EFFECT OF PAPRIKA (CAPSICUM ANNUM) ON COLOUR PARAMETERS OF DRY CURED SAUSAGES MEAT BUTTER MODEL SYSTEM BOVINE

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Background

The colour of foods in general, and meat products in particular, is a determining factor in their selection and acceptance by the consumer. (Alesón Carbonell, 2002)

The colour proprieties to the foodstuff, they are affect when the technological processes applied, for example size reduction (Judge *et al.*, 1989), mixing techniques and adding additives and spices.

In studies carried out upon colour changes during the dry-cured sausage making sausage, variations have been observed in the colour proprieties of the meat batter during that rest period (Rosmini, 1997; Fernández-López *et al.*, 2000), but don't fount in bibliography information the effect on the additives and spices on the colour of dry sausages obtained of the meat cow.

Objective

The aim of this work is to study, by mean of an objective methods (reflectance spectrophotometry), the effect of different paprika concentrations (0%, 1,5 % & 3 %) that influence colour development during the mincing resting stage, in cow meat butter, which are used for dry-cured meat products.

Methods

Sample preparation: Lean bovine shoulder meat cut into pieces of approximately 10 x 10 cm. Three sizes of minces were studied, two obtained by using a screw mincer provided whit plates whit 10 mm or 20 mm diameter holes, while the third size (fine) was obtained by using a cutter. For each particle size, three lots (2000 g each) were used. Two of these lots were mixing whit paprika (1,5 % and 3%), respectively) but not the third. After mixing, each lot was divided among 10 cylindrical glass containers (190 g) whit a dia of 6 cm and height of 3 cm so that the sample could be considered as an infinite solid for colour determinations.

Analytical methods: The colour determinations will be made by mean of a reflectance spectrophotometry, using CIELAB colour space (D65, 10°) and the American Meat Science Association Guidelines will be followed.(Hunt et al., 1991). The colour parameters will be L* (lightness), a* (red-green) y b* (yellow-blue). Colour determinations were made by means of Minolta CM-508 (Minolta Camera Co., Osaka, Japan) was put between the samples and the equipment spectrally pure glass (CR-A51, Minolta Camera Co., Osaka, Japan).

Statistical Analysis: Each parameter was tested in triplicate. Statistical analysis of the variance (ANOVA) and tukey's test were applied.(Gomez & Gomez, 1976; Afifi & Azen, 1979). The statistical data analysis was undertaken using the Sistem SAS/Base y SAS/STAT versión 6 para VAX/VMS.

Result and Discussion

Lightness (L*): The ANOVA shows that paprika significantly affect lightness (P<0,01) but the mincing-paprika interaction was analysed no differences (P > 0,05) were observed.

Wen Tukey test was applied to the paprika factor (Table 1), resulted in differences (P<0,01) between the three concentration used (0%, 1,5 % and 3 %), the mean values for L* diminished as its concentration increased. These effect has been document in other studies of lean meat (Rosmini, 1997; Fernández-López *et al.*, 2002)

The lightness of meat products, depends on water holding capacity, pH, myoglobin (Mb) concentration and state, moisture and fat content (Hunt *et al.*, 1991; Onyango *et al.*, 1998; Pérez-Álvarez *et al.*, 1998; Fernández-Ginés, 2001) as well as on the technological treatments applied (García-Marcos, 1996; Fernández-López, 1998; Pérez-Álvarez *et al.*, 1999).

Paprika is know to imbibe 1,5 times its ows weight in water (Gerhart, 1975), its probably that spice absorbs surface water (liberated by the brakdown of muscle during mincing) diminishing L*.

The interaction paprika for time not result significative. These result indicated that L* modifications due to paprika addition were made at the moment that this spice was added.

Redness (a*): The ANOVA shows that paprika significantly affect redness (P<0,01). Observing the Tukey test (Table 1), resulted in differences (P<0,01) between the three concentration used (0%, 1,5 % and 3 %). The addition of paprika, increased values of redness. The mincing-paprika interaction was analysed no differences (P>0,05) were observed.

The redness of meat products, it depends on pH, myoglobin (concentration, state) and moisture (Onyango *et al.*, 1998; Pérez-Álvarez *et al.*, 1996; Fernández-López, 1998; Fernández-López *et al.*, 2000).

Paprika has a high carotenoid content (Levy *et al.*, 1995; Reves, 1987). The ketocarotenoids capsanthin and capsorubin (red xanthopylls), are the main red compounds (Farrel 1990; Locey & Guzinski 2000) principally responsible for incresead a* the pastes containing paprika.

Yellowness (b*):The ANOVA shows that paprika significantly affect yellowness (P<0,01). Wen Tukey test was applied to the paprika factor (Table 1), resulted in differences (P<0,01) between the three concentration used (0%, 1,5 % and 3 %). The addition of paprika, increased values of yellowness. Analysis of the mincing-paprika interaction no differences (P>0,05) were observed. Paprika contains a high proportion of yellow components from its cryptoxanthin and zeaxanthin pigments (yellow xanthophylls) (Farrel, 1990; Locey & Guzinski, 2000) which are responsible for increased b* values of pastes with added paprika.

The interaction paprika for time result significative (P<0,05), during resting state the values b* diminishing, Osuna- García *et al.* (1997) reported that during oxidative processes, which paprika undergoes, the values of b* values decreasing. In the present study could reflect incipient oxidation of spice. (Fig.1)

Table 1.- Results of Tukey test of colour coordinates, lightness (L*), redness (a*), yellowness (b*) of dry-cured model system with added different Paprika concentrations.

Paprika concentration (%)	L*	a*	b*
0	41,10 $_a$	14,18 $_a$	10,04 $_a$
1,5	37,46 $_b$	21,28 $_b$	17,27 $_b$
3	36,0 $_c$	23,55 $_c$	19,60 $_c$

a to values in the same column bearing similar letters are not different (P > 0,05)

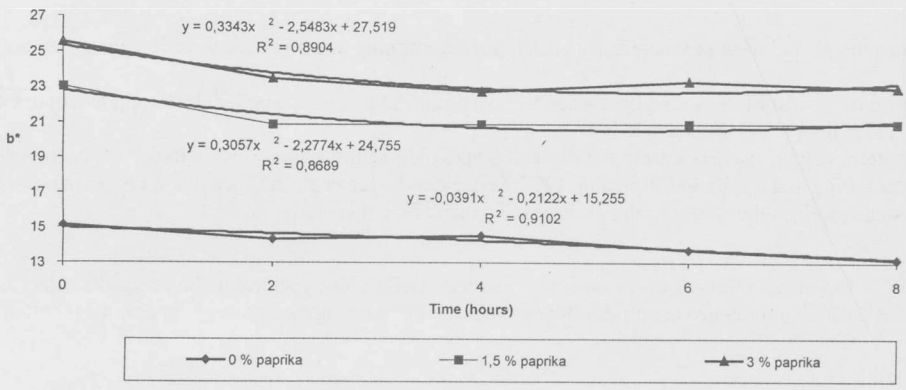

Fig 1.-Yellowness (b*) evolution during resting stage of dry-cured model system with added different Paprika concentrations.

Conclusions

The paprika incorporation in meat butter system model bovine, decreased lightness (L*) and increased redness (a*), yellowness (b*). During resting state the coordinate b* diminishing indicating incipient oxidation of spice.

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