

# 3<sup>RD</sup> GLOBAL FOOD SECURITY, FOOD SAFETY & SUSTAINABILITY CONFERENCE

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## Morphological, rheological and functional properties of starches isolated from pigmented, non pigmented and improved rice varieties

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**Objective:** Morphological, rheological and functional properties of starches isolated from pigmented, non pigmented and improved rice varieties.

**Methodology:** Pasting properties, rheological, X-ray, SEM and functional properties of starches isolated from pigmented, non pigmented and improved rice varieties.

**Results & Discussion:** Starches isolated from different improved rice (IRS), pigmented (PRS) and non-pigmented (NPRS) traditional rice varieties were investigated for their molecular structure and physico-chemical properties including blue value, morphology, crystallinity, functional, thermal, pasting and rheological properties. Significant differences were detected in physico-chemical and morphological properties of rice starches. The blue value results revealed that IC611169 is waxy rice; IC568266 and IC274376 are low-amylose while PB1121 and PR127 are considered as high amylose rice varieties. BV, PT, PV, SB and FV were higher for IRS as compared to NPRS and PRS. IRS showed the lower swelling power as compared to NPRS and PRS. Storage modulus ( $G'$  Peak) and loss modulus ( $G''$  Peak) of starches were higher for IRS as compared to PRS and NPRS. IRS showed higher percentage of large and small starch granules had more compact packing structure as compared to PRS and NPRS. Morphology of rice starch granules exhibited polyhedral edges with an irregular shape. XRD patterns of rice starches exhibited A-type crystalline patterns with peaks at  $2\theta=15.1^\circ$ ,  $17.1^\circ$ ,  $18.2^\circ$  and  $23.0^\circ$ . IRS showed lower crystallinity as compared to NPRS and PRS. Waxy rice starches shown highest enthalpy with lowest gelatinization temperatures. IRS showed the higher gelatinization temperatures ( $T_o$ ,  $T_p$  and  $T_c$ ) as compared to NPRS and PRS. The enthalpy value of different rice starches followed the order:  $IRS < PRS < NPRS$ . The proportion of starch granules (0–5  $\mu\text{m}$ ), (5–10  $\mu\text{m}$ ) and (10–20  $\mu\text{m}$ ) size was higher in IRS as compared to PRS and NPRS.

**Conclusion:** The present study provides knowledge for the utilization of starches isolated from NPRS, PRS and IRS rice varieties grown in North India that would be relevant for both domestic and industrial applications.

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