

COMMUNICATION

## On the Flavor Preference of Antacid Suspensions

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### ABSTRACT

*A standard base for a commercial formulation of aluminum and magnesium hydroxides antacid suspension was prepared in five flavors (cinnamon, cherry, apricot, peppermint, and spearmint) and tested for organoleptic preference by a group of 65 untrained judges from three different institutions. Correlation analysis between the sums of ranks of the results indicated that cinnamon, spearmint, peppermint, and apricot had a highly significant difference ( $\alpha = 0.01$ ) with cherry, which was the least preferred flavor. There were no significant differences among the other four flavors although the preference was in the order given above. It can be concluded from this study that sensory evaluation techniques can be advantageously applied for the selection of flavors in antacid formulations. This selection could be helpful to optimize compliance of the patient with gastrointestinal conditions with the prescribed therapy and also to the commercial success of this type of OTC medication.*

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## INTRODUCTION

Although organoleptic characteristics of aluminum and magnesium hydroxides antacid suspensions are important for both acceptance by the occasional consumer and compliance of the prescribed treatment by the chronic patient with gastrointestinal disorders, it is a topic that has been treated until recently in a few communications in the open literature (1,2,3). These types of OTC products are, to a great extent, dependent on their acceptance by the patient for the commercial success of a given formulation. Thus, the development of antacid suspensions, and indeed of other oral dosage forms, should consider sensory characteristics of the product so that patient acceptance and compliance with the therapy can be optimized.

The purpose of this investigation was to apply a preference test to three groups of volunteers from different institutions to determine flavor preference for a formulation of aluminum and magnesium hydroxides prepared in five flavors. It was also an objective of the work to demonstrate the applicability of sensory analysis techniques for selecting the most preferred flavor for the antacid suspension.

## EXPERIMENTAL SECTION

### Sample Preparation

The flavored samples were prepared from a standard base of aluminum and magnesium hydroxides (5% w/v of each hydroxide) with all ingredients of the formulation added in the usual manner and quantities to this commercial product (Química y Farmacia, S.A. de C.V., Ramos Arizpe, México). The flavors used (Mané de México, S.A.) were cinnamon (0.3 g/liter), cherry (1.5 g/liter), apricot (1.0 g/liter), peppermint (1.5 g/liter), and spearmint (1.0 g/liter). The concentrations used were established by the laboratory staff in accordance with the supplier's recommendations. These flavors were selected because in a previous study (4) they were preferred by a trained panel of judges from a group of eight candidate flavors.

### Judges

Personnel from the three participating institutions were invited to become part of the testing panel. A total of 65 volunteers (age range from 22 to 50 years) were instructed to avoid smoking and ingestion of food

at least 2 hr before the test and also asked not to use perfumes prior to the test. The judges were also instructed on the objectives of sensory analysis in general and of the preference test to be used in particular. Besides these instructions, the judges had no other training in sensory evaluation techniques. The volunteers from the three institutions were distributed as follows: 20 from Química y Farmacia, S.A. de C.V. (QUIFA), 22 from Facultad de Ciencias Químicas de la Universidad Autónoma de Coahuila (FACQUAC), and 23 from Centro de Investigación en Química Aplicada (CIQA). Although there is no general agreement on the minimum number of judges to be used in consumer-type sensory evaluation tests, the 65 judges participating in this study fall within the range recommended by several authors: between 40 and 80 suggested by Amerine et al. (5), between 50 and 100 (6), and a minimum of 30 (7).

### Sensory Evaluation Tests

A ranking test (8) was used to determine the preference for each of the five flavors tested. The tests were applied in different days in each of the three institutions. Each judge was presented with a tray containing the five randomly codified samples of the antacid suspension. The samples were also randomized when presented to the judges who were asked to take enough quantity of the suspension to impregnate his (her) tongue completely, hold it for the length of time necessary to detect the flavor, discard it and then rinse the tongue thoroughly with potable water before testing the following sample. They were asked to assign number 1 to the most preferred sample, number 2 to the sample second in preference, and so on until number 5 was assigned to the least preferred sample. Ranking tests were analyzed following the multiple comparison methods reported by Joanes (8).

## RESULTS AND DISCUSSION

The results of the analysis of correlations between the sums of the ranks for the tests in all three institutions are presented in Table 1. It can be seen that cinnamon, spearmint, peppermint, and apricot were all preferred over cherry. In the Mexican market products with some of these flavors can be found: Baytalcid<sup>®</sup> (hydrotalcite based, cinnamon) from Bayer, Alkagel<sup>®</sup> (peppermint), from Química y Farmacia, and Melox<sup>®</sup> from Rhorer Rhone-Poulanc (cherry). These results show that sensory

**Table 1**  
*Correlations Between the Sums of Ranks. Overall Results (Three Institutions)*

Flavor	Cherry	Apricot	Peppermint	Spearmint	Cinnamon
Cinnamon	98**	39	35	25	0
Spearmint	75**	16	12	0	
Peppermint	63**	4	0		
Apricot	59**	0			
Cherry	0				

\*\*Highly significant difference ( $\alpha = 0.01$ ) between pairs of samples.

analysis techniques can be successfully applied to determine consumer preference for the flavor of an antacid formulation and they could be used effectively by manufacturers to develop new products and to improve existing products. It is interesting to note that the results of this study indicate that cinnamon was the preferred flavor over all of the others with high significance ( $\alpha = 0.01$ ) over cherry. The latter is also true of the spearmint flavor. Peppermint (a popular flavor in aluminum and magnesium hydroxides antacid suspensions) on the other hand, was third in preference in the analysis. This fact indicates that for this sample of volunteers, a non-traditional flavor was preferred over what is more commonly found in the market.

### CONCLUSIONS

It can be concluded from this study that sensory analysis techniques can be successfully applied to determine flavor preference in volunteers of potential consumers of antacid suspensions. Further, the methodology can also be used to establish a series of flavors of potential application in the OTC antacid suspensions market. Finally, the findings reported here indicate that nontraditional flavors might be considered to compete

advantageously with traditional ones, such as peppermint, for these types of drugs.

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