

Differences between mango cultivars regarding their facility to be halved and spoon-eaten, and association with fiber.

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DIFFERENCES BETWEEN MANGO CULTIVARS REGARDING THEIR FACILITY TO BE HALVED AND SPOON-EATEN, AND ASSOCIATION WITH FIBER.

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ABSTRACT - Forty-three cultivars of mango including germplasm from Florida, Hawaii, Israel, India, Brazil, and South Africa, were evaluated for their facility to be spoon-eaten - a technique which can lead to a greater consumption of this fruit - and for fiber presence. A clear correlation between fiber presence, as judged here, and spooning ease is shown (although the scale used here to measure fiber content does not coincide with various extant bibliographical descriptions of different cultivars). Clear differences exist among cultivars regarding the ease with which they can be eaten with a spoon: the best were Glenn, Zill, Cogshall, Otts, Ah Ping, Isis, and Pope; on the other hand, other commercially interesting cultivars such as Tommy Atkins and Kensington are not well adapted to this technique although such widely-known cultivars as Haden, Kent and Keitt lent themselves particularly well to this way of consumption. It is suggested that the ease with which a cultivar can be spoon-eaten be included among the evaluating criteria in use by mango breeders.

INTRODUCTION

Mango is becoming a well-known fruit in the European market, confirming the brilliant prospects forecast at the beginning of the 80's (1,2) as witnessed by the 145.9% increase in imports experienced in the French market between the 2536 Tm of 1981 (10) and the 6237 Tm imported in 1987 (8). In 1988 the French import figures for mangos, guavas, and mangosteens were 7167 Tm (9) of which at least 7050 Tm can be assigned to mangos - a 13% increase over the preceding year. Elsewhere than France the increase in fresh mango trade is even more spectacular if we consider, for example, that the export volume from ACP countries to the EEC rose from just over 1000 Tm in 1976 to more than 5000 Tm by 1985, a five-fold increase in volume (3).

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COMPARAISON ENTRE DIFFERENTES VARIETES DE MANGUE POUR LEUR APTITUDE A ETRE CONSOMMEES A L'AIDE D'UNE CUILLERE, EN FONCTION DE LA PRESENCE DE FIBRES.

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RESUME - Etude de 43 variétés de mangue, de Floride, Hawaï, Israël, Inde, Brésil et Afrique du Sud, sous l'angle de leur facilité à être consommées avec une cuillère et en rapport avec la présence ou l'absence de fibres. Il existe une claire corrélation, même si l'échelle ici utilisée ne correspond pas à celle des descriptions bibliographiques habituelles sur la mangue. Mise en évidence de différences entre variétés pour cette aptitude, les mieux placées étant : Glenn, Zill, Cogshall, Otts, Ah Ping, Isis et Pope. En revanche, des variétés largement commercialisées dans certains pays telles que Tommy Atkins et Kensington ne sont pas bien placées. Haden, Kent et Keitt, amplement diffusées aussi, conviennent bien à ce mode de consommation. On propose de prendre en compte ce critère dans les travaux futurs.

Besides traditional exporting countries in Africa and the Americas, new producers such as South Africa and Israel are sending important quantities of this excellent fruit to the EEC. This should lead to a more competitive market where high standards of quality and supply reliability would be extremely important. All kinds of strategies to increase demand should be tried, including obviously the production of new cultivars with better eating characteristics.

As the presence of fibers in the flesh is most objectionable, this should be reduced as much as possible. The problem which arises for the producer and, ultimately, for the consumer when given a choice of cultivars is one of misleading descriptive information, each researcher having adopted his own nomenclature - for example, «extremely high, medium, and low on fibers» (6) versus «fiberless, almost fiberless, moderately fiberous» (12) - and/or grading system of scales ranging anywhere from 3 to 5 categories.

Also the mango is traditionally considered a difficult fruit to eat and although fiber is being phased out through selection of new cultivars, much can be done to improve the mango's current image as a messy fruit to peel and eat. A technique which is relatively unknown, particularly to consumers, consists in halving and spoon-eating the fruit - much as is done with the avocado - and can be applied to some cultivars. The viability of such a convenient method and its interrelationship with fiber presence was explored using several commercial cultivars including the best Florida types.

MATERIAL AND METHODS

The cultivars evaluated for spoon-eating facility were Adams, Ah Ping, Ameri, Amini, Bombay Green, Brasil, Carabao, Cogshall, Davis Haden, Eldon, Fascell, Glenn, Gouveia, Haden, Harders, Irwin, Isis, Keitt, Kensington, Kent, Lippens, Mabroka, Magshimin, Maya, Momi-K, Mulgoba, Nimrod, Oliveira, Osteen, Otts, Pairi, Peach, Pope, Pulihora, Ruby, Sensation, Smith, Sunset, Tolbert, Tommy Atkins, Valencia Pride, Van Dyke and Zill. The survey was made during 1986-89 on fruit from the CITANIA Research Station collection at Güimar, on the south-east side of the island of Tenerife, at an altitude of 120

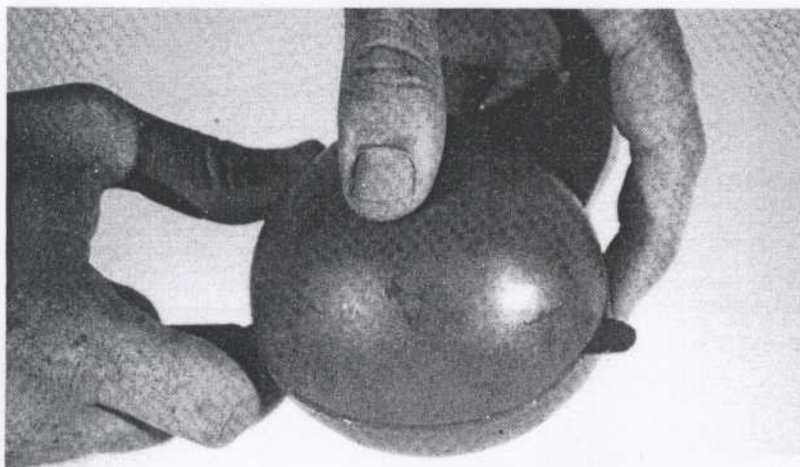
meters. The operation of halving and spooning is described as follows :

- 1) mango is cut transversally with a sharp knife (photo 1) ;
- 2) While tightly holding the upper half, the lower half is twisted until the two separate, leaving the seed and surrounding flesh in the upper portion (photo 2) ;
- 3) The exposed flesh adhering to the seed can be trimmed off and, if desired, «replaced» in the lower half ;
- 4) The seed is firmly gripped with any vise-like instrument - a nutcracker, for instance - and the second half is twisted to release it from the seed (photo 3).

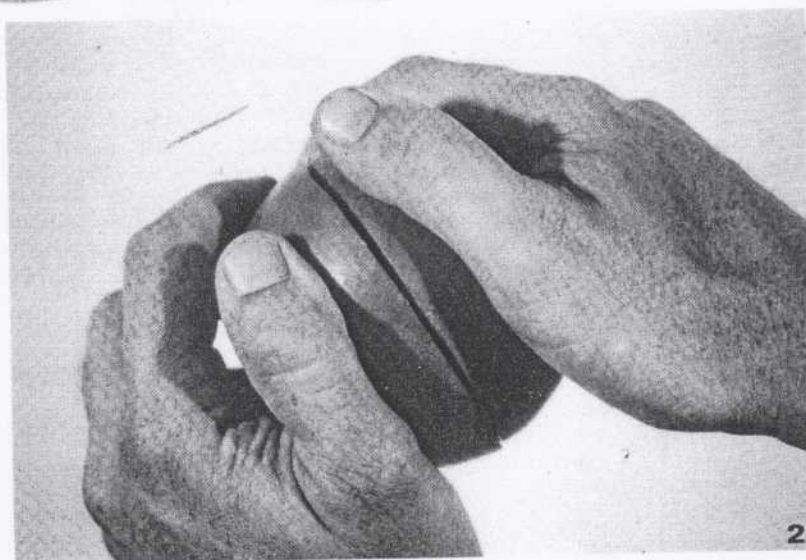
The two halves are now ready to be eaten with a spoon (photo 4).

Six fruits of each cultivar were opened at optimum consumption stage and classified on a 5 to 1 point scale according to the ease with which each could be first halved and then spoon-eaten. Scale grading can be described, grosso modo, as follows :

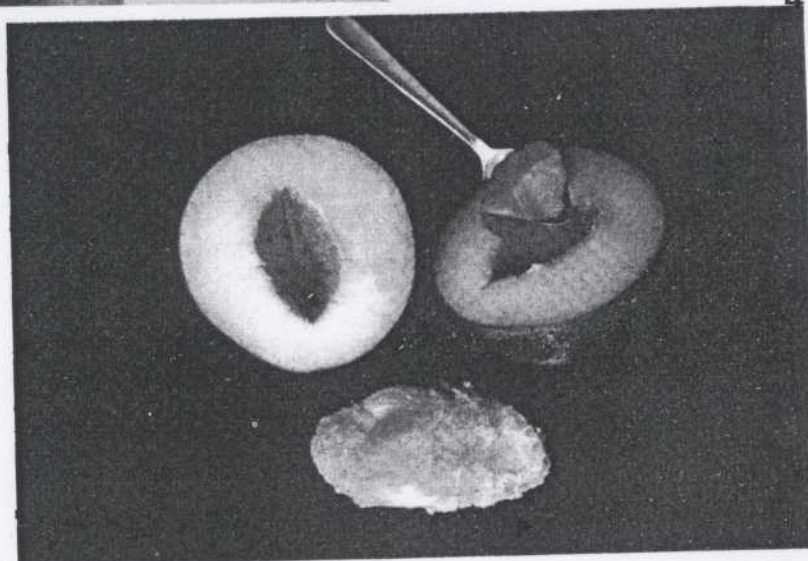
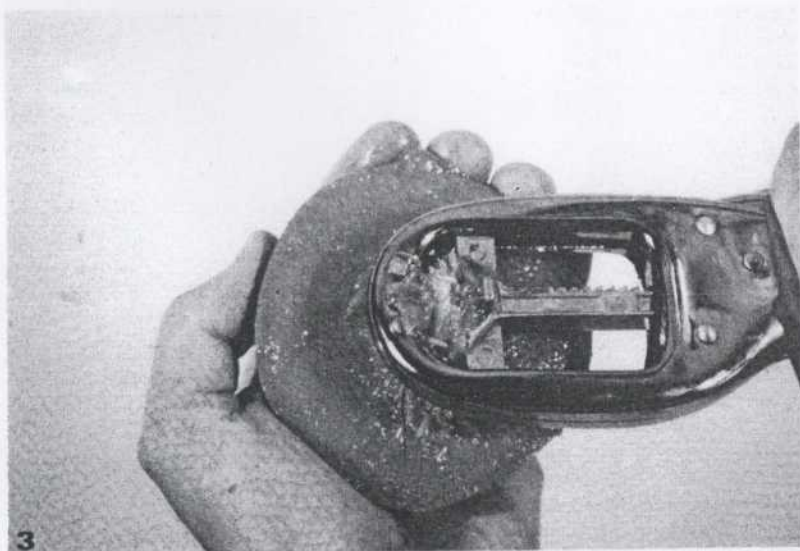
- 5 : Excellent - almost no flesh adhered to the seed after halving ; the pulp was easy to spoon out.



1



2



- 4 : Good - around one-fourth of the flesh adhered to the seed but spooning was still easy.
- 3 : Fair - around half of the flesh adhered to the seed but spooning was still practicable.
- 2 : Poor - around three-fourths of the flesh adhered and spooning was very difficult.
- 1 : Inferior - flesh adherence extended almost to the skin and it was impossible to carve out with a spoon.

These same six fruits were also classified on a scale of 5 categories according to presence of fiber in the flesh : 5 Free (almost), 4 Scarce, 3 Moderate, 2 Plentiful, 1 Full. Grades for both scales were given by five members of the Fruit Culture Department, giving each cultivar - rather than each fruit - a point.

To test the improvement in consumption quality which could be obtained from spoon-eating, a further survey was made using eight CITA staff members chosen randomly

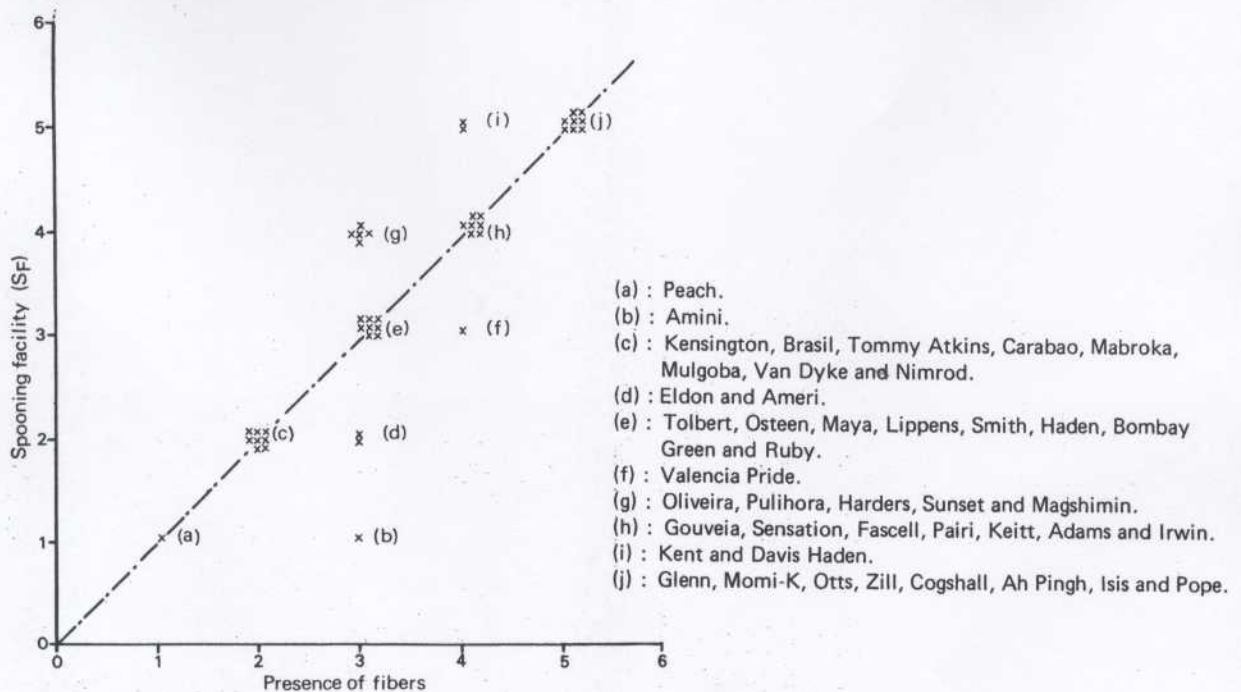
to whom the method was explained. Two mangos of an easily-spooned cultivar were then given to each person, who proceeded to eat one fruit in the usual manner - slice lengthwise, flush and parallel to the seed, and cut flesh away from skin - and the other using the new method and then giving his/her preference.

RESULTS AND DISCUSSION

Both fiber presence and spooning ease, and their inter-relationship, are shown in Figure 1 ; in view of this figure, several points should be emphasized :

a) As expected, there was a clear correlation between fiber presence as judged here, and spooning ease : less fiber led to more easy spooning. It should be stated however that many of the cultivar descriptions prevailing traditionally elsewhere may not be useful for predicting this, as mentioned earlier ; for instance, «Tommy Atkins», first described as firm and with the presence of fine-texture fibers (4), is usually commercially portrayed as being only slightly

FIGURE 1 - RELATIONSHIP BETWEEN SPOONING FACILITY AND PRESENCE OF FIBERS



fibrous (5), but for our purposes it merited a classification of «Plentiful» fiber and «Poor» spooning quality (i.e., rating 2 on each scale); the same applies to «Van Dyke», described as having little fiber (13). Other well-known cultivars such as «Haden» and «Lippens» have been described, respectively, as fiberless (5) and practically without fiber (11) but achieved a rating of 3 and 3 on our scales. Other examples can be found which illustrate the relatively poor value of these literary descriptions inasmuch as correlation between fiber content and eating ease is concerned.

b) Clear differences exist amongst cultivars regarding the ease with which they can be eaten with a spoon. «Zill» and «Glenn», both Florida cultivars, and the Hawaiian cv. Pope are excellent in this respect, as are several lesser-known cultivars. On the other hand, the commercially interesting cvs. Kensington and Tommy Atkins rated poorly, of note as «Tommy Atkins» in particular is of increasing market importance due to its attractive red colour and excellent transport hardiness which make it increasingly popular for planting in all areas. Other Florida cultivars grown worldwide such as «Haden», «Kent», and «Keitt» (7) lend them-

selves well to this eating technique, especially the last two. Of particular note is that the very attractive, red cultivar from South Africa, «Isis» - already commercially known and present in the European market - is also excellent in this respect (rating 5-5).

c) Seven of the eight people who tried the new method showed a clear preference for mangos which could be spooned, and the eighth showed some (although not total) preference for it, casting no doubts on the suitability of this method.

CONCLUSION

Spoon-eating ease correlates very well with fiber presence and may give a more accurate idea of the general eating ease of a particular cultivar. As the possibility of spoon eating mangos can clearly lead to a greater consumption of this fruit, future breeding programmes would need to take this into account in order to deliver final products which can be easily eaten and consequently more in demand.

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DIFERENCIAS ENTRE CULTIVARES DE MANGO EN RELACION A SU FACILIDAD DE CONSUMO CON CUCHARA Y PRESENCIA DE FIBRA.

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RESUMEN - Se evalúan 43 cultivares de mango, incluyendo germoplasma de Florida, Hawaii, Israel, India, Brasil y Sudáfrica, respecto a la facilidad para ser comido con cuchara -lo que puede aumentar el consumo de esta fruta- y presencia de fibra. Se pone de manifiesto la relación entre ambas variables, aunque la escala aquí establecida en cuanto a fibra no es coincidente con las diversas descripciones realizadas para algunos cultivares en la bibliografía existente sobre mango. Se detectan claras diferencias entre cultivares en cuanto a su facilidad de consumo destacando positivamente los cultivares Glenn, Zill, Cogshall, Otts, Ah Ping, Isis y Pope. Por contra otros cultivares de gran importancia en diversos países y mercados como Tommy Atkins y Kensington no son especialmente aptos para su consumo con cuchara, mientras que Haden, Kent y Keitt de amplia difusión mundial se adaptan bien a esta técnica. Se sugiere la conveniencia de incluir la evaluación de la facilidad de consumo con cuchara en futuros trabajos de mejora.

