Haem iron content in Australian meats and fish

A Rangan, G Blight, C Binns

School of Public Health, Curtin University of Technology, Perth, WA 6001

Haem iron is important in iron nutrition because of its high bioavailability and its enhancing effect on non-haem iron absorption. The widely used Monsen model assumes that 40% of the iron content in all meat, fish and poultry (MFP) is haem iron (1). More recent American data suggests that this may be an under-estimation of the true amount of haem iron in the diet (2). There is no Australian data on the haem iron content of MFP.

The aim of this study was (a) to determine the haem iron contents of commonly consumed Australian meats, chicken and fish and (b) to derive an estimate of haem iron present in MFP in the typical Australian diet. Meat, chicken and fish samples were purchased from a random selection of retail outlets across a wide range of socio-economic areas in the Perth metropolitan area. Both raw and cooked samples were analysed in triplicate. Total iron was analysed using atomic absorption spectrophotometry, after dry-ashing. Non-haem iron was analysed using the modified Schricker method (3). Haem iron was estimated by subtracting non-haem iron from total iron.

Sources (cooked)	Total iron (mg/g)	Haem iron (mg/g)	Haem iron (%)
rump steak	24.6	17.2	70
skirt steak	21.2	13.7	65
rib roast	19.3	12.3	64
mince	22.2	10.6	48
lamb chop	25.5	15.9	62
leg of lamb	21.6	12.8	59
pork chop	11.1	7.4	66
beef sausage	18.5	6.6	36
liver	100.7	33.6	33
chicken thigh	10.2	5.5	54
chicken breast	8.5	6.0	70
tuna	9.8	1.8	18
snapper	5.0	3.2	63

Cooked beef, lamb, pork and chicken contained approximately 60-65% haem iron, depending on the cooking method. Beef sausages and liver contained 33-36% haem iron while the results for fish were highly variable. More detailed analyses using a wider variety of fish may be warranted.

The percentage haem iron in the Australian diet can be estimated based on the consumption frequency of meat, chicken and fish (4). This estimates the haem iron content to be 59% of the total dietary iron derived from MFP. This figure is considerably higher than the widely used estimate of 40% derived from the Monsen model (1).

1. Monsen ER, Hallberg L, Layrisse M, Hegsted M, Cook JD, Mertz W, Finch CA. Estimation of available dietary iron. Am J Clin Nutr 1978 31:134-41.
2. Carpenter CE, Mahoney AW. Contributions of heme and nonheme iron to human nutrition. Critical Reviews in Food Science and Nutrition 1992;31:333-67.
3. Rhee KS, Ziprin YA. Modification of the Schricker nonheme iron method to minimize pigment effects for red meats. J Food Sci 1987;52:1174-6.
4. Australian Bureau of Statistics. Apparent consumption of foodstuffs and nutrients. Catalogue No 4306.0, Australia 1992-93.