

## COMPOSITION AND PHYSICOCHEMICAL CHARACTERISTICS OF 'CHORIZO' FROM THE HIDALGENSE HUASTECA REGION IN MEXICO

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### Introduction

'Chorizos', in Spanish, or 'Chouriços', in Portuguese, are popular raw-meat sausages in Iberian and most of Latin American countries, showing regional differences regarding recipe and processing. Main ingredients of Mexican-style 'chorizo' including 'Huasteco chorizo', are minced pork and fat, salt, dry chilies and paprika (both *Capsicum* spp.), vinegar, and a mix of several spices, namely, cumin, pepper, and others (Personal communication, 2006); sometimes curing salts, sugars and other vegetable matter are also added to the mix. In general, the resulting sausage is bright red with a distinctive aroma. Usually, it is not intentionally subjected to ripening. However, a spontaneous ripening may occur if the product is subjected to long enough storage. This storage would take place with the sausage hung for periods of hours to weeks at room temperature which largely depends on local weather conditions, and involves fermentation and dehydration (Escartin *et al.*, 1999).

The 'Hidalguense Huasteca' is a region located amidst a mountain range with semi-tropical wet climate and abundant vegetation (Schryer, 1986). 'Huasteco chorizo' is typically produced at small plants or butchers and its manufacture is differentiated from other 'chorizos', i.e. after stuffing in natural casings sausages are tied into short segments (5-10 cm long) by means of small strips made from dry husks (special leaves that protect the ear of the corn plant), then sausages are dried a few days at room temperature, and finally at the moment of purchasing in the market sausages are wrapped with banana leaves, instead of paper or plastic (Figure 1).

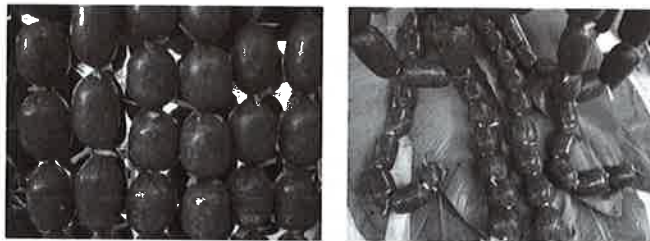


Figure 1: Photographs of 'Huasteco chorizo' as presented in the market.

Considering the social and commercial interests of regional food characterization (Tregear *et al.*, 1999), the facts that 'Huasteco chorizo' is a typical regional product, and that to our knowledge it has not been studied before, this study was aimed at contributing to the characterization of this typical sausage by acquiring knowledge about its chemical composition and other basic physicochemical properties.

### Materials and Methods

Ten samples of 'Huasteco chorizo' were purchased in the local retail market and then transported to the lab where an amount c.a. 150 g of each was homogenized. Subsequently homogenized samples were wrapped in aluminum foil and frozen (-40°C) until aliquots were taken for analysis. Proximate composition was determined according to official methods of analysis and the pH,  $a_w$  and colour parameters with a pHmeter,  $a_w$ -meter device (Decagon Aqualab, model CX-2), and colorimeter (Minolta, model CM-508d), respectively. Salt (NaCl) and lactic and acetic acid contents were analyzed on an aqueous extract of the sample by HPLC with a chromatograph (Waters, model 2690) equipped with a cation-exchange column (Bio Rad, Aminex HPX-87H) using aqueous H<sub>2</sub>SO<sub>4</sub>-solutions as mobile phases, and with a differential refractometer detector (Waters, model 410) for NaCl and a photodiode array detector (Waters, model 996) for the organic acids, following Van Riel and Olieman (1986) and Bruna *et al.*, (2003) methodologies, respectively.

### Results and Discussion

Compositional and physicochemical parameters of 'Huasteco chorizo' are shown in table 1a) and b), respectively. Protein and fat contents, expressed as percentage of dry matter, were similar to those found in European ripened sausages (Moretti *et al.*, 2004; Osorio *et al.*, 2004), which imply that fat levels of the initial mix (before stuffing) of 'Huasteco chorizo' were c.a. 25-30% (fresh matter). In dry fermented sausages, moisture content changes from 55 to 65% (initial) to lower final values which depend on sausage properties, time and ripening conditions; normally, after

one month drying moisture decreases on average to 25-35%; the decrease being more sharp during the first few days (Stiebing and Rödel, 1988; Pérez-Álvarez, 1999; Zanardi *et al.*, 2002; Moretti *et al.*, 2004). In this sense, considering moisture content of 'Huasteco chorizo', and  $a_w$  too, a few days drying must have occurred. NaCl content was in the highest part of the range for initial mixes of fermented sausages content was usually around 2-3% common salt (Incze, 1992). Lactic acid content of 'Huasteco chorizo' implies that fermentation of sugars took place; sugars will come mainly from chillies and paprika (Aguirrezábal *et al.*, 1998). To reach pH<5.3 and  $a_w$ <0.95 values in a short time appears to be critical objectives for high acid fermented sausage stability (Incze, 1992); this seems easy to fulfil in the case of 'Huasteco chorizo' by basic control. With regard to colour, differences between chorizos are expected; these could be mainly due to amount and type of *Capsicum* spp added and, in general, sausage composition (Pérez-Álvarez *et al.*, 1999).

**Table 1:** Characteristics of Huasteco chorizo. a) Composition expressed as weight percentage of fresh matter # or of dry matter\*; b) Physicochemical parameters of 'chorizo' (n=10).

a)	Protein*	Fat*	Moisture	NaCl#	Lactic acid <sup>#</sup>	Acetic acid <sup>#</sup>
Mean	37.1	51.6	51.8	3.23	1.95	0.13
Minimum	31.6	48.2	45.1	2.52	1.33	0.02
Maximum	40.3	56.9	56.4	4.33	2.67	0.40
D.E.	3.0	3.0	3.9	0.59	0.48	0.13

b)	pH	$a_w$	L*	a*	b*
Mean	4.82	0.955	40.8	16.1	18.5
Minimum	4.67	0.942	36.5	13.6	14.4
Maximum	5.07	0.969	44.1	19.9	23.1
D.E.	0.14	0.008	2.2	2.0	2.5

### Conclusions

Proximate composition, pH,  $a_w$  and colour of 'Huasteco chorizo' have been determined. This product can be classified as a high acid sausage. Controls should be done to guarantee a quick pH and  $a_w$  (under 0.95) decrease.

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