa* [4]. The aim of this study was to evaluate a new topical emulsion that contained the prenyl flavanones (8S)-5-hydroxy-2,2-dimethyl-8-prenyl-3,4,7,8-tetrahydro-2H,6H-Benzo[1,2-b:5,4-b']dipyran-6-one **2**; and (8S)-5-hydroxy-2,2-dimethyl-8-phenyl-7,8-dihydro-2H,6H-Benzo[1,2-b:5,4-b']dipyran-6-one **3** (Figure 1) in a nano system formulation through *in vitro* drug release. The nano system formulation of flavanones **2** and **3** (0.5% w/w) were preparated with, labrasol, labrafac, plurol oleique and propyleneglycol as excipients. The particles sizes were measured by Zeta-Sizer, Malvern Instruments. *In vitro* release assays were performed in Franz Diffusion Cells of 2.54cm$^2$ with dialysis membrane. The receptor phase was ethanol:water (70:30), under temperature of 32 ± 1ºC. Samples were withdrawn at different time point scheme for 89 h and quantified by means a validated HPLC method [5] (water:acetonitrile (20:80) for **2** and (10:90) for **3** as mobile phase; 1 ml/min flow rate; 300 nm; Machery Nagel® C18 5mm, 25x4.6cm column). *In vitro* data were analyzed by GraphPad Prism software with Weibull model. The results showed the average drop size of the nanostructured formulation of **2** and **3** were 340.6 and 383 nm with PI=0,2 and 0.4 respectively. The kinetic release model that best describes the amount of (**2** and **3**) load at any time is representing by the function named as Weibull, $Q_t = Q_\infty \left[1 - e^{-\left(\frac{t}{t_d}\right)^\beta}\right]$ where; Q = 1714 ± 556.2 and 48.4 ± 16.1 and $t_d$ = 83.6 ± 25.5 and 41.5 ± 33.2, respectively. Although the similar drop size of both nano structured formulation, the kinetic release of the formulation showed a significant difference. While, Q represents the maximum quantity at which release tends; td is the time at which 63% of the initial amount of flavanone tested has dissolved. The flavanone **2** release more than flavanone **3** maybe due to the absence of double bond in **3**. The nano-structured formulation of flavanones **2** and **3** are promising alternatives to administrate modified drug. Acknowledge to CONACyT, Mexico for the scholarship 709906. The authors would like to thank Gattefossé for supplying excipients for this study.

## REFERENCES

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## FIGURES

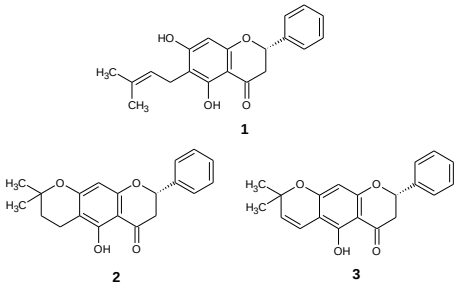


**Figure 1:** (2*S*)-5,7-dihydroxy-6-(3-methyl-2-buten-1-yl)-2-phenyl-2,3-dihydro-4H-1Benzopyran-4-one **1**; (8S)-5-hydroxy-2,2-dimethyl-8-prenyl-3,4,7,8-tetrahydro-2H,6H-Benzo[1,2-b:5,4-b']dipyran-6-one **2**; and (8S)-5-hydroxy-2,2-dimethyl-8-phenyl-7,8-dihydro-2H,6H-Benzo[1,2-b:5,4-b']dipyran-6-one **3**