

## BRIEF COMMUNICATIONS

WATER-SOLUBLE POLYSACCHARIDES  
OF CULTIVATED *Narcissus* VARIETIESM. Kh. Malikova, D. A. Rakhimov,  
and K. S. Zhaunbaeva

UDC 547.917

It has been previously noted that water-soluble polysaccharides (WSPS), glucomannans (GM), dominate in bulbs of *Narcissus tazetta* and *N. poeticus* L. [1]. We studied WSPS from five varieties of narcissus bulbs to determine the distribution of GM in the *Narcissus* genus. These were Tazetta (I), Double (II), Small-cupped (III), Trumpet (IV), and Queen (V) that were cultivated at the Scientific-Industrial Center "Botanika" of the AS RUz.

Ground and air-dried raw material was processed with ethanol (82°) on a boiling-water bath to isolate the alcohol-soluble sugars. These were filtered, evaporated, and analyzed by paper chromatography [1]. Fructose, mannose, glucose, galactose, saccharose, and fructooligosaccharides were found. After the alcohol-soluble sugars were removed, the raw material was extracted with water (1:5, 1:3) at room temperature to isolate WSPS by subsequent precipitation with ethanol. The WSPS content and monosaccharide composition of the hydrolysates are listed in Table 1.

The amount of WSPS in the bulbs varies depending on the variety from 1.2 (Small-cupped) to 6.8% (Tazetta). The WSPS samples are amorphous powders that are soluble in water and alkali solutions. They do not contain starch according to a negative test with iodine. The WSPS form viscous aqueous solutions with relative viscosity from 12 to 80. Addition of Fehling solution produces a precipitate, which is characteristic of acetylated GM and mannans. The samples were completely acid hydrolyzed. Paper chromatography and GC as the aldononitrile acetates [2] detected mannose, glucose, and traces of galactose. The ratio of structural mannose and glucose in WSPS differs, e.g., 8.2:1 (Tazetta) and 4.5:1 (Small-cupped). Mannose dominates quantitatively.

Therefore, the isolated WSPS are glucomannans. The IR spectra of all samples exhibit an absorption spectrum typical of  $\beta$ -1 $\rightarrow$ 4 mannans and GM. The low-frequency part of the spectrum contains three absorption bands: 815, 870, and 900  $\text{cm}^{-1}$ , which are consistent with the presence of a  $\beta$ -1 $\rightarrow$ 4 mannopyranoside chain. Furthermore, absorption bands at 1740 and 1250  $\text{cm}^{-1}$  are characteristic of acetyls. These bands are absent in the product obtained by purification using a copper complex.

Thus, the alcohol-soluble sugars are hexoses, saccharose, and fructooligosaccharides. The naturally acetylated GM are metabolites of the studied varieties. They differ in viscosity and quantitative ratio of the monomers.

TABLE 1. Content and Monosaccharide Composition of WSPS Hydrolysates from Cultivated *Narcissus* Varieties

Plant	WSPS yield, %	$\eta_{\text{rel}}$ (1%, water)	Sugar ratio
			Glc : Man
I. <i>Tazetta Narcissi</i> L.	6.8	11.0	1:8.2
II. <i>Double Narcissi</i> L.	6.1	80.6	1:5.5
III. <i>Small-cupped Narcissi</i> L.	3.0	20.0	1:4.5
IV. <i>Trumpet Narcissi</i> L.	4.2	35.0	1:7.6
V. <i>Small-cupped Queen Narcissi</i> L.	1.2	12.0	1:6

S. Yu. Yunusov Institute of the Chemistry of Plant Substances, Tashkent, fax (99871) 120 64 75. Translated from Khimiya Prirodnykh Soedinenii, No. 2, p. 158, March-April, 2002. Original article submitted February 4, 2002.

## REFERENCES

1. D. A. Rakhimov and K. S. Zhaunbaeva, *Khim. Prir. Soedin.*, 277 (1997).
2. D. G. Lance and I. K. Jones, *Can. J. Chem.*, **45**, 1965 (1967).