

Sodium and Pottassium Contents of Common Seasonings Used in Cooking on the Jos Plateau

Research Article

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Abstract

Background: Hypertension is prevalent in Africa with an established role for dietary sodium. Also the low potassium in the diet of Africans is said to play a significant role in the disease and its complications. With most populations unable to meet their potassium needs through fruits and vegetable intake, it becomes necessary to look for convenient and culturally acceptable means of meeting the requirement. As most sodium intake is through dietary ingestion of table salt in cooked and processed food, it would be very important to establish sodium and potassium contents of common seasonings used in cooking. We therefore sought to determine the sodium and potassium contents of common seasonings used in cooking in our environment. That way we would be in an evidence-based position to know which ones to recommend.

Methods: We procured from the open market in Jos, common seasonings used to cook in our environment, (a commercial seasoning powder, 2 commercial seasoning cubes, table salt, traditional rock salt and traditional seasoning powder) analyzing them for sodium and potassium contents after making standard solutions from each.

Results: Table salt had the highest sodium and lowest potassium contents. The sodium levels fell with a slight rise in potassium when it came to the commercially produced seasonings. The traditional seasonings had yet lower sodium and much higher potassium contents with sodium/potassium ratio being lowest for "tookka", a traditional seasoning powder.

Conclusion: Given the foregoing, traditional seasonings especially "tookka" would be the recommended seasoning in our environment for a favourable impact on individual and population blood pressure by reducing dietary sodium/potassium ratio.

Key Words: Seasonings; Traditional; Commercial; Cooking; Blood pressure

Introduction

It has been known for long that a direct and continuous relationship exists between dietary sodium (Na) intake and blood pressure; the result of which is higher prevalence of hypertension and associated cardiovascular diseases in those whose dietary intake of sodium is high [1,2]. This dietary salt and blood pressure response varies in the population with some individuals more sensitive than others [3]. Africans are known to express high salt sensitivity and this is one of the explanations for a higher prevalence of hypertension in them [4]. On the contrary, potassium (K) intake is inversely related

to systolic and diastolic blood pressures, an effect thought to play a significant role in the high prevalence of hypertension in blacks [5]. Independent of its effect on blood pressure, high intake of potassium reduces incidence of cardiovascular and cerebrovascular accidents [6]. The effects of both sodium and potassium are closely related; and human studies show that blood pressure raising potentials of high sodium intake are blunted by potassium supplementation [7].

One of the patient related barriers to hypertension control in Africans is dietary especially low potassium and high sodium intake [8]; hence the dietary recommendation to increase potassium and

reduce sodium in order to control hypertension. In sub-Saharan Africa salt consumption is mainly in the diet. This is from the addition of salt during cooking and at table as well as the use of flavourings in cubes and powder form, since the use of processed food is not so common [9]. Since life style and dietary modifications are most successful if tailored to customs and tradition [10], we decided to compare sodium and potassium contents of common seasonings (traditional and commercially prepared) used in cooking in our environment against that of table salt. This is to put us in a strong evidence based position to advise our patients on dietary salt intake while suggesting culturally sensitive ways to reduce sodium and increase potassium; since the food industry hardly includes appropriate labeling about salt content on products. Successful attainment of these goals helps in hypertension prevention and control. This derives from the fact that modest reductions in dietary salt substantially reduce cardiovascular events thus reducing medical costs [11]; and should be a target for public health manipulation.

Methods

Common seasonings used for cooking in our environment were procured from the open market in Jos, Nigeria. They included table salt, two different popular brands of seasoning cubes and one popular brand of seasoning powder. Two popular traditional seasoning materials were also procured to compare with the commercially produced ones. These were “kanwa” (lake salt) and “tooka”. The former is in solid form and is produced by boiling to evaporation, water from salt lakes or in some instances recovered as granules while digging under the soil in the same area(s). The latter is in powder form and is produced by cooking the chaff of a local cereal (millet) called “acha” after crushing and mixing with water. This is then sieved to discard the sediments. The sieved fluid is then boiled to evaporation leaving a golden brown powder used as seasoning in cooking.

One gram of each material was measured and dissolved in 10 mls of distilled de-ionised water and used as the working solution. One hundred mls of each working solution was added to 9.9 mls of de-ionised distilled water in separate containers. One hundred mls of the standard was treated the same way as the working solutions to bring the standard concentration to 160mmol/l. Sodium and potassium were then determined for each working solution by flame photometry in the analytical laboratory of National Veterinary Research Institute, Vom near Jos by BND and GONE.

Results

The table salt expectedly had the highest sodium content and lowest potassium content. This was followed in sodium content by the commercially prepared seasoning powder with potassium content as low as for table salt. The two seasoning cubes were almost equal in sodium content, roughly seven times less than for table salt. Their potassium content was roughly six times greater than for table salt. For the traditional seasonings, the lake salt “kanwa” had sodium in the same range as the commercially prepared seasoning cubes, but had double their potassium content. For the traditional seasoning powder “tooka”, the sodium was markedly less than the rest with very high potassium levels. In order of sodium/potassium ratio, the table salt was highest and “tooka” the least. Table 1 shows the details of the results.

Table 1: Sodium (Na), Potassium (K) contents and Sodium/Potassium (Na/K) ratios of common seasonings used in cooking on the Jos Plateau.

	TS	CSP	CSC1	CSC2	TSS	TSP
Na (mmol/l)	700	143.6	106	104	110	32
K (mmol/l)	0.1	0.1	0.5	0.6	1.4	71.2
Na/K	7000	1436	212	173	79	0.4

Key: TS - Table salt, CSP - Commercial seasoning powder, CSC1 - Commercial seasoning cube 1, CSC2 - Commercial seasoning cube 2, TSS - Traditional seasoning salt, TSP - Traditional seasoning powder

Discussion

Almost in all instances hypertension treatment guidelines recommend non-pharmacological measures (life style modification) to control hypertension, a major one being salt restriction in diet [12]. Life style modification is known to work better if tailored to the individual or group cultural heritage, beliefs and norms [13,14]. Salt taste threshold is known to be higher in hypertensives and their off springs [15,16]. Taste attitude is a very high predictor of added salt in food [17] and determines what individuals or groups use in food as seasoning. The tendency is that individuals at greater risk for hypertension would crave more table salt in food, further fuelling a rise in their blood pressures. The above notwithstanding, it is possible to achieve significant salt reduction in the population; and Adeyemo has shown the feasibility in Nigeria [18].

This study has found that commercially produced seasonings used in cooking in our environment though better than table salt in sodium and potassium profile could add significantly to the sodium intake if used in addition to table salt in cooking. This is highest for the seasoning powder. The traditional seasoning salt (kanwa) though with sodium in the same range as the commercially prepared seasonings has about double to triple their potassium content; and hence better regarding sodium/potassium profile than the commercially prepared seasonings. The best turned out to be the traditional seasoning powder (tooka) which has very low sodium and high potassium contents resulting in the least sodium/potassium ratio. This makes it ideal for seasoning in hypertensives and those prone to the disease. It is known that high sodium/potassium ratios contribute to hypertension and several cardiovascular diseases [19]. Use of such plant based seasonings with low sodium/potassium ratio could partly explain the lower prevalence of hypertension in the rural areas where they are used more commonly than the commercially prepared seasonings.

Potassium intake all over the world is lower than desired [20]. In the west improved intake is by recommended intake in fruits and vegetables [21]. Unfortunately this is low there [22] as well as in our environment for reasons ranging from cost, lack of storage facilities and group food habits. Seasonings used for cooking would seem to be a convenient way of increasing potassium intake since most of the sodium intake is via table salt used in food. Use of traditional seasonings like “tooka” in this case should be encouraged in our environment and the commercially produced ones discouraged in addition to table salt used for cooking. Where flavor becomes a great issue, non salt containing seasonings like onion, garlic, curry

pepper and nutmeg or various traditional plant based seasonings could suffice, to prevent high sodium intake in diet with consequent hypertension. Such individual and population intervention in food habits would go a long way in keeping hypertension statistics low and by extension its attendant complications; especially in blacks where a modest reduction in sodium intake is associated with significant decreases in blood pressure [23]. Smith-Sprangler et al. [24] have shown how efforts in the population to decrease sodium intake result in decreased cardiovascular disease burden. The same applies to stroke as Gardener et al have also found that low dietary reduces incidence of stroke [25].

Until large scale co-operation by the food industry is achieved in this regard (especially in appropriate sodium labeling of products), our roles as clinicians should hinge on education of the public regarding dietary choices towards decreasing dietary sodium intake.

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References

- Weinberger MH (2008) Are children doomed by what they eat and drink? *Hypertension* 51: 616-616.
- Messerli FH, Schmieder RE, Weir MR (1997) Salt a perpetrator of hypertensive target organ disease? *Arch Intern Med* 157: 2449-2452.
- Sanders PW (2008) Salt sensitivity. It is not always in the genes. *Hypertension* 51: 823-823.
- Ferdinand KC (2008) Hypertension in Blacks. In: JL Izzo, DA Sicca, HL Blacks (eds). *The essentials of high blood pressure. Basic Science, Population Science and Clinical Management*. 4th edition. Wolters Kluwer/Lippincott Williams & Wilkins. Philadelphia. 279- 280.
- Whelton PK (2008) Potassium and blood pressure. *Ibid* 4: 304-306.
- Houston MC, Harper KJ (2008) Potassium, magnesium and calcium: their role in both the cause and treatment of hypertension. *J Clin Hypertens* 10: 3-11.
- Chirinos JA, Townsend R (2010) Sodium, Potassium and Target Organ Damage. A Case for Central Haemodynamics. *Hypertens* 56: 578-580.
- Appel LJ, Espeland MA, Easter L, Wilson AC, Folmar S, et al. (2001) Effects of reduced sodium intake on hypertension control in older individuals: results from the trial of non-pharmacological interventions in the elderly (TONE). *Arch Intern Med* 161: 685-693.
- Cappuccio FP, Plange-Rhule J, Philips RO, Eastwood JB (2000) Prevention of Hypertension and Stroke in Africa. *Lancet* 356: 677-678.
- Gao SK, Fitzpatrick AL, Psaty B, Jiang R, Post W, et al. (2009) Sub-optimal nutritional intake for hypertension control in 4 ethnic groups. *Arch Intern Med* 169: 702-707.
- Bibbings-Domingo K, Chertow GM, Coxson PG, Moran A, Lightwood JM, et al. (2010) Projected effects of dietary salt reductions on future cardiovascular diseases. *N Engl J Med* 362: 590-599.
- Elliot WJ, Black WR (2005). Hypertension. In: ND Wong, JM Gardin (eds). *Preventive Cardiology. A practical approach*. McGraw Hill. New York, Chicago, San Francisco, Lisbon, London, Madrid, Mexico-City, Milan, New Delhi, San Juan, Singapore, Sydney, Toronto. 2nd edition. P 149- 182.
- Scisney-Matlock M, Busworth A, Giger JN, Strickland OL, Harrison RV, et al. (2009) Strategies for implementing and sustaining therapeutic life style changes as part of hypertension management in African Americans. *Postgrad Med* 121: 147-159.
- Lee J (2008) An ethnic sensitive approach for the promotion of a healthy life style. Is it warranted? *J Hum Hypertens* 22: 587-589.
- Olayemi SO, Mabadeje AF (2003) Comparative study of salt threshold of hypertensives, their normotensive relatives and non-relatives. *Niger Postgrad Med J* 10: 96-98.
- Ukoh VA, Ukoh GC, Okosun RE, Azubike E (2004) Salt intake in first degree relations of hypertensive and normotensive Nigerians. *East Afr Med J* 81: 524- 528.
- Van der Veen JE, DeGraaf C, Van Dis SJ, Van Staveren WA (1999) Determinants of salt used in cooked meals in the Netherlands: attitudes and practices of food preparers. *Eur J Clin Nutr* 53: 388-394.
- Adeyemo AA, Prewitt TE, Luke A, Omatade OO, Rotimi CN, et al. (2002) The feasibility of implementing a dietary sodium reduction intervention among free living normotensive individuals in South West Nigeria. *Ethn Dis* 12: 207-212.
- Eaton SB, Eaton SB 3rd, Kronner MJ (1997) Paleolithic nutrition revisited. A twelve year retrospective on its nature and implications. *Eur J Clin Nutr* 51: 207- 216.
- Van Mierlo LAJ, Greyling AG, Zock PL, Kok FJ, Geleijnse JM (2010) Sub-optimal potassium intake and potential impact on population blood pressure. *Arch Intern Med* 170: 1501-1502.
- Kotchen TA, Kotchen JM (2008) Life style modification. *Ibid* 4: 406-409.
- Kris-Etherton PM, Hilpert KF, Krauss RM (2000) Nutrition. *Ibid* 9: 256-295.
- He FJ, Maciniak M, Visagie E, Markandu ND, Anand V, et al. (2009) Effect of modest salt reduction on blood pressure, urinary albumin and pulse wave velocity in white, black and Asian mild hypertensives. *Hypertension* 54: 482-488.
- Smith-Spangler CM, Juusola JL, Euns EA, Owens DK, Garber AM (2010) Population strategies to decrease sodium intake and the burden of cardiovascular disease: a cost effectiveness analysis. *Ann Intern Med* 152: 481-487.
- Gardener H, Rundek T, Wright CB, Elkind MSV, Sacco RL (2012) Dietary sodium and risk of stroke in the Northern Manhattan Study. *Stroke* 43: 1200-1205.