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(54) Title: MULTI-LAYERED TISSUE PAPER WEB COMPRISING BIODEGRADABLE CHEMICAL SOFTENING COMPOSITIONS AND BINDER MATERIALS AND PROCESS FOR MAKING THE SAME

(57) Abstract

Multi-layered tissue paper webs comprising biodegradable chemical softener compositions and binder materials are disclosed. The multi-layered tissue webs are useful in the manufacture of soft, absorbent paper products such as facial tissues and/or toilet tissues. The multi-layered tissue paper

products contain a biodegradable chemical softening composition, preferably comprising a mixture of an ester-functional quaternary ammonium compound and a polyhydroxy compound. Preferred ester-functional quaternary ammonium compounds include diester dialkyl dimethyl ammonium salts such as diester di(tough hardened)tallow dimethyl ammonium chloride, diester di(hydrogenated)tallow dimethyl ammonium chloride. Preferred polyhydroxy compounds are selected from the group consisting of glycerol, sorbitols, polyglycerols having a weight average molecular weight of from about 150 to about 800, polyoxyethylene glycols and polyoxypropylene glycols having a weight average molecular weight of from about 200 to 4,000. The multi-layered tissue paper webs also contain an effective amount of binder materials to control linting and/or to offset the loss in tensile strength, if any, resulting from the use of the chemical softening compositions. The binder materials are selected from the various wet and dry strength additives, and retention aids used in the paper making art. Preferably, the majority of the biodegradable chemical softening compositions will be disposed on the outer layers of the multi-layered tissue paper products where they are most effective. The binder materials are typically dispersed throughout the multi-layered product to control linting. In other words, the chemical softening compositions and the binder materials can be selectively distributed within the multi-layered tissue paper web to enhance the softness, absorbency, and/or lint resistance of a particular layer or ply.

