



Recombinant frutalin production and its potential application in cancer diagnosis and therapeutics

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Frutalin is the alpha-D-galactose-binding Jacalin-related lectin from *Artocarpus incisa* seeds. One of the most interesting biological properties of frutalin is its potential use in cancer diagnosis and therapy due to its ability to bind carbohydrate complexes expressed in cancer cells membranes. It can be potentially used as a histochemical probe in the diagnostic of several cancers. However, frutalin extraction from seeds is a long process with low yields and typically, a heterogeneous mixture with several isolectins is obtained. To improve and facilitate the availability of frutalin, its codifying gene was cloned and expressed in *Pichia pastoris* [1] (yeast), *Escherichia coli* (bacteria) and baculovirus/insect cells system (Sf9 cells line). Recombinant frutalin was detected in cultures of all the different organisms by Western blot analysis. Molecular differences were found between each recombinant frutalin obtained and native frutalin. Optimisation of recombinant frutalin expression and purification was conducted for the *P. pastoris* and *E. coli* systems. Recombinant yeast frutalin specifically bound to Me- α -galactose and was able to differentiate malign from benign prostate diseases in immunohistochemical studies of prostate tissues removed from patients by surgery, highlighting the potential applications of the recombinant frutalin in cancer diagnosis. In addition, the effect of native and recombinant yeast frutalin on the proliferation of human cancer cell lines was investigated. Preliminary results show a potent inhibitory effect of frutalin on proliferation in two different cell lines suggesting that it deserves study as a potential anticancer agent.

References

- [1] Oliveira C, Felix W, Moreira RA, Teixeira JA, Domingues L "Expression of frutalin, an alpha-D-galactose-binding jacalin related lectin, in the yeast *Pichia pastoris*", *Prot. Exp. Pur.* (2008) **60**: 188-193.