General Position

The purpose of this document is to set out the joint position of Action on Salt, World Action on Salt and Health and Blood Pressure UK on the use of potassium-based sodium replacers to reduce population salt (sodium chloride) intake.

In 2006, Action on Salt worked with the Food Standards Agency to set voluntary salt reduction targets on more than 80 categories of food. The targets were regularly reset to progressively more stringent targets and the salt content of many food categories was reduced by up to 50% between 2003 and 2011. This was accompanied by a 15% decrease in population salt intake, a fall in population blood pressure and a fall in deaths from cardiovascular disease, including stroke.

Salt substitutes consist of salts with reduced sodium content and added mineral salts. Their use - and namely that of potassium-based sodium replacers - to reduce the salt content of food was not originally included in the UK's salt reduction strategy. There were concerns that increasing potassium consumption could be hazardous for some (e.g. those with undiagnosed kidney disease), and because it was preferred to reduce the population's taste preference for salty foods by reducing their salt content.

The Scientific Advisory Committee on Nutrition (SACN), in collaboration with the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT), have since conducted a lengthy and extensive review of the potential benefits and risks of potassium-based sodium replacers to population health. They tested replacing 15% of sodium in bread and 25% of sodium in other commonly consumed foods with potassium and found that the benefits outweigh the potential risks, with those benefits having a large impact at the population level. They recommended that the government encourage the food industry to consider the use of potassium-based sodium replacers to reduce the salt content of food.

Action on Salt, World Action on Salt and Health and Blood Pressure UK agree with the SACN and COT joint report and recommend the use of potassium-based sodium replacers as one way the food industry can reduce the sodium content of food products. This will also lead to an increase in potassium intake, which will benefit the health of the UK population. However, further reformulation leading to a gradual reduction of salt content is technically feasible in the majority of foods. We are ultimately working towards reducing population preference for salt and salty foods.

Potassium

Potassium is an essential nutrient and is present in all animal and plant tissues. Potassium is required for normal cell function, maintenance of body fluid levels and maintenance of the natural acid and electrolyte balance in the body[1,2].

Potassium is found naturally in many foods, including fruits and vegetables. Data from the National Diet and Nutrition Survey (NDNS) shows that the main sources of potassium in the UK diet are vegetables, milk, cereals and cereal products, and meat and meat products. Milk is the main source of potassium in the diet of young children (aged 1-3 years), whereas vegetables and potatoes are the main source in the diets of other age groups[3].

Recommended Potassium Intake

In 1991, the Committee on the Medical Aspects of Food and Nutrition Policy (COMA) set Dietary Reference Values (DRVs) for potassium[4]. The DRVs include a Reference Nutrient Intake (RNI) – the amount of a nutrient needed to ensure that the needs of 97.5% of the population are met – and a Lower Reference Nutrient Intake (LRNI) – the amount of a nutrient that would be enough for only a small number of people in a group who have low requirements (2.5%).

Age Group	RNI (mg/day)	LRNI (mg/day)
0-3 months	800	400
4-6 months	850	400
7-9 months	700	400
10-12 months	700	450
1-3 years	800	450
4-6 years	1100	600
7-10 years	2000	950
11-14 years	3100	1600
15-50+ years	3500	2000

Table 1: UK Dietary Reference Values for Potassium[5]

Current UK Potassium Intake

In the UK, typical diets are low in fresh fruits and vegetables and high in processed foods. This results in a high-salt diet lacking in potassium[5].

Potassium intakes in the UK are measured as part of the NDNS rolling programme[3]. Table 2 highlights that current potassium intakes in adults are far below the recommended level of 3500 mg/day.

Age Group	Mean Potassium Intake (mg/day)	RNI (mg/day)
1.5 – 3 Years	1664	800
4 – 10 Years	2043	1100 –2000
11 – 18 Years	2249	3100 –3500
19 – 64 years	2865	3500
65+ years	2736	3500

Table 2: Current potassium intakes in the UK[3]

Potassium and Health

The World Health Organisation (WHO) commissioned a systematic review and meta-analysis on the effect of potassium and health to inform the development of their guidance on potassium intakes for adults and children. The review found that increased potassium intake lowers blood pressure in adults[5], which agrees with previous meta-analyses on the effect of potassium intake on blood pressure[6-8]. The review found evidence of moderate quality that higher potassium intake reduced the risk of stroke by 24%, but had no significant effect on total cardiovascular disease (CVD) or coronary heart disease (CHD)[5]. The authors suggest that this is due to few studies reporting on total CVD or CHD as outcomes. The WHO recommends increasing potassium intake from food in order to reduce blood pressure and risk of total CVD, stroke and CHD in adults (owing to the relationship between blood pressure and total CVD, stroke and CHD)[9].

A full review of the evidence on potassium and health can be found in the *WHO Guideline: Potassium Intake for Adults and Children* and *SACN's Statement on Potassium-based Sodium Replacers*[9,10].

Salt Substitutes

Potassium-based sodium replacers are a salt substitute – a table salt alternative where a portion of the sodium chloride has been replaced with a mineral salt, such as potassium salt (potassium chloride). Salt substitutes may also contain magnesium and calcium salts.

A meta-analysis evaluated the effect of salt substitutes on blood pressure[11]. Differing compositions of salt substitutes were used in the studies included in the meta-analysis, including:

- 65% sodium chloride, 25% potassium chloride and 10% magnesium sulphate;
- 41% sodium chloride, 41% potassium chloride, 17% magnesium sulphate and several trace minerals;
- 65% sodium chloride, 30% potassium chloride, 5% calcium salts and some folic acid.

The meta-analysis found that all salt substitutes were effective in lowering blood pressure.

Salt and the UK Salt Reduction Strategy

Salt

Sodium is naturally present in foods such as milk, meat and shellfish, and is present in salt (sodium chloride), raising agents such as sodium bicarbonate and certain preservatives. Salt is the main source of sodium in the diet, providing more than 90% of sodium intake. Most salt in the diet (75%) comes from salt added by the food industry to processed food, or food eaten out of the home[12].

Small amounts of sodium are required to support the normal function of nerve and muscle cells, maintain the volume of fluids in the body and maintain the acid and electrolyte balance in the body. However strong evidence demonstrates that a diet high in salt raises blood pressure at all ages. Raised blood pressure is a major risk factor for CVD, which is the leading cause of death and disability worldwide. In addition, high salt intake is linked to greater incidence of stomach cancer, osteoporosis and chronic kidney disease[13]. Salt reduction is internationally recognised as a priority for public health and benefits the whole population, particularly the socially deprived[14].

UK Salt Reduction Strategy

Many people do not realise they are eating too much salt and remain unaware of the effect this has on blood pressure and health, particularly as raised blood pressure is symptomless. Reformulating foods to contain less salt is key to reducing population salt intake, lowering blood pressure and decreasing the prevalence of CVD.

In 2006 the FSA, in partnership with Action on Salt, set voluntary salt reduction targets for 85 categories of food to be met by 2010. In 2008, the salt targets were reviewed and reset to lower targets (approximately 10-20% lower than the previous targets), and were expected to be met by 2012. In 2010, responsibility for nutrition passed from the FSA to the Department of Health, who launched the Public Health Responsibility Deal in 2011. The Responsibility Deal put the food industry in charge of policing themselves and improving the nutritional quality of the food they produced. The 2012 salt reduction targets were incorporated into the Responsibility Deal as a voluntary pledge that companies could sign up to, but by this time the targets had already lost significant momentum due to lack of monitoring. In 2013, after significant pressure from Action on Salt, the then Public Health Minister Anna Soubry agreed to review and reset the salt targets further. New targets were subsequently set in 2014 to be achieved by December 2017, along with new targets for the out of home sector.

Following the 2015 General Election, the Public Health Responsibility Deal was dissolved and responsibility for salt reduction was transferred in 2016 to Public Health England, who have since taken little action on salt reduction. As a result, progress with salt reduction has stalled in the UK.

SACN and COT Position Statements

The use of potassium-based sodium replacers was not previously recommended as part of the UK's salt reduction strategy as the aim of the strategy was to reduce consumer preference for salty food, in addition to the concerns that increasing potassium intakes could harm those with impaired kidney function. The kidneys maintain the body's potassium balance and in those with impaired kidney function, there is a concern that increased potassium intake may lead to hyperkalaemia[10].

Manufacturers were therefore encouraged to reduce levels of salt in food through reformulation. However, the food industry has stated that for some food categories it would be difficult to remove more salt from food without significantly altering recipes, as the salt in these foods serves other purposes other than taste. The food industry requested to use potassium-based sodium replacers to reduce sodium levels in these products[11].

In 2013, the Department of Health requested SACN to review the evidence on potassium-based sodium replacers and the potential benefits of reducing the sodium content of foods using potassium-based sodium replacers, ingredients and additives. SACN concluded that increasing potassium intakes would benefit those with hypertension and the decrease in sodium resulting from potassium-based sodium replacers would have further beneficial effects on population blood pressure. SACN also concluded that a higher potassium intake is associated with a lower risk of stroke[10].

SACN asked the COT to assess the potential risks. COT acknowledged that in those who may have undiagnosed kidney disease, the use of potassium-based sodium replacers could lead to hyperkalaemia (too much potassium in blood) but they advised policy-makers to weigh the potential risks against the benefits of potassium-based sodium replacers and

recommended close monitoring of such a scheme to measure the effect on incidence of hyperkalaemia[15].

SACN and COT's Joint Report

A joint SACN-COT working group was convened to conduct a benefit-risk assessment to consider the impact of substituting 15 to 25% of sodium in foods with potassium (15% in bread, 25% in all other commonly consumed food categories) [16].

The joint assessment integrates advice based on independent position statements published by SACN looking at the potential benefits and by COT looking at the potential risks of increasing potassium intakes. The integrated position statement concludes that at a population level, the benefits of using potassium-based sodium replacers (including reduced blood pressure and reduced stroke incidence) to replace sodium in commonly consumed foods outweigh the potential risks.

SACN and COT recommend that the government consider encouraging food companies to explore the use of potassium-based sodium replacers to help reduce salt levels in foods, up to the levels specified in the 'alternative scenario' where 15% of the sodium in bread, 25% of the sodium in all other commonly consumed food would be substituted with potassium.

Age Group (years)	RNI (mg/day)	Population Mean Intake	
		Reference Scenario*	Alternative Scenario**
1.5 to 3	800	1800	2113
4 to 10	1100 - 2000	2187	2655
11 to 18	3100 - 3500	2384	2978
19 to 49	3500	2764	3373
50 to 64	3500	3005	3554
65 to 74	3500	3004	3564
75+	3500	2666	3143

Table 3: SACN-COT predicted potassium intakes if potassium-based sodium replacers used at specified levels
* Current UK potassium intakes
** Potassium intakes as a result of the use of potassium-based sodium replacers

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Action on Salt is a group concerned with salt and its effects on health, supported by 24 experts. Action on Salt is successfully working to reach a consensus with the food industry and the UK government over the harmful effects of a high salt diet, and bring about a reduction in the amount of salt in processed foods.

World Action on Salt and Health aim to translate the success of the UK's salt reduction strategy to all countries in line with World Health Organisation recommendations. WASH has expert members in 100 countries, all of whom are committed to salt reduction.

Blood Pressure UK is the only UK charity solely dedicated to lowering the nation's blood pressure to prevent disability and death from stroke and heart disease.