

# **A STANDARD FOR POTTING MIXES**

**KEVIN HANDRECK**

*CSIRO Division of Soils, Private Bag No. 2  
Glen Osmond, South Australia 5064*

Until now there have not been any regulations for either the quality or quantity of potting mixes sold in retail packs. That situation should change in Australia before the end of 1988 by the setting of a Standard through the Standards Association of Australia. The need for such a Standard was highlighted by Handreck (2), who found an incredibly wide range of properties amongst mixes sold in retail packs in Australia.

A draft of the Standard is about to be released (June 1, 1988) for a 3-month period of public comment. That comment will then be considered by the committee which has the task of developing the Standard, so some of the details given here are likely to have been modified before the Standard is finalized.

## **STEPS IN SETTING AN AUSTRALIAN STANDARD**

Australian Standards are set by the Standards Association of Australia, which is an independent body set up under Royal Charter in 1922. It cooperates with governments, industry and commerce in the preparation of Standards for a wide range of products and practices. An Australian Standard is a document containing a concise set of requirements, including, where appropriate, the procedures to be used to ensure compliance. Standards are set by consensus of committees of experts in the particular field. Compliance with an Australian Standard is voluntary, but it is in a manufacturer's interest to promote his products as conforming to the appropriate Standard.

Any individual, organization, or group of organizations can request the Association to prepare a Standard. The request for a Standard on potting mixes was made by CSIRO Division of Soils and the Australian Institute of Horticulture in December, 1986 and was supported by the Australian Nurserymen's Association.

Investigations by the Standards Association indicated that there was indeed a need for a Standard for potting mixes as sold in retail packs, so it formally agreed, in February 1987, to form a committee to prepare a Standard. The committee eventually formed contained representatives of CSIRO, the Australian Institute of Horticulture, the Allied Traders and Retailers groups of the Australian Nurserymen's Association, some state government departments and the Standards Association.

## **AIMS OF THE STANDARD FOR POTTING MIXES**

At the first committee meeting in August, 1987, the committee

considered and modified a draft prepared by myself, as chairman. It was decided that the Standard should apply primarily to mixes sold in retail packs, although it was realized that once a Standard existed, it could be used by nurserymen to specify bulk mixes. The primary aim of the Standard was to ensure that gardeners were not sold potting mixes which were toxic, had poor physical properties, were deficient in nutrients, had excessive nitrogen drawdown rates, or were sold in bags which did not state the volume of mix and/or had misleading instructions and descriptions of capabilities. It was recognized that the Standard would also protect reputable manufacturers from unfair competition from those who did not practice good quality control, used inferior materials, or smaller volumes than might be inferred from the use of pack identification numbers such as 'No. 3 pack'.

### THE MAIN FEATURES OF THE STANDARD

The following is a summary of the main parts of the draft of the Standard as it is at present. Again I stress that this is subject to change through the process of public comment. The Standard starts by outlining the scope of the Standard and by defining a number of terms to be used. The Standard will recognize a general-purpose mix and a premium grade mix. It will not be permissible to use the word Premium on a pack which claims that the contents conforms with the Standard UNLESS the mix is capable of giving good plant growth for at least a month without the addition of fertilizer. There are several categories of special mixes recognized, including those for orchids, cacti, acid-loving plants and those intolerant of even modest levels of phosphorus.

All packs conforming to the Standard are required to be marked with the volume of contents. Permitted volumes are 2.5, 5, 10, 15, 20, etc. litres. There is a standard procedure given for determining volume. Packs are required to give accurate information on the time when fertilizer must be used to ensure good plant growth. This will usually be at potting for general-purpose mixes and after about 1 month for Premium mixes.

The physical properties defined are air-filled porosity, total water-holding capacity and wettability. There is currently an interlaboratory study of different methods of determining air-filled porosity, involving 14 laboratories. A method will be chosen by participants before the end of the public comment period and included in the final Standard.

The central part of the Standard is contained in two tables which list ranges of concentrations of nutrient elements and other properties with which the mix must conform. Of course the concentrations of nutrient elements which can be extracted from a mix vary with the method of extraction, so it has been necessary to decide upon a method which is able to provide reliable information

about the levels of available nutrients in potting mixes. Many such methods are in use around the world (1, 4, 6), but for this Standard it has been decided to use 0.002 molar DTPA (diethylenetriaminepentacetic acid) in a ratio of 1 volume of mix to 1.5 volumes of extractant. This decision was based on the recommendation of a workshop attended by analysts from around Australia and held in Brisbane in March, 1988. While not all of the ranges of nutrients suggested at this stage are fully authenticated by rigorously controlled experiments, it was considered by participants in the workshop that existing information from local research (K. A. Handreck, personal communication) and from overseas (3, 5) was acceptable.

It was recognized that there were many advantages in adopting the same method throughout Australia. In the past, each laboratory has used its own methods and the ranges used for interpretation purposes have not necessarily been based on experimental data. Those laboratories interested in the analysis of potting mixes are now in the process of changing over to the agreed methods.

These requirements for concentrations of nutrients will ensure that mixes conforming to the Standard will have adequate base levels of all trace elements except molybdenum and all major elements except for nitrogen (but note the discussion below on nitrogen). There is at present no simple test for the concentration of available molybdenum in potting mixes. Authentic cases of molybdenum deficiency are very rare, so it is considered that not having a minimum requirements for molybdenum will rarely cause difficulties for users. The requirements for trace elements will be especially useful in overcoming the currently common problem of mixes not having adequate levels of available iron.

The Standard requires that most mixes have pH values in the range 5.3 to 6.5, with those sold as suitable for acid-loving plants required to be between 4.7 to 5.5. These requirements will eliminate mixes which are too alkaline for adequate iron supply or too acid for adequate calcium supply.

All mixes must be non-toxic for both the germination of seeds and the growth of roots. Again, a standard test is given.

The ability of the mix to supply nitrogen is a critical property, as nitrogen is the nutrient which most commonly first limits growth in soilless media. Most such media have a high proportion of wood wastes (bark, sawdust, shavings). Their continuing decomposition while in the bag or pot reduces the supply of soluble nitrogen to plant roots. There is currently no method for rapidly assessing the magnitude of this nitrogen drawdown effect. After many hours of deliberation, the committee preparing the Standard decided on the requirement that all mixes have a C/N ratio of no more than 150. This gives some guarantee that soluble nitrogen has been added to the mix. Combined with the requirement for an upper limit to

salinity and for freedom from toxicity, the C/N ratio means in practice that sawdusts, at least, must be composted before use in potting mixes. Thus, while a general-purpose mix may not have any soluble nitrogen at potting, the somewhat diminished nitrogen drawdown inherent in a C/N ratio of less than 150 and the instruction on the bag that fertilizer must be used from potting, should allow users to achieve good growth from the beginning. This is a considerable improvement on the current situation where many bags suggest that fertilizer is not needed for several weeks, yet the mix in the bag has little or no soluble nitrogen.

The requirement that Premium mixes must sustain good plant growth for at least one month means that there must be soluble nitrogen in the mix for that period. In practice, this requirement makes it essential that wood wastes be composted before use in Premium mixes, and sometimes slow-release fertilizers will need to be incorporated before bagging. Of course such requirements will mean that Premium mixes will sell for premium prices, but at least purchasers will get value for their money.

The committee is still somewhat unhappy about the requirements for nitrogen but, without further research it has concluded that it has gone as far as it is possible to go at present.

Unless there are last minute complications, it is anticipated that the "Standard for Potting Mixes" will be established before the end of 1988. But it will be some months after that before manufacturers clear stocks of old bags, arrange for registration with the Standards Association, embark on testing programs to ensure that their mixes conform to the Standard, and so on. During and after this time there will need to be a campaign to inform consumers of the improved situation, so that they begin to look for bags whose contents conform with the Standard. The mix manufacturers group of the Australian Nurserymen's Association has this in hand, but garden writers and talkback radio comperes will all be asked to cooperate in providing information. Hopefully, chain stores will begin to specify that their mixes conform to the Standard when calling for tenders.

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## TISSUE CULTURE OF INDUSTRIAL CROPS

SHIH-FOONG CHIN<sup>1</sup>

*Plantek International (Pte) Ltd*  
Singapore

I have chosen to speak on tea, coffee, oil palm, black pepper, and cocoa. Plantek has commercial tissue culture experience in all these crops. The economic importance of these plants to Asia and the Pacific region can be seen in Table 1 which shows that three quarters or more of world production of oil palm, tea, and black pepper come from this region.

**Table 1:** Some Important Industrial Crops in Asia and the Pacific Region.

Crop	Production (1000 t)		Export (million US\$)		
	World	Asia-Pacific	World	Asia-Pacific	
Coffee	5897	798 (14%)	9639	930 (10%)	
		Indonesia			327 (41%)
		India			170 (21%)
Tea	2247	1641 (73%)	1844	1230 (67%)	
		India			656 (40%)
		China			451 (27%)
Palm (oil)	7420	5642 (76%)	294	216 (74%)	
		Malaysia			4000 (71%)
		Indonesia			1148 (20%)
Black Pepper	163	122 (75%)	215	159 (74%)	
		Indonesia			45 (37%)
		India			28 (23%)
Cocoa	1739	155 (9%)	2051	188 (9%)	
		Malaysia			101 (65%)
		Papua			36 (23%)

Production data from: Regional Office for Asia and the Pacific (RAPA), FAO Bangkok, Publication: 1986/14;

Export data from: United Nations Yearbook of International Commodity Statistics, 1985.

<sup>1</sup> Senior Scientist