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Isolation and Partial Characterization of Heterophyllin, a New Lectin from *Artocarpus heterophyllus* Seeds

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SUMMARY. Four lectins present in the seeds of jackfruit (*Artocarpus heterophyllus*, Lamk.) were isolated by employing solubility criteria and by guar gum, chitin and agarose-D-mannose affinity chromatography. One of the two lectins that bound to guar gum behaved as an albumin (AII) and was identified as the well known jacalin lectin by its sugar specificity, electrophoretic mobility and N-terminal amino acid sequence. The other guar gum binding lectin (GII) had the same above properties but was distinguished by its globulin nature. An albumin lectin (AIMII) which did not bind to guar gum was isolated due to its association with agarose-D-mannose and was identified as the lectin artocarpin. A newly identified lectin was isolated from the globulin fraction through its association with chitin. Chitin binding of the lectin was competed by N-acetyl-D-glucosamine. The new lectin designated heterophyllin, with a pI value of 6.5, contained three subunits of molecular weight 31.4, 18.7 and 16.3 kDa as estimated by SDS-PAGE.

RESUMEN. "Aislamiento y Caracterización Parcial de Heterofilina, una Nueva Lectina de Semillas de *Artocarpus heterophyllus*". Fueron aisladas cuatro (4) lectinas presentes en las semillas de *Artocarpus heterophyllus* Lamk. ("jaca") mediante el uso de criterios de solubilidad y varias cromatografias de afinidad: goma de guar, quitina y agarosa-D-manosa. De las dos lectinas que tuvieron afinidad a la goma de guar, una se comportó como albúmina (AII) y fue identificada como la bien conocida lectina "jacalina" por su especificidad al azúcar, movilidad electroforética y secuencia de aminoácidos en el extremo N-terminal. La otra lectina (GII) que se une a la goma de guar tiene las mismas propiedades anteriormente mencionadas, a excepción de su naturaleza globulínica. La lectina albumínica (AIMII), la cual no se unió a la goma de guar, fue aislada gracias a su asociación con agarosa-D-manosa y fue identificada como la lectina artocarpina previamente descripta. Una nueva lectina fue aislada de la fracción globulínica a través de su asociación con quitina. La unión de esta lectina com a quitina fue inhibida por N-acetil-D-glucosamina. La nueva lectina, designada heterofilina, con un pI de 6,5, contiene tres subunidades de pesos moleculares 31,4, 18,7 y 16,3 kDa, según se ha determinado por SDS-PAGE.

INTRODUCTION

Seeds of jackfruit (*Artocarpus heterophyllus*, Lamk. or *Artocarpus integrifolia*, Linn., Moraceae) are known since the late seventies to contain a lectin, namely jacalin, which is a glycoprotein Galβ (1→3) GalNAc binding lectin [1, 2]. Lately, a mannose binding lectin has been described from these seeds [3, 4] and more recent studies have pointed out to the existence of multiple jacalin isolectins [5]. Apart from crystallographic data [6] not much information on molecular structures and biological properties is known for these lectins.

Immunologists have been interested in jacalin for several reasons: it has been reported that jackfruit seed crude extracts show mitogenic properties towards human lymphocytes [7], increase the production of interferon-gamma by human-T-cells [8] and produce an enhanced IgE response [9] in mice initially fed and subsequently immunized with the same extract. Lately, jacalin has been shown to bind to IgA and to IgD [10, 11] and to inhibit C1 inhibitor [12]. More recently, jacalin has been reported to induce CD4-T lymphocyte proliferation with no effect on CD8-T lymphocytes in humans [13]. Furthermore, jacalin has been shown to inhibit human immunodeficiency virus [14].

KEY WORDS: Albumin, *Artocarpus heterophyllus*, Globulin, Heterophyllin, Jacalin, Lectins.
PALABRAS CLAVE: Albúmina, *Artocarpus heterophyllus*, Globulina, Heterofilina, Jacalina, Lectina.

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