

Tyramine content of canned and packet soups

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McQueen (1975) reported possible adverse reactions in patients treated with monoamine oxidase drugs (MAO) who consumed soups, especially those containing hydrolysed yeasts and monoamines such as tyramine. No details were given, so the possibility of soups containing tyramine and dopamine was investigated.

Tyramine hydrochloride, (\pm)-amphetamine sulphate, dopamine hydrochloride, trifluoroacetic anhydride were purchased from BDH, hydrochloric acid and dichloromethane from Hopkins & Williams. The dichloromethane was fractionally distilled and dried over molecular sieves (3A) before use.

Powdered soup, 2.0 g was homogenized with hydrochloric acid (0.01 M, 20 ml) and the mixture centrifuged for 20 min, and the supernatant removed and sampled for derivative formation. Liquid soups were blended and a 10 g sample treated as above.

To an aliquot (5 ml) of the supernatant acidic extract, amphetamine sulphate (50 μ g) was added and the resulting solution evaporated to dryness under vacuum. The residue was dried by two additions of dry dichloromethane (1 ml) which were removed by evaporation under vacuum. The residue was then treated with trifluoroacetic anhydride (1 ml) and dichloromethane (2 ml) and mixed ultrasonically for 2 min. The resulting solution was evaporated to dryness and dichloromethane (100 μ l) added. Samples (2 μ l) were analysed immediately by a modification of the g.l.c. method of Kaplan et al (1974) using the amphetamine sulphate as internal standard (Rt 2.9 min).

A Varian Aerograph Series 1520 gas chromatograph fitted with a flame ionization detector was used. The column was stainless steel, 1.5 m, 0.40 cm i.d., packed with 2%w/w OV-17 and 1%w/w OV-210 on acid washed, DMCS treated Chromosorb W (100-120 mesh); conditioned at 235 °C for 24 h with nitrogen (oxygen free) carrier gas flowing at 30 ml min⁻¹. Injector and detector temperatures were 200 °C and the column temperature for analytical runs was 175 °C; nitrogen carrier gas flow, 40 ml min⁻¹. Immediately before use the column was treated with HMDS (5 μ l).

Tyramine and dopamine derivatized satisfactorily and gave Rt values of 7.6 and 9.4 min respectively.

* Correspondence.

When the ratios of peak heights of the tyramine and dopamine to that of the internal standard was plotted against known tyramine and dopamine concentrations the relationship was linear over the range 1-8 μ g/2 μ l.

Known amounts of tyramine hydrochloride and dopamine hydrochloride were added to aliquots of soup (0.2 mg g⁻¹ for the packet type and 40 μ g g⁻¹ for the liquid type) and analysed. The recovery values were within 85-115% of theory. Four soups were examined in detail: a packet type, containing dried cooked peas, wheat flour, salt, emulsifying salt, dried onions, leek, monosodium glutamate, hydrolysed protein and pepper; a packet type, containing skimmed milk, wheat flour, chicken, onion, salt, monosodium glutamate, hydrolysed vegetable protein, herbs, spices and yeast extract; a liquid type, containing carrots, potatoes, mutton, onions, green beans, swedes, pearl barley, salt, dried skimmed milk, food starch, stabilizers, hydrolysed vegetable protein, seasoning salt and spices and a liquid type, containing tomatoes, onions, beef, apples, vegetable oil, rice, mango chutney, curry powder, hydrolysed vegetable protein, salt, sugar, food starch, caramel and flour.

None of the soups gave detectable peaks on g.l.c. indicative of tyramine or dopamine, although all gave satisfactory peaks when spiked with these compounds.

It has been held that about 10 mg of tyramine (Boakes 1971) needs to be ingested by a MAO-inhibited patient before a reaction is produced. Although the soups gave no detectable peaks, calculations from the minimum sensitivity of the assay procedure give concentrations of less than 2 and 4 mg per pint (approximately 570 ml) for the chicken and pea soups respectively and less than 4 mg per can (15½ oz or 432 g) for the liquid variety.

Therefore it is highly unlikely that a reaction to these particular soups would occur, even if all the contents were consumed at one time.

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REFERENCES

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