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MICROENCAPSULATED FLAVONOIDS AND A FLAVONOID DERIVATIVE AGAINST GLIOBLASTOMA CELLS

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Abstract: The applications of microcapsules include the controlled release of drugs, rust protection or protecting substances of interactions with the environment. Biodegradable microcapsules are typically used to increase the therapeutic value of medicinal drugs insoluble or soluble in water, increasing bioavailability, solubility and retention time [1]. Flavonoids are a class of metabolites with many biological properties [2]. Among the therapeutic properties can be highlighted the chemopreventive and anticancer activities. In the present study we prepared 7-apiosyl scutellarein derivative with FDAA (Nα-(5-flúor-2,4-dinitrofenil)-L-alaninamida) and microcapsules of flavonoids apigenin, 7-apiosyl scutellarein and quercetin for testing against different gliobastoma cells lines. The microcapsules were prepared as described by Tripathi et al (2010 [3]). The resulting microcapsules were analyzed then by scanning electron microscopy (SEM), in relation to the zeta potential and by ^{13}C solid state NMR. To assess the controlled release of the encapsulated flavonoids tests were conducted using UV-VIS spectrophotometer, using standard solutions of flavonoids, the microcapsules and the wash water to assess the efficiency of the process by quantification of non-encapsulated flavonoids present in it. 7-apiosyl scutellarein derivative was prepared with Marfey's reagent (FDAA [4]). The three microcapsules, 7-apiosyl scutellarein derivative with FDAA and 7-apiosyl scutellarein were tested against GBM 95, U87 and GBM 02 gliobastoma cell lines by the Erlich methodology [5]. There were obtained 150 mg of apigenin, 160 mg of 7-apiosyl scutellarein and 170 mg of encapsulated quercetin and 5mg of 7-apiosyl scutellarein FDAA derivative. A comparison of ^{13}C NMR spectroscopic data of flavonoids isolated in a liquid state to solid state, were used to observe the patterns of the signals allocated to the flavonoids that are repeated at a lower intensity in solid state. This allows to deduce that not all flavonoid subjected to encapsulation process was effectively retained in the microcapsules. Flavonoids and microcapsules were not citotoxic for astrocytes. Microcapsules reduced cell viability in all cell lines tested. Apigenin and quercetin microcapsules reduced cell proliferation and total number of cells in GBM 02 and cell death. Apigenin microcapsules were the most active and 7-apiosyl scutellarein microcapsules were more active than the flavonoid isolated.

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