

## ARE POTATO 'APPLES' TOXIC?

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Legume crop harvests may include the berries of *Solanum tuberosum* (potato "apples") from plants arising from uncollected tubers on the same ground. Immature stages of the berries could escape the screening process and contaminate food. Although toxicity due to solanine and related glycoalkaloids in the tubers of the potato has been reported (Wilson 1959), little is known of the risk of consuming the fruits.

Preliminary studies with homogenised berries given by stomach tube to small numbers of mice ( $67\text{g berries kg}^{-1}$ ), rats ( $34\text{g kg}^{-1}$ ), rabbits ( $6\text{g kg}^{-1}$ ), chickens ( $24\text{g kg}^{-1}$ ) and ferrets ( $8\text{g kg}^{-1}$ ) daily for up to 14 days produced no evidence of toxicity. These doses were limited by the animals' stomach capacity. To evaluate the potential toxicity of the fruits and to compare different manufacturing processes used on legume crops, glycoalkaloid concentrates were prepared from samples of: I. Untreated berries; II. Berries blanched for 3 min. at  $93^{\circ}\text{C}$ ; III. Berries blanched, canned and processed for 15 min. at  $121^{\circ}\text{C}$ ; IV. Untreated tomatoes (control). The materials were freeze-dried and extraction and concentration of the glycoalkaloids were carried out by the methods of Baker et al (1955) and Wang et al (1972). The glycoalkaloid content was determined by a method based on that of Karawa et al (1975). In relating this content to the LD<sub>50</sub> values, it has been assumed that the toxicity of the extracts was due entirely to the alkaloid content. The LD<sub>50</sub> values of the berries ( $\pm 95\%$  limits) in  $\text{g kg}^{-1}$  for the mouse, chicken and ferret respectively were for the untreated berries 677 (573-797), 588 (489-708) and  $>1040$ ; for the blanched berries 828 (677-1016), 771 (655-907) and 1088 (814-1448); for canned and drained berries 1605 (1377-1837), approx. 2150 and 2540 (1908-3390). The differences between treated and untreated berries may have been due to leaching into the processing fluid. No toxic effects were observed with the tomato extracts. When the alkaloid contents were related to data on solanine toxicity in man (Rühl, 1961), it was calculated that about 400 g of potato "apples" would be necessary to induce symptoms of toxicity.

When rats were fed 10% potato sprouts in their diet from early pregnancy, 55% of the litters died (Kline et al 1961). This was attributed to failure of lactation of the mothers. In order to separate ante- and post-natal effects a cross-fostering study was undertaken, in which the litters of a group of rats treated with the extract were exchanged at birth with those of a control group. Groups A and C were given 5 ml  $\text{kg}^{-1}$  of tomato extract from day 6 of pregnancy to 21 days post-partum. Groups B and D received instead extract of sample I diluted 1:50; thus receiving about 2 mg glycoalkaloid  $\text{kg}^{-1} \text{day}^{-1}$  a dose approximately that used by Kline et al (1961). The live litter weights, the pup weights and the litter sizes in groups appropriate to examine ante- and post-natal effects were compared by Student's *t* tests. No differences of statistical significance were found. The changes in mean body weight of the mothers in all groups were similar and there were no signs of intoxication. It is concluded that the effect of potato sprouts on mothers or their litters has not been confirmed with alkaloid concentrates of potato "apples".

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