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Effect of Variety, Harvesting Stage and Season on the Concentration of Tannins and Alkaloids in Tagasaste (*Chamaecytisus palmensis*)

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Abstract

Most browse trees in the tropics contain substantial amounts of secondary metabolites such as phenolic compounds (mainly tannins) and alkaloids. The astringent effect of tannins and the bitter taste of alkaloids accompanied by toxicity generally affect intake and their utilisation by animals. In this study the first experiment evaluates contents of hydrolysable tannins (HT) and condensed tannins (CT) of 65 $^{\text{accession}}/_{\text{varieties}}$ of tagasaste. The second and third experiments were done on the widely grown variety "MOA" for evaluation of HT, CT and alkaloids. In the second experiment regrowths harvested at 4, 6, 8 and 10 months and separated to growing bud, leaf, bark, branch and stem were evaluated, while In the third experiment leaves harvested during main rainy, dry and short rainy seasons were used.

The leaves of tagasaste accessions tested gave HT and CT in ranges of 16–197 $^{\text{g}}/_{\text{kg}}$ and 6.9–35.0 $^{\text{abs}}/_{\text{g}}$ with means of 115 and 12.5 respectively on dry matter basis. In the harvesting stage studies the edible fractions have on average higher HT and CT mainly in the leaves (177.2 $^{\text{g}}/_{\text{kg}}$ and 20.1 $^{\text{abs}}/_{\text{gm}}$, respectively) and follow a declining trend as harvesting stage progressed. About 90 % of the alkaloids found in tagasaste were sparteine. High distributions of alkaloids were found in the non-edible fractions, where bark (235 $^{\text{mg}}/_{\text{kg}}$) was the highest and leaf (40 $^{\text{mg}}/_{\text{kg}}$) was the lowest. In all fractions, alkaloids increased until the 8^{th} month and declined at the 10^{th} month.

High concentration of HT and alkaloids was found in tagasaste leaves harvested during the rainy seasons compared to the dry season. However, CT was lower during the short rains and dry season and the highest was during the short rains. Generally HT and CT were positively correlated (r=0.25), however, both the HT and CT have a negative correlation coefficient of r=-0.58 and r=-0.69 with alkaloids respectively. The results of this study showed that varietal selection, harvesting management and growing season could be used as a means to control the level of tannins and alkaloids.

Keywords: variety, alkaloids, harvesting stage, season, tagasaste, tannins

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