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## Reducing the sodium chloride content in chicken pate by using potassium and ammonium chloride

Ivana Brankovic Lazic<sup>a,\*</sup>, Mladen Raseta<sup>a</sup>, Dragica Nikolic<sup>a</sup>, Mirjana Lukic<sup>a</sup>, Dragica Karan<sup>a</sup>, Slobodan Lilic<sup>a</sup>

<sup>a</sup>*Institute of Meat Hygiene and Technology, 13 Kacanskog, 11000 Belgrade, Serbia*

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### Abstract

The aim of this research was to investigate possibility of chicken pate production with reduced sodium chloride content, as well as to establish changes in sensory characteristics. In the study, six experimental groups of chicken pate were produced with the same basic ingredients, but different amounts of added salts. Sensory evaluation was performed in order to determine general taste acceptability, and of the sodium and potassium levels in the chicken pate. The pate from EI and EII groups in which the amount of added sodium chloride was reduced and/or partially substituted with ammonium chloride had a most acceptable taste.

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*Key words:* chicken pate; sodium chloride; reducing of the content

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### 1. Introduction

Salt is of great importance for humans. Given that food is our main source of salt today, it is not surprising there is a close connection of food consumption with normal functioning of the body, primarily in terms of reducing the

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\* Corresponding author. Tel.: +381-11-2650-655; fax: +381-11-2650-825.  
E-mail address: [ivana@inmesbgd.com](mailto:ivana@inmesbgd.com)

content of salt, but also sugar and fat. Table salt, or sodium chloride in food products is main source of sodium. Increased sodium intake expresses a negative impact on health, because excessive sodium intake is directly correlated with increased blood pressure<sup>12</sup>. Besides hypertension<sup>10</sup>, an excessive sodium intake leads to other negative health impacts, including a direct risk of heart attack<sup>11,13</sup>, left ventricular hypertrophy<sup>15</sup>, the proteinuria<sup>5</sup>, developing kidney stones risk<sup>1</sup>, reduction bone density risk<sup>4</sup>. Of the total daily amount of salt consumed through food, 20% comes from meat products<sup>17</sup>. The average salt content in boiled sausages ranges from 1.6% to 2.4%, 3.5% to 5.0% in dry fermented sausages, and in smoked products ranges from 3% to 4%, while the highest content is in dried meat products, from 4% to 7%<sup>2</sup>. Adding salt to meat products has an effect on salinity<sup>14</sup>, which is more pronounced in meat products with more fat than in products with more protein. Sodium chloride leads not only to the feeling of salinity, but in many categories of food plays other roles, including product strength perception, enhancing sweet taste, masking metallic and off tastes, rounding the overall taste (flavour), and so contributing to food flavour intensity<sup>7</sup>.

The most common methods to reduce sodium intake are by reducing the added sodium chloride<sup>14</sup>, substituting part of the sodium chloride with other salts<sup>8,9,14,15</sup>, the use of flavorings and taste enhancers and the use of masking agents<sup>3</sup>.

The most common substitute for sodium chloride is potassium chloride, but its main deficiency is amplification of bitter taste and reducing salinity<sup>7</sup>, if it is used as a 50% replacement. Use of potassium chloride is often challenged from the health aspect since it leads to sensitivity of one part of population, such as people suffering from diabetes type I, or chronic renal insufficiency<sup>6</sup>.

The aim of this study was to examine the possibility of reducing the sodium chloride content in cooked sausages, produced as a type of chicken pate, and to evaluate changes in the sensory properties, primarily changes in general taste acceptability.

## 2. Materials and methods

The main ingredient used was chicken meat (thighs and drumsticks) and broth; both were later added when creating pates. Soy isolate, onions and sodium nitrite were additives used. Six groups of chicken pate, one control group and five experimental groups were prepared, and the amount of salt differed between groups. The composition of pate in the six groups is given in Table 1.

Table 1. Composition of chicken pate.

Group	Chicken meat, g	Sunfloweroil, ml	Broth, ml	Soy isolate, g	Onion, g	Na-nitrite, mg	Na-chloride, g	K-chloride,g	NH <sub>4</sub> chloride, g
C (control)	182.5	150	150	10.00	20.00	16.25	5.00	-	-
E I	182.5	150	150	10.00	20.00	16.25	3.25	-	-
E II	182.5	150	150	10.00	20.00	16.25	3.25	-	1.75
E III	182.5	150	150	10.00	20.00	16.25	2.17	1.10	-
E IV	182.5	150	150	10.00	20.00	16.25	2.17	1.10	1.75
E V	182.5	150	150	10.00	20.00	16.25	-	3.25	1.75

The first group (control) contained 1% added sodium chloride, which is usual for this type of product. The second group, EI, contained 3.25 g of added sodium chloride, which was 65% of the usual amount. The third group, EII, contained 3.25 g of added sodium chloride and 1.75 g of added ammonium chloride. The fourth group, EIII, contained 2.17 g of added sodium chloride and 1.10 g of added potassium chloride. The fifth group, EIV, contained 2.17 g of sodium chloride, 1.10 g potassium chloride and 1.75 g of ammonium chloride all added, while the sixth group, EV, did not contain any sodium chloride or potassium chloride, but did contain 3.25 g of added ammonium chloride. After cooking the chicken meat, salts, soy isolate, onion, broth and sunflower oil was mixed into the filling. The filling was prepared by grinding these ingredients in a mixer to a homogeneous, smooth texture. This prepared filling was dispensed in cans with net weight of 150 g, which were then closed and sterilized in an

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