

This article was downloaded by:

On: 27 January 2011

Access details: *Access Details: Free Access*

Publisher *Taylor & Francis*

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Organic Preparations and Procedures International

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t902189982>

### SYNTHESIS OF ALKALI AND ALKALINE-EARTH METAL ADDUCTS OF SUCROSE

Laurence Poncini<sup>a</sup>; Vijaya Chand<sup>a</sup>

<sup>a</sup> Department of Chemistry, School of Natural Resources, University of the South Pacific, Suva, Fiji

**To cite this Article** Poncini, Laurence and Chand, Vijaya(1983) 'SYNTHESIS OF ALKALI AND ALKALINE-EARTH METAL ADDUCTS OF SUCROSE', *Organic Preparations and Procedures International*, 15: 1, 69 – 70

**To link to this Article:** DOI: 10.1080/00304948309355434

**URL:** <http://dx.doi.org/10.1080/00304948309355434>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

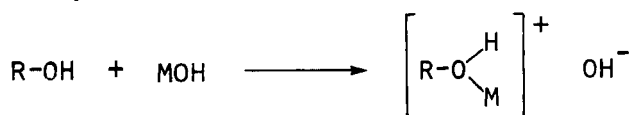
The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

## SYNTHESIS OF ALKALI AND ALKALINE-EARTH METAL ADDUCTS OF SUCROSE

Submitted by Laurence Poncini\* and Vijaya Chand  
(8/23/82)

Department of Chemistry  
School of Natural Resources  
University of the South Pacific  
SUVA, FIJI

Alkali and alkaline-earth metal adducts of sucrose have been known since last century.<sup>1</sup> However, very few procedures have appeared whereby these adducts could be isolated free from contamination by the starting materials. The procedures reported in the literature involve either aqueous,<sup>2</sup> alcoholic<sup>3</sup> or liquid ammonia<sup>4</sup> systems. All these procedures employ sucrose in excess and the resulting metal adducts are generally obtained in low yields and are relatively impure. In our hands, these aforementioned methods gave yields in the range of 5-25% for the adducts reported here. However, if an excess of the metal salt (in this case the metal hydroxide) is used, very high yields of the adducts are obtained. For example, for the sodium and lithium adducts the yields were quantitative. The products are exceedingly deliquescent and appear to be simple addition compounds whose formation may be depicted as follows.



## EXPERIMENTAL

All reagents were analytical grade and dry distilled solvents were used. Ether was sodium-dried. All reactions were carried out in a glove bag under an atmosphere of dry nitrogen. Analyses of the complexes were carried out as previously reported,<sup>3</sup> and found to be in agreement with results reported earlier for 1:1 metal complexes.

To a solution of sucrose, (0.5 g, 1.46 mM) in water (0.5 ml), was added dropwise with stirring to an ethanolic MOH (M = Na, K) solution (3.5 ml, 1 M). The white precipitate which formed (1-2 hrs) turned to a viscous semi-opaque liquid phase upon standing.<sup>5</sup> The upper layer was decanted

cautiously and the viscous liquid phase washed well with anhydrous ethanol (2 x 4 ml), then ether. The product, a fine white amorphous glass, was obtained after drying under vacuum over  $P_2O_5$  at 2 mm and  $25^\circ$  for 20 hrs. The yields for the sodium and potassium adducts ( $[M(\text{sucrose})] \text{OH} \cdot H_2O$ ) were 97-99% and 93-95% respectively. (Found: Na, 5.8; sucrose, 86.1.

$C_{12}H_{25}NaO_{13}$  requires Na, 5.7; sucrose 85.7%; found: K, 9.6; sucrose, 83.0.

$C_{12}H_{25}KO_{13}$  requires K, 9.4; sucrose 82.0%).

The procedure was identical for the lithium hydroxide adduct  $[Li(\text{sucrose})] \text{OH} \cdot 2H_2O$ , except that a saturated alcoholic solution of the hydroxide was used. Yield 95-99%. (Found: Li, 1.8; sucrose, 86.1.  $C_{12}H_{27}LiO_{14}$  requires Li, 1.8; sucrose 85.1%).

For the calcium adduct,  $[Ca(\text{sucrose})_2](OH)_2 \cdot x H_2O$ , a cold ( $2^\circ$ ) saturated aqueous solution of the metal hydroxide was employed. Because of the extreme deliquescent nature of this complex (over fresh  $P_2O_5$  it remained moist after 56 hrs. drying and could only be dried by freeze drying) water analysis gave x as 1-3. Yield 80% (as anhydrous adduct). (Found: Ca, 5.3; sucrose, 99.1.  $C_{24}H_{48}CaO_{25}$  requires Ca, 5.3; sucrose 89.8%.

Acknowledgements.— Financial assistance by the USPRC Grant No. R-158 is gratefully acknowledged by one of us (LP). Our thanks are due to Mr. Vas Deo for construction of the glove bag facilities and to Dr. F. Wimmer for assistance with the manuscript.

#### REFERENCES

1. L. Poncini, *Int. Sugar J.*, 81, 36 (1979).
2. N. Roy and A. K. Mitra, *Carbohydr. Res.*, 24, 175 (1972); N. Roy and A. K. Mitra, *ibid.*, 24, 180 (1972).
3. L. Poncini, *Ind. J. Chem.*, 19, 1035 (1980); J. A. Rendleman, *J. Org. Chem.*, 31, 1845 (1966).
4. P. C. Arni, W. A. P. Black, E. T. Dewar, J. C. Patterson and D. Ruth-erford, *J. Appl. Chem.*, 9, 186 (1959).
5. Centrifugation which is employed by some workers,<sup>2</sup> resulted in compaction of the product thus preventing successful washing to free it of unreacted reagents.