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Research Article

Influence of Sodium Acetate and Sodium Chloride on Emulsion Capacity and Stability of Mushroom Varieties

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Abstract

The effects of sodium acetate and sodium chloride salts (2-8%) on emulsion capacity (EC) and emulsion stability (ES) of mushroom samples (Lentinus subnudus Berk (M_1), Chlorophyllum molybditis (M_2), Volvariella esculenta (M_3), Coprinus tramentarius (M_4), Pleurotus ostreatus Jacq (M_5), Termitomyces microcarpus (M6) and Pleurotus pulmonarius (M_7) have been studied using standard methods. EC findings for water samples (%) were: 76.26 (M2) to 87.26 (M6), while EC values for all salt concentrations were 2% (67.26-78.18), 4% (60.48-78.18), 6% (64.48-78.18%) and 8% (64.48-78.18). At $p < 0.05$, there were no substantial differences. The ES of most mushrooms was found to be stable between 1 and 4h in both water and different salt concentrations. The findings showed that the two salts used at different concentrations had no significant impact on emulsion capability and stability.

Keywords: Mushrooms, capacity, stability, salts, coalescence, food processing.

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Introduction

In the South-western part of Nigeria, fungi, especially edible ones, have been an alternative to meat (Abulude and Ndamitso, 2013). The names of these mushrooms are based on morphology, habitat, taste, texture, and growth habit (Oso, 1975; Adeyeye and Abulude, 2010). According to Abulude and Abdulrasheed (2014), the quantity of mushrooms grown or collected by local farmers is lower than the consumer intake. In other words, the attitude of Nigerians towards consumption is high.

In many sectors, sodium acetate and sodium chloride salts are useful. In the textile industry, for example, they are used to neutralize sulphuric acid waste streams, again enhancing the consistency of finished textiles. They may be employed as part of the developer solution and works as photo resist agent. They act as preservatives and flavouring agents in the food industry. Potato chips with sodium acetate have a distinctive "salt and vinegar" flavor in particular. Sodium acetate solutions in the medical sector treat patients with elevated levels of blood acid and/or low levels of sodium (Wasserman, 2015).

The physical and chemical changes that happen during food storage, preparation, and presentation are considered to be the functional properties of food. Lipids have functional properties that make them a significant food requirement and a useful component when frying food as well. The dispersion of lipids, oil, or fat in a liquid is emulsification. As oil and water are not mixable, emulsification involves the use of a third ingredient. The oil is reduced to very tiny droplets when oil and water are shaken or combined for a long time, which tends to be dispersed in the water. If the mixture is permitted for a time of rest or standing, it will separate. Mayonaise, gravy, and cheese are realistic applications for the food industry (Lorizio, 2017).

Several studies have been conducted on the functional properties of food using water as a solvent (Abulude, 2004; Abulude *et al*., 2005; Adeyeye *et al*., 2005; Adeyeye *et al*., 2008; Adebayo *et al*., 2013; Ojo and Ade-Omowaye, 2015; Nnadozie *et al*., 2015; Emeka-Ike and Ike 2020), while others have investigated the effects of various salts on various food samples (Pham *et al*., 2016; Pan et al., 2018; Ikenna, 2018; Adubiaro *et al*., 2018; Adubiaro *et al*., 2019; Yaku *et al*., 2019). None of the studies on the effects of salt on mushrooms have been carried out, as it is noted that mushrooms are meat alternatives. If work is done on them as well, it will not be out of reach. On this premise, ours is reported on mushrooms.

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The goal of the research is therefore to determine the effect of salts (sodium acetate and sodium chloride) on the EC and ES of food properties of seven different varieties of mushrooms acquired in Akure, Ondo State, Nigeria.

Materials and Methods

Source of Materials and Sample Pre-treatment

Mushrooms were collected from the Federal College of Agriculture campus, Akure, Ondo State, Southwest Nigeria; *Lentinus subnudus*Berk (M_1), *Chlorophyllum molybditis* (M_2), *Volvariella esculenta* (M_3), *Coprinus tramentarius* (M_4), *Pleurotus ostreatus* Jacq (M_5), *Termitomyces microcarpus* (M_6) and *Pleurotus pulmonarius* (M_7). The bad or rotten samples were removed. The samples were oven-dried for 72 hours at 65^oC and were then pound with porcelain pestle and mortar into powdered form. For further analysis, the milled samples were then sieved with a 2mm mesh size sieve and stored in waterproof polyethylene bags at room temperature.

Determination of Emulsion Stability (ES)

Using Beuchat's technique, the emulsion was prepared (Adeyeye *et al*., 2008). In a Kenwood blender, one gram (1g) of the sample was mixed with 50 cm^3 of distilled water for a maximum speed of 30 seconds with continuous blending, 5 cm^3 each of Executive Chef vegetable oil was continuously added until there was a decrease in quality. At this point, the oil addition was discontinued. The prepared emulsion was then allowed to stand in a graduated cylinder and, in each case, the volume of water separated at intervals of between 1 and 24h was noted. Determinations in triplicates have been done.

Determination of Emulsion Capacity (EC)

The research technique was used by Adeyeye *et al*. (2008) as 0.5 g of triplicate flour samples were applied to 3 cm^3 of executive Chef vegetable oil in 10 cm^3 graduated centrifuge tubes. To distribute the flour in the liquid, the blends were blended with a glass rod. The volumes of separated oil were noted after keeping for a time of 30 minutes. The absorbed excess oil was expressed as the percentage of oil bound by a sample of 100 g. A specific gravity bottle was used to assess the density of the oil.

Statistical Analysis

Data obtained were generated in triplicates and analyzed using Mean, Standard deviation, and one-way analysis of variance with Duncan Multiple Range test at 95% confidence or $p < 0.05$.

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Results and Discussion

The results of EC samples in water are shown in Table 1 (%). The findings thus varied: 76.26 (M_2) to 87.26 (M_6), while the values obtained in all salt concentrations are shown in Tables 2 to 6. 2% (67.26 - 78.18), 4% (60.48 - 78.18), 6% (64.48 - 78.18 percent), and 8% (64.48 - 78.18). The findings did not vary significantly ($p < 0.05$). The highest values were found for M_7 in all mushroom varieties. This illustrates the degree to which the oil was combined with sample M_7. In general, with the addition of salts and the increase in concentration, as compared to water, the EC decreased. The discrepancies found between the concentrations of water and salt may be due to the mushroom samples' hydrophobic ability. For mushrooms, *Ganoderma spp*., *Omphalotus olearius,* and *Hebeloma mesophaeum* (Aremu *et al.,* 2009), the EC values obtained in this analysis were higher than 57.3-61 %, but in complete agreement with those of Adeyeye *et al*. (2005). The degree to which the dietary protein can shape dietary oil into fine particles may be called oil emulsion ability. Furthermore, it specifically tests the degree to which oil is combined with dietary protein. It is essential in the sense that during digestion, proteins in food are often emulsified. Due to the high free energy contributed by interfacial stress, the emulsion of water and oil is unstable. At the end stage, EC measurements take place in two-step procedures, at first releasing oil droplets, the large globular structure breaks down, then coalescence (Pour-El, 1979).

ES is stable between 1 and 4h for most mushrooms in both water and various salt concentrations (Tables 2 – 9). For both water and various salt concentrations, the values obtained were between 22.10 and 42.40 %. No significant difference was shown in the results ($p < 0.05$). Good and stable emulsion stability was demonstrated by all the mushroom samples. ES is the ability to resist alterations in properties over time, according to McClements (2017). ES is useful in determining the shelf-life of food emulsions and processing them.

In food formulations, the emulsion has several values, such as mayonnaise, salad creams, desserts, and drinks. Emulsion science has been used to enhance the consistency of food emulsions (Adheeb - Usaid *et al*., 2014; Cassiday, 2014).

The food properties rely on the affinity of the protein, including solubility, water absorption, and wettability, for water and other polar solvents. Proteins are among the most effective emulsifiers widely used in the food industry due to their hydrophilic (water-loving) and hydrophobic (oil-loving) structures. The terminals of outer hydrophilic hydrocarbons may interact with the aqueous phase surrounding them, while

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the lipophilic interphases interact with the oil phase surrounding them. The consequence is that the interphase stress between molecules of one immiscible liquid and another immiscible liquid (such as oil and water) is decreased (Jayasena *et al.*, 2010).

Table 1. The Results of Emulsion Capacity and Stability of Selected Varieties of Mushrooms in Water (%)

			Samples				
Time (h)	M_1	M_2	M_3	M_4	M_5	M_6	M_7
Capacity							
0	78.29±21.26^a	76.26±20.17^b	78.48±19.00^c	78.40±19.17^a	80.49±19.17^b	87.26±20.17^b	85.70±20.17^c
1	34.22±17.51^a	36.37±20.03^a	34.86±20.03^b	40.37±20.02^a	42.11±20.03^a	45.20±20.03^a	40.33±20.03^b
2	34.14±18.72^a	36.55±20.17^a	38.29±20.17^b	40.29±21.17^a	36.55±20.17^a	41.45±20.17^a	39.49±20.17^b
3	34.43±19.18^a	36.44±19.82^a	38.29±19.82^b	40.07±20.82^a	34.22±18.82^a	41.44±19.82^a	38.52±18.82^{ab}
4	34.34±20.90^a	35.44±19.99^a	38.18±19.42^b	40.34±20.99^a	34.41±19.99^a	40.94±19.99^a	38.30±20.99^{ab}
5	33.29±20.57^a	35.56±20.05^a	38.18±18.90^b	40.51±20.05^a	34.26±20.05^a	39.56±20.05^a	38.26±20.05^{ab}
6	32.37±19.40^a	35.58±21.45^a	38.11±21.45^a	40.41±19.45^a	34.37±21.45^a	39.55±21.45^a	37.41±21.45^a
22	32.27±19.19^a	35.59±21.18^a	38.10±21.18^b	40.59±21.18^a	34.58±21.18^a	39.15±21.18^a	37.36±21.18^a
24	32.37±20.55^a	35.33±20.00^a	38.00±20.00^b	38.33±19.95^a	34.46±19.00^a	39.33±20.00^a	37.30±19.56^a

All values were expressed as averages of triplicate determinations ± the standard deviations and values bearing the same superscripts in the same column are significantly not different ($p < 0.05$).

Table 2. The Results of Emulsion Capacity and Stability of Selected Varieties of Mushrooms in Sodium Acetate (2%)

Time (h)			Samples				
	M_1	M_2	M_3	M_4	M_5	M_6	M_7
Capacity							
0	78.11±18.26^b	69.11±20.17^b	70.48±19.00^b	78.40±19.17^b	68.09±21.17^b	67.26±20.17^b	78.18±20.17^c
1	40.22±22.51^a	35.37±20.03^a	40.86±20.03^a	42.37±20.02^a	37.11±20.03^a	35.20±20.03^a	38.11±20.03^b
2	40.10±21.72^a	35.55±20.17^a	37.29±20.17^a	42.29±21.17^a	37.55±20.17^a	35.45±20.17^b	34.19±20.17^a
3	40.11±21.18^a	35.44±19.82^a	37.45±19.82^a	41.07±20.82^a	37.22±18.82^a	35.44±19.82^a	34.12±18.82^a
4	40.07±20.90^a	35.44±19.99^a	37.57±19.42^a	41.34±20.99^a	37.41±19.99^a	35.94±19.99^a	34.11±20.99^a
5	40.29±20.57^a	35.15±20.05^a	37.52±18.90^a	41.51±20.05^a	37.26±20.05^a	35.56±20.05^a	34.11±20.05^a
6	40.15±20.40^a	35.11±21.45^a	37.58±21.45^a	41.41±19.45^a	36.37±21.45^a	35.55±21.45^c	34.11±21.45^a
22	40.16±20.19^a	35.29±21.18^a	37.10±21.18^a	41.40±21.18^a	36.58±21.18^a	35.15±21.18^a	34.26±21.18^a
24	40.15±20.18^a	35.33±20.00^a	36.47±20.00^a	40.48±19.95^a	36.46±19.00^a	35.33±20.00^a	34.11±20..09^a

All values were expressed as averages of triplicate determinations ± the standard deviations and values bearing the same superscripts in the same row are significantly not different ($p < 0.05$).

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Table 3. The Results of Emulsion Capacity and Stability of Selected Varieties of Mushrooms in Sodium Acetate (4%)

	Samples						
Time (h)	M_1	M_2	M_3	M_4	M_5	M_6	M_7
Capacity							
0	70.19±18.26^{d}	69.18±20.17^{b}	60.48±19.00^{b}	72.11±19.17^{c}	68.09±21.17^{b}	68.26±20.17^{a}	78.18±20.17^{a}
1	44.22±22.51^{c}	42.37±20.03^{b}	24.86±20.03^{a}	44.20±20.02^{b}	30.15±20.03^{a}	42.20±20.03^{a}	40.11±20.03^{c}
2	42.10±21.72^{bc}	41.55±20.17^{b}	24.57±20.17^{a}	44.19±21.17^{ab}	29.55±20.17^{a}	40.45±20.17^{a}	40.19±20.17^{ab}
3	40.11±21.18^{a}	41.44±19.82^{b}	24.45±19.82^{a}	42.07±20.82^{a}	29.22±18.82^{a}	39.44±19.82^{a}	40.12±18.82^{ab}
4	40.07±20.90^{a}	40.44±19.99^{a}	24.29±19.42^{a}	42.34±20.99^{a}	28.41±19.99^{a}	39.94±19.99^{a}	39.11±20.99^{ab}
5	40.29±20.57^{ab}	40.15±20.05^{b}	22.58±18.90^{b}	40.51±20.05^{a}	28.26±20.05^{a}	39.56±20.05^{a}	39.11±20.05^{ab}
6	40.15±20.40^{ab}	38.11±21.45^{b}	22.52±21.45^{a}	40.48±19.45^{a}	28.37±21.45^{a}	39.55±21.45^{a}	39.11±21.45^{abc}
22	38.18±20.19^{ab}	38.29±21.18^{a}	22.47±21.18^{b}	40.40±21.18^{a}	28.58±21.18^{a}	39.15±21.18^{a}	39.26±21.18^{ab}
24	38.15±20.18^{ab}	38.33±20.00^{b}	22.10±20.00^{a}	40.40±19.95^{ab}	28.46±19.00^{a}	39.33±20.00^{a}	39.11±20.09^{a}

All values were expressed as averages of triplicate determinations ± the standard deviations and values bearing the same superscripts in the same row are significantly not different ($p < 0.05$).

Table 4. Emulsion Capacity and Stability of Selected Varieties of Mushrooms in Sodium Acetate (6%)

	Samples						
Time (h)	M_1	M_2	M_3	M_4	M_5	M_6	M_7
Capacity							
0	70.11±18.26^{b}	73.11±20.17^{b}	64.48±19.00^{b}	72.40±19.17^{c}	78.09±21.17^{a}	68.26±20.17^{c}	78.18±20.17^{d}
1	34.22±22.51^{a}	40.37±20.03^{b}	28.86±20.03^{b}	43.37±20.02^{b}	36.11±20.03^{a}	40.20±20.03^{b}	44.11±20.03^{c}
2	33.10±21.72^{a}	40.55±20.17^{b}	26.29±20.17^{b}	42.29±21.17^{ab}	34.55±20.17^{a}	40.45±20.17^{b}	42.19±20.17^{ab}
3	33.11±21.18^{a}	40.44±19.82^{b}	26.45±19.82^{b}	42.07±20.82^{ab}	34.22±18.82^{a}	38.44±19.82^{ab}	42.12±18.82^{ab}
4	32.07±20.90^{a}	40.44±19.99^{a}	26.57±19.42^{b}	40.34±20.99^{ab}	34.41±19.99^{a}	38.94±19.99^{ab}	42.11±20.99^{ab}
5	32.29±20.57^{a}	38.15±20.05^{ab}	24.52±18.90^{b}	40.51±20.05^{ab}	32.26±20.05^{a}	38.56±20.05^{ab}	42.11±20.05^{ab}
6	32.15±20.40^{a}	38.11±21.45^{ab}	24.58±21.45^{a}	40.41±19.45^{ab}	32.37±21.45^{a}	38.55±21.45^{ab}	42.11±21.45^{abc}
22	32.16±20.19^{a}	35.29±21.18^{a}	24.10±21.18^{b}	40.40±21.18^{ab}	32.58±21.18^{a}	37.15±21.18^{a}	40.26±21.18^{ab}
24	32.15±20.18^{a}	35.33±20.00^{ab}	24.47±20.00^{b}	37.48±19.95^{a}	30.46±19.00^{a}	35.33±20.00^{a}	40.11±20..09^{a}

All values were expressed as averages of triplicate determinations ± the standard deviations and values bearing the same superscripts in the same row are significantly not different ($p < 0.05$).

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Table 5. The Results of Emulsion Capacity and Stability of Selected Varieties of Mushrooms in Sodium Acetate (8%)

			Samples				
Time (h)	M_1	M_2	M_3	M_4	M_5	M_6	M_7
Capacity							
0	$70.11±18.26^{b}$	$73.11±20.17^{b}$	$64.48±19.00^{b}$	$72.40±19.17^{c}$	$78.09±21.17^{a}$	$68.26±20.17^{c}$	$78.18±20.17^{d}$
1	$33.22±22.51^{a}$	$41.37±20.03^{b}$	$26.56±20.03^{b}$	$44.37±20.02^{b}$	$38.11±20.03^{a}$	$40.60±20.03^{b}$	$43.10±20.03^{a}$
2	$33.10±21.72^{a}$	$40.55±20.17^{b}$	$26.29±20.17^{b}$	$42.29±21.17^{ab}$	$34.55±20.17^{a}$	$40.45±20.17^{b}$	$42.19±20.17^{a}$
3	$33.11±21.18^{a}$	$40.44±19.82^{b}$	$26.45±19.82^{b}$	$42.07±20.82^{ab}$	$34.22±18.82^{a}$	$38.44±19.82^{ab}$	$42.12±18.82^{a}$
4	$32.07±20.90^{a}$	$40.44±19.99^{a}$	$26.57±19.42^{b}$	$40.34±20.99^{ab}$	$34.41±19.99^{a}$	$38.94±19.99^{ab}$	$42.11±20.99^{a}$
5	$32.29±20.57^{a}$	$38.15±20.05^{ab}$	$24.52±18.90^{b}$	$40.51±20.05^{ab}$	$32.26±20.05^{a}$	$38.56±20.05^{ab}$	$42.11±20.05^{a}$
6	$32.15±20.40^{a}$	$38.11±21.45^{ab}$	$24.58±21.45^{a}$	$40.41±19.45^{ab}$	$32.37±21.45^{a}$	$38.55±21.45^{ab}$	$42.11±21.45^{a}$
22	$32.16±20.19^{a}$	$35.29±21.18^{a}$	$24.10±21.18^{b}$	$40.40±21.18^{ab}$	$32.58±21.18^{a}$	$37.15±21.18^{a}$	$40.26±21.18^{a}$
24	$32.15±20.18^{a}$	$35.33±20.00^{ab}$	$24.47±20.00^{b}$	$37.48±19.95^{a}$	$30.46±19.00^{a}$	$35.33±20.00^{a}$	$40.11±20..09^{b}$

All values were expressed as averages of triplicate determinations ± the standard deviations and values bearing the same superscripts in the same row are significantly not different ($p < 0.05$).

Table 6. The Results of Emulsion Capacity and Stability of Selected Varieties of Mushrooms in Sodium Chloride (2%)

			Samples				
Time (h)	M_1	M_2	M_3	M_4	M_5	M_6	M_7
Capacity							
0	$70.11±1.26^{a}$	$73.11±2.17^{a}$	$72.48±1.00^{b}$	$68.40±1.17^{b}$	$75.15±2.17^{c}$	$75.26±2.17^{b}$	$70.18±2.17^{c}$
1	$29.11±2.51^{a}$	$34.37±2.03^{a}$	$38.86±2.03^{a}$	$28.37±2.02^{a}$	$46.11±2.03^{b}$	$38.20±2.03^{a}$	$44.49±2.03^{b}$
2	$29.11±2.72^{a}$	$32.55±2.17^{a}$	$38.29±2.17^{a}$	$26.29±1.17^{a}$	$44.55±2.17^{ab}$	$38.45±2.17^{a}$	$44.19±2.17^{b}$
3	$27.11±2.18^{a}$	$32.44±1.82^{a}$	$38.45±1.82^{a}$	$26.07±2.82^{a}$	$42.22±1.82^{ab}$	$38.44±1.82^{a}$	$44.12±1.82^{ab}$
4	$27.07±2.90^{a}$	$32.44±1.99^{a}$	$38.57±1.42^{a}$	$26.34±2.99^{a}$	$42.41±1.99^{a}$	$38.94±1.99^{a}$	$44.11±2.99^{b}$
5	$27.29±2.57^{a}$	$32.15±2.05^{a}$	$38.52±1.90^{a}$	$26.51±2.05^{a}$	$42.26±2.05^{a}$	$38.56±2.05^{a}$	$44.11±2.05^{ab}$
6	$27.15±2.40^{b}$	$32.11±2.45^{a}$	$38.58±2.45^{a}$	$26.41±1.45^{a}$	$42.37±2.45^{a}$	$38.55±2.45^{a}$	$44.00±2.45^{ab}$
22	$27.16±2.19^{b}$	$32.29±2.18^{a}$	$38.10±2.18^{a}$	$26.40±2.18^{a}$	$42.58±2.18^{a}$	$36.15±2.18^{a}$	$40.24±2.18^{a}$
24	$27.15±2.18^{ab}$	$30.33±2.00^{a}$	$38.47±2.00^{a}$	$26.48±1.95^{a}$	$42.46±1.98^{a}$	$36.33±2.00^{a}$	$40.96±2.09^{a}$

All values were expressed as averages of triplicate determinations ± the standard deviations and values bearing the same superscripts in the same row are significantly not different ($p < 0.05$).

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Table 7. The Results of Emulsion Capacity and Stability of Selected Varieties of Mushrooms in Sodium Chloride (4%)

	Samples						
Time (h)	M_1	M_2	M_3	M_4	M_5	M_6	M_7
Capacity							
0	70.11±1.26^{ab}	73.11±2.17^{a}	70.48±1.00^{c}	68.40±1.17^{c}	75.15±2.17^{c}	75.26±2.17^{b}	71.19±2.17^{ab}
1	28.11±2.51^{ab}	33.37±2.03^{a}	37.88±2.03^{b}	28.37±2.02^{b}	47.11±2.03^{b}	38.20±2.03^{a}	45.39±2.03^{ab}
2	28.11±2.72^{ab}	32.55±2.17^{a}	37.30±2.17^{ab}	26.29±1.17^{ab}	44.55±2.17^{b}	38.45±2.17^{a}	44.19±2.17^{ab}
3	27.11±2.18^{ab}	32.44±1.82^{a}	37.25±1.82^{ab}	26.07±2.82^{ab}	43.22±1.82^{ab}	37.44±1.82^{a}	44.12±1.82^{ab}
4	27.07±2.90^{b}	32.44±1.99^{a}	37.57±1.42^{ab}	26.34±2.99^{a}	43.41±1.99^{ab}	37.94±1.99^{a}	44.11±2.99^{b}
5	27.29±2.57^{ab}	31.15±2.05^{a}	37.02±1.90^{ab}	26.51±2.05^{a}	42.26±2.05^{ab}	37.56±2.05^{a}	42.12±2.05^{ab}
6	27.05±2.40^{ab}	31.11±2.45^{a}	35.48±2.45^{ab}	26.41±1.45^{ab}	42.37±2.45^{a}	38.55±2.45^{a}	42.10±2.45^{b}
22	27.06±2.19^{a}	31.29±2.18^{a}	35.10±2.18^{ab}	26.40±2.18^{a}	42.58±2.18^{a}	36.15±2.18^{a}	42.23±2.18^{a}

All values were expressed as averages of triplicate determinations ± the standard deviations and values bearing the same superscripts in the same row are significantly not different ($p < 0.05$).

Table 8. The Results of Emulsion Capacity and Stability of Selected Varieties of Mushrooms in Sodium Chloride (6%)

	Samples						
Time (h)	M_1	M_2	M_3	M_4	M_5	M_6	M_7
Capacity							
0	68.15±1.26^{ab}	76.11±2.17^{c}	81.48±1.00^{c}	76.03±1.17^{b}	75.15±2.17^{b}	78.18±2.17^{b}	77.72±2.17^{ab}
1	34.11±2.51^{a}	43.37±2.03^{a}	46.86±2.03^{b}	34.37±2.02^{a}	46.11±2.03^{a}	45.20±2.03^{a}	24.49±2.03^{a}
2	29.11±2.72^{a}	38.55±2.17^{a}	45.29±2.17^{b}	32.29±1.17^{a}	44.55±2.17^{a}	45.45±2.17^{a}	24.19±2.17^{a}
3	26.11±2.18^{a}	38.44±1.82^{a}	45.45±1.82^{b}	32.07±2.82^{a}	42.22±1.82^{a}	43.44±1.82^{a}	24.12±1.82^{a}
4	26.07±2.90^{a}	38.44±1.99^{a}	45.57±1.42^{b}	32.34±2.99^{a}	42.41±1.99^{a}	43.94±1.99^{a}	24.11±2.99^{a}
5	26.29±2.57^{a}	38.15±2.05^{a}	45.52±1.90^{b}	32.51±2.05^{a}	42.26±2.05^{a}	43.56±2.05^{a}	24.11±2.05^{a}
6	26.15±2.40^{ab}	38.11±2.45^{a}	45.58±2.45^{b}	32.41±1.45^{a}	42.37±2.45^{a}	43.55±2.45^{a}	24.00±2.45^{a}
22	26.16±2.19^{a}	38.29±2.18^{a}	43.10±2.18^{a}	32.40±2.18^{a}	42.58±2.18^{a}	43.15±2.18^{a}	24.24±2.18^{a}
24	26.15±2.18^{b}	38.33±2.00^{b}	43.47±2.00^{a}	32.48±1.95^{a}	42.46±1.98^{a}	43.33±2.00^{a}	24.96±2.09^{a}

All values were expressed as averages of triplicate determinations ± the standard deviations and values bearing the same superscripts in the same row are significantly not different ($p < 0.05$).

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Table 9. The Results of Emulsion Capacity and Stability of Selected Varieties of Mushrooms in Sodium Chloride (8%)

			Samples				
Time (h)	M_1	M_2	M_3	M_4	M_5	M_6	M_7
Capacity							
0	70.11±1.26^{b}	72.11±2.17^{c}	68.18±1.00^{b}	70.19±1.17^{b}	70.15±2.17^{c}	75.26±2.17^{b}	70.18±2.17^{c}
1	34.11±2.51^{a}	42.37±2.03^{b}	40.15±2.03^{a}	39.37±2.02^{a}	40.11±2.03^{b}	43.20±2.03^{ab}	44.49±2.03^{b}
2	34.11±2.72^{a}	42.55±2.17^{b}	40.12±2.17^{a}	39.29±1.17^{a}	40.55±2.17^{b}	43.45±2.17^{ab}	44.19±2.17b
3	34.11±2.18^{a}	42.44±1.82^{b}	38.45±1.82^{a}	39.07±2.82^{a}	40.22±1.82^{ab}	43.44±1.82^{ab}	42.12±1.82^{ab}
4	32.07±2.90^{a}	42.44±1.99^{b}	38.57±1.42^{a}	38.34±2.99^{a}	40.41±1.99^{b}	43.94±1.99^{ab}	42.11±2.99^{ab}
5	32.29±2.57^{a}	40.15±2.05^{ab}	38.52±1.90^{a}	38.21±2.05^{a}	40.26±2.05^{b}	43.56±2.05^{ab}	42.11±2.05^{ab}
6	32.15±2.40^{a}	40.11±2.45^{ab}	38.58±2.45^{a}	38.11±1.45^{a}	40.37±2.45^{b}	42.55±2.45^{ab}	40.00±2.45^{a}
22	32.16±2.19^{a}	40.29±2.18^{ab}	37.10±2.18^{a}	38.10±2.18^{a}	36.58±2.18^{a}	40.15±2.18^{ab}	40.24±2.18^{a}
24	32.15±2.18^{a}	36.33±2.00^{a}	37.47±2.00^{a}	38.08±1.95^{a}	36.46±1.98^{a}	40.33±2.00^{a}	40.96±2.09^{a}

All values were expressed as averages of triplicate determinations ± the standard deviations and values bearing the same superscripts in the same row are significantly not different ($p < 0.05$).

Conclusion

The study determined the influence of salts (sodium acetate and sodium chloride) on the EC and ES food properties of seven different varieties of mushrooms acquired in Akure using standard analytical methods. The results showed that the EC was high and ES was stable for about 3 h in some instances. In short, there was no significant influence of the salts on the properties of the food substance used.

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